Check Sheet

Company Name: MONSANTO CHEMICAL COMPANY
Permit Number: AC 17-127871, 127872
PSD Number:
Permit Engineer:

Application:

- ☑ Initial Application
  - ☑ Incompleteness Letters
  - ☑ Responses
  - ☐ Waiver of Department Action
  - ☐ Department Response
  - ☐ Other

Cross References:

- ☐
- ☐
- ☐

127872 - Nylon Pyrolysis furnace

127871 - ammonia handling and storage Tank Flare

Intent:

- ☑ Intent to Issue
- ☑ Notice of Intent to Issue
- ☑ Technical Evaluation
- ☒ BACT or LAER Determination
- ☑ Unsigned Permit

  Correspondence with:
  - ☐ EPA
  - ☐ Park Services
  - ☐ Other
- ☑ Proof of Publication
  - ☐ Petitions - (Related to extensions, hearings, etc.)
  - ☐ Waiver of Department Action
  - ☐ Other

Final Determination:

- ☑ Final Determination
- ☑ Signed Permit
- ☒ BACT or LAER Determination
  - ☐ Other

Post Permit Correspondence:

- ☑ Extensions/Amendments/Modifications
- ☐ Other

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.
1. ☐ Show to whom delivered, date, and addressee's address. *(Extra charge)*
2. ☐ Restricted Delivery *(Extra charge)*

3. Article Addressed to:

Mr. W. J. Board
Monsanto Chemical Company
P. O. Box 12830
Pensacola, FL 32575-2830

4. Article Number
P 938 762 632

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Address
X

6. Signature — Agent
X Bob Pulsey

7. Date of Delivery

8. Addressee's Address (ONLY if requested and fee paid)

PENSACOLA FL JUL 31 1989 USPO

PS Form **3811**, Mar. 1988 ★ U.S.G.P.O. 1988-212-865 **DOMESTIC RETURN RECEIPT**

P 938 762 632

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to Mr. W. J. Board, Monsanto	
Street and No. P.O. Box 12830 Chem. Co.	
P.O., State and ZIP Code Pensacola, FL 32575-2830	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Mailed: 7-28-89 Permit: AC 17-127871	

PS Form 3800, June 1985

Florida Department of Environmental Regulation

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

Bob Martinez, Governor | Dale Twachtmann, Secretary | John Shearer, Assistant Secretary

July 26, 1989

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. W. J. Board
General Superintendent
Government Affairs/Environmental
Health & Safety
Monsanto Chemical Company
Post Office Box 12830
Pensacola, Florida 32575-2830

Dear Mr. Board:

Re: Amendment of Permit No. AC 17-127871

The Department is in receipt of Mr. Bruce P. McLeod's May 18, 1989, letter requesting your permit to construct a cyrogenic ammonia handling and storage tank flare system be extended. The purpose of the extension is to allow time to start-up the facility, conduct the compliance tests, and submit an application for permit to operate. This request is acceptable and the expiration date of permit No. AC 17-127871 is changed from January 1, 1990, to January 1, 1991.

A copy of this letter must be attached to the referenced construction permit and shall become a part of that permit.

Sincerely,

John D. Shearer for

Dale Twachtmann
Secretary

DT/kt

cc: E. Middleswart, NW District
B. McLeod, P.E.

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee	
To:	Location:
To:	Location:
To:	Location:
From:	Date:

Interoffice Memorandum

TO: Dale Twachtmann

FROM: Steve Smallwood

DATE: July 26, 1989

SUBJ: Amendment of a Construction Permit
Monsanto Chemical Company

Attached for your approval and signature is a letter that will extend the expiration date of a permit to construct a cyrogenic ammonia handling and storage tank flare system at Monsanto Chemical Company's plant located north of Pensacola, Escambia County, Florida. The extension will allow more time for the permittee to startup the facility, conduct the compliance tests, and submit the application for permit to operate.

The request is not controversial. I recommend your approval and signature.

SS/WH/s

attachment

PM
5-15-89
Gonzalez, CL

file copy

Monsanto

MONSANTO CHEMICAL COMPANY
P. O. Box 12830
Pensacola, Florida 32575-2830
Phone: (904) 968-7000

RECEIVED
MAY 19 1989
DER - BAQM

May 18, 1989

Mr. Clair H. Fancy, P.E.
Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Fancy:

The Department is requested to extend the term of Construction Permit AC17-127871, Cryogenic Ammonia Handling and Storage Tank Flare System, to January 1, 1991. The current permit term will not allow sufficient time to start-up the facility, conduct the required compliance tests and submit the certificate of completion ninety days prior to permit expiration. The twelve months construction permit extension will allow adequate time to complete construction and fulfill the construction permit conditions.

Monsanto has actively pursued construction of this facility. A continuous program of on-site construction activity is anticipated throughout the remainder of the project. If there are any questions concerning this construction permit extension request, please contact me at 904-968-8725.

Sincerely,

Bruce P McLeod

Bruce P. McLeod
Senior Specialist
Environmental Control

c: B. E. Nelson/477, Monsanto, Pensacola
J. T. McKean/601, Monsanto, Pensacola

copied: [illegible]
[illegible], NW Dist
CHF/BT

1564.BPM

Monsanto

MONSANTO CHEMICAL COMPANY
P. O. Box 12830
Pensacola, Florida 32575

MR CLAIR FANCY
DEPARTMENT OF ENVIRONMENTAL REGULATION
TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE FL 32399-2400

P 408 530 532

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to W. J. Board	
Street and No. Monsanto Company P.O. Box 12830	
P.O., State and ZIP Code Pensacola, FL 32575	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 3/13/87	

PS Form 3800, Feb. 1982

PS Form 3811, July 1983 447-845

SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☒ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:
W. J. Board
Monsanto Company
P.O. Box 12830
Pensacola, FL 32575

4. Type of Service:	Article Number
☐ Registered ☐ Insured ☒ Certified ☐ COD ☐ Express Mail	P 408 530 532

Always obtain signature of addressee or agent and **DATE DELIVERED.**

5. Signature – Addressee
X

6. Signature – Agent
X

7. Date of Delivery
MAR 16 1987 3-16-87

8. Addressee's Address *(ONLY if requested and fee paid)*

DOMESTIC RETURN RECEIPT

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMITS

Mr. W. J. Board
S.E. Regional Director
Monsanto Company
Post Office Box 12830
Pensacola, Florida 32575

March 13, 1987

Enclosed are Permit Numbers AC 17-127871 and -127872 to Monsanto Company which authorizes the construction of a cryogenic ammonia handling and storage tank flare system and a nylon pyrolysis furnace with afterburner, respectively, at your existing site of the Monsanto Fibers and Intermediates Company in Escambia County, Florida. These permits are issued pursuant to Section 403, Florida Statutes.

Any Party to these permits has the right to seek judicial review of the permits pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date these permits are filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

Copies furnished to:

Bruce P. McLeod, P.E.
Jack Preece

CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF PERMITS and all copies were mailed before the close of business on March 13, 1987 to the listed persons.

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

R Bruce Mitchell — 3/13/87
Clerk — Date

Final Determination

Monsanto Company
Pensacola, Florida
Escambia County

Projects:	Permit Numbers:
Nylon Pyrolysis Furnace	AC 17-127872
Cyrogenic Ammonia Handling and Storage Tank Flare System	AC 17-127871

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

March 10, 1987

Final Determination

The Technical Evaluation and Preliminary Determination for Monsanto Company's proposed nylon pyrolysis furnace (AC 17-127872) and cryogenic ammonia handling and storage tank flare system (AC 17-127871) were distributed on January 27, 1987. Copies of the evaluations were available for public inspection at the department's offices in Pensacola and Tallahassee. The Notice of Proposed Agency Action on the permit applications was published in the Pensacola News Journal on February 4, 1987.

No comments were submitted on the department's intent to issue the permits. The final action of the department will be to issue the permits as proposed in the Technical Evaluation and Preliminary Determination.

PENSACOLA
News Journal

PUBLISHED DAILY
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

RECEIVED
FEB 17 1987
ENVIRONMENTAL CONTROL

State of Florida,
County of Escambia.

Before the undersigned authority personally appeared J. Diane Deal

who on oath says that she is Legal Advertising Supervisor of the Pensacola News Journal, a daily newspaper published at Pensacola in Escambia County, Florida; with general circulation in Escambia, Santa Rosa, Okaloosa and Walton Counties that the attached copy of advertisement, being a NOTICE in the matter of

Intent

in the _____ Court,

was published in said newspaper in the issues of

Feb. 4, 1987

Affiant further say that the said The Pensacola News Journal is a newspaper published at Pensacola, in said Escambia County, Florida, and that the said newspaper has heretofore been continuously published in said Escambia County, Florida, each day and has been entered as second class mail matter at the post office in Pensacola, in said Escambia County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

J. Diane Deal

Sworn to and subscribed before me this 16th day of Feb. A.D., 1987

Lucy J. Foster
NOTARY PUBLIC.

My Commission Expires Oct. 16, 1987

LEGAL NOTICE

STATE OF FLORIDA
DEPARTMENT OF
ENVIRONMENTAL
REGULATION
NOTICE OF INTENT

The Department gives notice of its intent to issue two permits to Monsanto Company to construct 1) a controlled pyrolysis cleaning furnace with afterburner and 2) a cryogenic ammoniz handling and storage tank flare system at the applicant's existing facility near the intersection of State Road 292 and 297 in Escambia County, Florida. A determination of best available control technology (BACT) was not required.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative determination (hearing) in accordance with Section 120.57 Florida Sattutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administration Code, and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Failure to file a petition within this time period constitutes a waiver of any right such person has to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

If a petition is field, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, person who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Rule 28-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing office if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009, Apalachee Parkway, Tallahassee, Florida 32301. If no hearing office has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

The application is available for public inspection during normal business hours, 8:00 A.M. to 5:00 P.M., Monday through Friday, except legal holidays, at:

Department of
Environmental Regulation
Bureau of Air
Quality Management
2600 Blair Stone Road
Tallahassee, Florida,
32399-2400
Department of
Environmental
Regulation
Northwest District
160 Governmental Center
Pensacola, Florida 32501

Any person may send written comments on the proposed action to Mr. Bill Thomas at the Department's Tallahassee address. All comments mailed within 14 days of the publication of this notice will be considered in the Department's final determination.

Legal No. 32436 1T
Feb. 4, 1987

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

PERMITTEE:
Monsanto Company
P. O. Box 12830
Pensacola, Florida 32575

Permit Number: AC 17-127872
Expiration Date: January 1, 1989
County: Escambia
Latitude/Longitude: 30° 35' 59" N/ 87° 14' 50" W
Project: Nylon Polymerization Furnace

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the construction of an IGG88 Controlled Pyrolysis Cleaning Furnace at the existing facility located in Escambia County, north of Pensacola, Florida, at the intersection of State Roads 292 and 297.

Construction shall be in accordance with the permit application and plan, documents, amendments, and drawings submitted, except as noted on pages 5 and 6 of the Specific Conditions.

Attachments are as follows:

1. Application to construct air pollution sources, DER Form 17-1.202(1), which was received on November 24, 1986, by FDER Bureau of Air Quality Management.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD).
( ) Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. Only nylon is to be pyrolyzed in this incinerator.

2. The annual amount of nylon pyrolyzed shall not exceed 10,000 pounds.

3. Continuous operation of the nylon pyrolysis furnace is approved (8,760 hours annually).

4. Visible emissions (VE) shall not exceed 5% opacity during any 6 minute period. Compliance with this standard shall be determined by EPA Method 9, Visual Determination of the Opacity of Emissions from

PERMITTEE:
Monsanto Company

Permit Number: AC 17-127872
Expiration Date: January 1, 1989

SPECIFIC CONDITIONS:

Stationary Sources as described in Appendix A of 40 CFR 60. If the visible emissions exceed 5% opacity, a Method 5 test, Determination of Particulate Emissions from Stationary Sources, may be required by the Department. The district office shall be notified 15 days prior to any compliance test.

5. Objectionable odors from the furnace shall not be allowed off plant property.

6. Afterburner temperature must exceed 1400° F when the furnace is in operation and the temperature shall be recorded a minimum of once per hour of operation.

7. Construction shall reasonably conform to the plans submitted in the application. The applicant shall report any delay in construction of this project to the Department's Northwest District office.

8. The permittee shall submit a complete application for a permit to operate this incinerator, which must include an emissions test report, to the DER Northwest District office at least 90 days prior to the expiration date of this construction permit. The permittee may continue to operate this source, if it is in compliance with all conditions of this construction permit, until its expiration date.

9. Upon obtaining a permit to operate, the permittee will be required to submit annual operation reports to the DER Northwest District office which shall include, as a minimum: the actual hours of operation; total tonnage of nylon material input; and recorded of temperatures of the afterburner; and an emissions test for visible emissions as specified in Specific Condition No. 4.

Issued this 11 day of March 1987

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

Dale Twachtmann

Dale Twachtmann, Secretary

_____pages attached

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

PERMITTEE:
Monsanto Company
P. O. Box 12830
Pensacola, Florida 32575

Permit Number: AC 17-127871
Expiration Date: January 1, 1990
County: Escambia
Latitude/Longitude: 30° 35' 59" N
87° 14' 50" W
Project: Cryogenic Ammonia Handling and Storage Tank Flare System

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the construction of an ammonia storage and handling system with emissions controlled by a 95 percent efficient utility flare (6" dia, 50' ht.) that uses natural gas fuel. The system will be located at the permittee's existing facility in Escambia County that is near the intersection of State Roads 292 and 297.

Construction shall be in accordance with the permit application and plan, documents, amendments, and drawings submitted, except as noted on pages 5 and 6 of the Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), which was received on November 24, 1986, by FDER Bureau of Air Quality Management.

2. Monsanto Company's December 19, 1986, letter received by BAQM on December 22, 1986.

PERMITTEE:
Monsanto Company

Permit Number: AC 17-127871
Expiration Date: January 1, 1990

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD).
( ) Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. Ammonia vented to the flare shall not exceed 1,000 lbs/hr and 60 TPY without prior approval of the Department (Bureau of Air Quality Management).

2. The ammonia system may be used continuously, 8760 hrs/yr, if the flare is maintained and operated properly.

3. Visible emissions from the flare, as determined by DER Method 9 described in Rule 17-2.700(6)(a)9, FAC, shall not exceed 5% opacity.

4. The system shall not cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor (Rule 17-2.620(2), FAC).

PERMITTEE:
Monsanto Company

Permit Number: AC 17-127871
Expiration Date: January 1, 1990

SPECIFIC CONDITIONS:

5. Construction shall reasonably conform to the plans and specifications submitted in the application. The applicant shall report any delay in construction and completion of this project to the Department's Northwest District office.

6. The permittee shall submit a complete application for a permit to operate the ammonia storage and handling system, which must include a visible emissions test report and a manufacturer's guarantee of destruction efficiency of the flare selected by the permittee, to the DER Northwest District office at least 90 days prior to the expiration of this construction permit. The permittee may continue to operate this source, if it is in compliance with all conditions of this construction permit, until its expiration date.

7. Upon obtaining a permit to operate, the permittee will be required to submit annual operation reports to the DER Northwest District office which shall include, as a minimum: a recent visible emissions test report and an engineering estimate of the quantity of ammonia vented to the flare and the emissions from the flare (TPY) during the preceding 12 months.

Issued this 11 day of March 1987

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

Dale Twachtmann

Dale Twachtmann, Secretary

____ pages attached

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

Clair

FOR ROUTING TO OTHER THAN THE ADDRESSEE

To: _____ LOC'TN: _____
To: _____ LOC'TN: _____
To: _____ LOC'TN: _____
FROM: _____ DATE: _____

TO: Dale Twachtmann

THRU: Howard Rhodes

FROM: Clair Fancy 7 CALL when signed 8-1344

DATE: March 10, 1987

SUBJ: Approval of Air Construction Permits

Attached for your approval and signature are two air construction permits to Monsanto Company to authorize the construction of a nylon pyrolysis furnace and cryogenic ammonia handling and storage tank flare system at the applicant's existing facility in Pensacola, Escambia County, Florida. There have been no controversies regarding these permits.

Day 90, after which the permits would be issued by default, is March 31, 1987.

The bureau recommends your approval and signature.

CF/ks

Attachment

PM
2-19-87
Pensacola, FL

Monsanto

MONSANTO CHEMICAL COMPANY
P. O. Box 12830
Pensacola, Florida 32575
Phone: (904) 968-7000

February 17, 1987

Mr. C.H. Fancy
Deputy Chief
Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

Dear Mr. Fancy:

Please find enclosed, proof of publication of the Notice of Proposed Agency Action for two permits 1) a controlled pyrolysis cleaning furnace with afterburner (DER file no. AC 17-127872) and 2) a cryogenic ammonia handling and storage tank flare system (DER file no. AC 17-127871).

If you have any questions, please contact me at (904) 968-8725.

Sincerely,

Bruce P. McLeod

Bruce P. McLeod
Senior Specialist
Environmental Control

cc. J.G. Wiley, Monsanto

675.BPM

PENSACOLA
News Journal

PUBLISHED DAILY
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

RECEIVED
FEB 17 1987
ENVIRONMENTAL CONTROL

State of Florida,
County of Escambia.

Before the undersigned authority personally appeared J. Diane Deal who on oath says that she is Legal Advertising Supervisor of the Pensacola News Journal, a daily newspaper published at Pensacola in Escambia County, Florida; with general circulation in Escambia, Santa Rosa, Okaloosa and Walton Counties that the attached copy of advertisement, being a NOTICE in the matter of

Intent

in the _____ Court,

was published in said newspaper in the issues of

Feb. 4, 1987

Affiant further say that the said The Pensacola News Journal is a newspaper published at Pensacola, in said Escambia County, Florida, and that the said newspaper has heretofore been continuously published in said Escambia County, Florida, each day and has been entered as second class mail matter at the post office in Pensacola, in said Escambia County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

J. Diane Deal

Sworn to and subscribed before me this 16th day of Feb. A.D., 1987

Lucy J. Fenton
NOTARY PUBLIC.

My Commission Expires Oct. 16, 1987

LEGAL NOTICE

STATE OF FLORIDA
DEPARTMENT OF
ENVIRONMENTAL
REGULATION
NOTICE OF INTENT

The Department gives notice of its intent to issue two permits to Monsanto Company to construct 1) a controlled pyrolysis cleaning furnace with afterburner and 2) a cryogenic ammoniz handling and storage tank flare system at the applicant's existing facility near the intersection of State Road 292 and 297 in Escambia County, Florida. A determination of best available control technology (BACT) was not required.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative determination (hearing) in accordance with Section 120.57 Florida Sattutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administration Code, and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Failure to file a petition within this time period constitutes a waiver of any right such person has to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

If a petition is field, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, person who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Rule 28-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing office if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009, Apalachee Parkway, Tallahassee, Florida 32301. If no hearing office has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

The application is available for public inspection during normal business hours, 8:00 A.M. to 5:00 P.M., Monday through Friday, except legal holidays, at:

Department of
Environmental Regulation
Bureau of Air
Quality Management
2600 Blair Stone Road
Tallahassee, Florida,
32399-2400
Department of
Environmental
Regulation
Northwest District
160 Governmental Center
Pensacola, Florida 32501

Any person may send written comments on the proposed action to Mr. Bill Thomas at the Department's Tallahassee address. All comments mailed within 14 days of the publication of this notice will be considered in the Department's final determination.

Legal No. 32436 1T
Feb. 4, 1987

P 408 531 144

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. W. J. Board	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date	

1/27/87

PS Form 3800, Feb. 1982

PS Form 3811, July 1983 447-845

● SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:

Mr. W. J. Board
Monsanto Company
Post Office Box 12830
Pensacola, FL 32575

4. Type of Service:

☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number

P 408 531 144

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee

X

6. Signature – Agent

X

7. Date of Delivery

8. Addressee's Address *(ONLY if requested and fee paid)*

DOMESTIC RETURN RECEIPT

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

January 23, 1987

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. W. J. Board
Monsanto Company
Post Office Box 12830
Pensacola, Florida 32575

Dear Mr. Board:

Attached is one copy of the Technical Evaluation and Preliminary Determination, and proposed permit to construct a cyrogenic ammonia handling and storage tank flare system at your existing facility in Escambia County, Florida.

Please submit, in writing, any comments which you wish to have considered concerning the department's proposed action to Mr. Bill Thomas of the Bureau of Air Quality Management.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/pa

Attachments

cc: Bruce P. McLeod, P.E.
Jack Preece

State of Florida
Department of Environmental Regulation
Notice of Intent

The Department gives notice of its intent to issue a permit to Monsanto Company to construct a cyrogenic ammonia handling and starage tank flare system at the applicant's existing facility near the intersection of State Roads 292 and 297 in Escambia County, Florida. A determination of best available control technology (BACT) was not required.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative determination (hearing) in accordance with Section 120.57, Florida Statutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code, and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Failure to file a petition within this time period constitutes a waiver of any right such person has to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Rule 28-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009, Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Dept. of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dept. of Environmental Regulation
Northwest District
160 Governmental Center
Pensacola, Florida 32501

Any person may send written comments on the proposed action to Mr. Bill Thomas at the department's Tallahassee address. All comments mailed within 14 days of the publication of this notice will be considered in the department's final determination.

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of
Application for Permit by:

Monsanto Company
Post Office Box 12830
Pensacola, Florida 32575

DER File No. AC 17-127871

INTENT TO ISSUE

The Department of Environmental Regulation hereby gives notice of its intent to issue a permit (copy attached) for the proposed project as detailed in the application specified above. The Department is issuing this Intent to Issue for the reasons stated in the attached Technical Evaluation and Preliminary Determination.

The applicant, Monsanto Company, applied on November 24, 1986, to the Department of Environmental Regulation for a permit to construct a cyrogenic ammonia handling and storage tank flare system at the applicant's facility in Escambia County, Florida.

The Department has permitting jurisdiction under Chapter 403, Florida Statutes and Florida Administrative Code Rules 17-2 and 17-4. The project is not exempt from permitting procedures. The Department has determined that an air construction permit was needed for the proposed work.

Pursuant to Section 403.815, F.S. and DER Rule 17-103.150, FAC, you (the applicant) are required to publish at your own expense the enclosed Notice of Proposed Agency Action on permit application. The notice must be published one time only in a section of a major local newspaper of general circulation in the county in which the project is located and within thirty (30) days from receipt of this intent. Proof of publication must be provided to the Department within seven days of publication of

the notice. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit.

The Department will issue the permit with the attached conditions unless petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S. A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. Petitions must comply with the requirement of Florida Administrative Code Rules 17-103.155 and 28-5.201 (copies enclosed) and be filed with (received by) the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant must be filed within fourteen (14) days of receipt of this intent. Petitions filed by other persons must be filed within fourteen (14) days of publication of the public notice or within fourteen (14) days of receipt of this intent, whichever first occurs. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes, concerning the subject permit application. Petitions which are not filed in accordance with the above provisions will be dismissed.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

Copies furnished to:

W. J. Board
Bruce McLeod
Jack Preece

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF INTENT TO ISSUE and all copies were mailed before the close of business on Jan. 27, 1987.

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Patricia G. Adams Clerk

Jan. 27, 1987 Date

RULES OF THE ADMINISTRATIVE COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

28-5.15 Requests for Formal and Informal Proceedings

(1) Requests for proceedings shall be made by petition to the agency involved. Each petition shall be printed, typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double spaced and indented.

(2) All petitions filed under these rules should contain:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name and address of the petitioner or petitioners;

(c) All disputed issues of material fact. If there are none, the petition must so indicate;

(d) A concise statement of the ultimate facts alleged, and the rules, regulations and constitutional provisions which entitle the petitioner to relief;

(e) A statement summarizing any informal action taken to resolve the issues, and the results of that action;

(f) A demand for the relief to which the petitioner deems himself entitled; and

(g) Such other information which the petitioner contends is material.

of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to an administrative determination (hearing) under Section 120.57, F.S.

---

(4) Notice to substantially affected persons concerning applications for Department permits is an essential and integral part of the state environmental licensing process. Therefore, no application for a permit for which publication of notice is required shall be granted until and unless proof of publication of Notice is furnished to the appropriate Department permitting office.

(5)(a) Any applicant or person benefiting from the Department's action may elect to publish notice of proposed agency action in the manner provided by subsection (2), or (3). Any person who elects to publish notice of proposed agency action, upon presentation of proof of publication to the Department, prior to final agency action, shall be entitled to the same benefits under this rule as a person who is required to publish notice of proposed agency action. Since persons whose substantial interests are affected by a Department decision on a permit application may petition for an administrative proceeding within fourteen (14) days after receipt of notice and since, unless notice is given or published as prescribed in this rule, receipt of notice can occur at any time, the applicant or persons benefiting from the Department's action cannot justifiably rely on the finality of the Department's decision without the notice having been duly given or published.

(b) The notices required by this rule may be combined with other notices required by the Department pursuant to Chapter 403, 376, or 253, F.S., or Chapter 17, FAC.

(c) The provisions of this section shall also apply to the permitting of hazardous waste facilities, but only to the extent it is consistent with Chapter 17-30, Part IV, FAC. Whenever Chapter 17-30, Part IV, FAC, provides for a different time or notice procedure than that set forth in this section the time and notice provisions of Chapter 17-30 shall govern.

(6) Failure to publish any notice of application, notice of proposed agency action, or notice of agency action required by the Department shall be an independent basis for the denial of a permit.

Specific Authority: 120.53, 403.0876, 403.815, F.S. Law Implemented: 120.53, F.S. History: New 9-20-79, Amended 4-28-81, Transferred from 17-1.62 and Amended 6-1-84.

17-103.155 Petition for Administrative Hearing; Waiver of Right to Administrative Proceeding.

(1)(a) Any person whose substantial interests may be affected by proposed or final agency action may file a petition for administrative proceeding. A petition shall be in the form required by this Chapter and Chapter 28-5, FAC, and shall be filed (received) in the Office of General Counsel of the Department within fourteen (14) days of receipt of notice of proposed agency action or within fourteen (14) days of receipt of notice of

agency action whenever there is no public notice of proposed agency action. In addition to the requirements of Rule 28-5.201, FAC, the Petition must specify the county in which the project is or will be located.

(b) Failure to file a petition within fourteen (14) days of receipt of notice of agency action or fourteen (14) days of receipt of notice of proposed agency action, whichever notice first occurs, shall constitute a waiver of any right to request an administrative proceeding under Chapter 120, F.S.

(c) When there has been no publication of notice of agency action or notice of proposed agency action as prescribed in Rule 17-103.150, FAC, a person who has actual knowledge of the agency action or has knowledge which would lead a reasonable person to conclude that the Department has taken final agency action, has a duty to make further inquiry within fourteen (14) days of obtaining such knowledge by contacting the Department to ascertain whether action has occurred. The Department shall upon receipt of such an inquiry, if agency action has occurred, promptly provide the person with notice as prescribed by Rule 17-103.150, FAC. Failure of the person to make inquiry with the Department within fourteen (14) days after obtaining such knowledge may estop the person from obtaining an administrative proceeding on the agency action.

(2)(a) "Receipt of notice of agency action" means receipt of written notice of final agency action, as prescribed by Department rule, or the publication, pursuant to Department rule, of notice of final agency action, whichever first occurs.

(b) "Receipt of notice of proposed agency action" means receipt of written notice (such as a letter of intent) that the Department proposes to take certain action, or the publication pursuant to Department rule of notice of proposed agency action, whichever first occurs.

(3) Notwithstanding any other provision in this Chapter, should a substantially affected person who fails to timely request a hearing under Section 120.57, F.S., administratively appeal the final Department action or order, the record on appeal should be limited to:

(a) the application, and accompanying documentation submitted by the applicant prior to the issuance of the agency's intent to issue or deny the requested permit.

(b) the materials and information relied upon by the agency in determining the final agency action or order;

(c) any notices issued or published; and

(d) the final agency action or order entered concerning the permit application.

(4) In such cases where persons do not timely exercise their rights accorded by Section 120.57(1), Florida Statutes, the allegations of fact contained in or incorporated by the final agency action shall be deemed uncontested and true, and appellants may not dispute the truth of such allegations upon subsequent appeal.

(5) Any applicant may challenge the Department's request for additional information by filing with the Office of General Counsel an appropriate petition for administrative proceeding pursuant to Section 120.60, F.S., following receipt by

the applicant of the Department's notification, pursuant to Section 403.0876, F.S., that additional information is required.
Specific Authority: 120.53, 403.0876, 403.815, F.S. Law Implemented: 120.53, F.S.
History: New 9-20-79, Amended 4-28-81, Transferred from 17-1.62 and Amended 6-1-84.

17-103.160 Uniformity in Approval and Denial of Applications for Department Permits and Certifications. To the extent possible and consistent with the public interest, the Department approves and denies applications for permits and certifications on a uniform and consistent basis. Final Department actions on applications for permits and certifications shall be consistent with prior Department actions, unless deviation therefrom is explained by the Department in writing or the hearing officer who submits a recommended order to the Department for final agency action in accordance with Section 120.57, Florida Statutes.
Specific Authority: 120.53(1), F.S. Law Implemented: 120.53(1), 120.68(12), F.S. History: New 2-6-78, Transferred from 17-1.63, 6-1-84.

17-103.170 Designation, Preparation and Transmittal of Record for Administrative Appeals.

When any Department action or order is the subject of an administrative appeal under Chapter 17-103, Part II, FAC, the following requirements shall apply:

(1) Designation of Record. Within fifteen (15) days of rendition of the Department's final order, the appellant shall designate to the Department, in writing, with copies to other parties, those documents or things under the control of or in the possession of the Department which the appellant desires to have included in the record, and which were received or considered in the Department proceeding below. If a proceeding was reported by mechanical recording devices, the appellant shall designate those portions of the proceeding for which it requires written transcription or tapes for transcription. Any other party may designate other portions of the record in the manner provided herein. Such cross-designation shall be filed with the Department, with copies provided other parties, within seven (7) days after receipt of the designation by the appellant.

(2) Original Record. The Department shall thereupon include in the record all of the designated portions of the original papers and exhibits in the proceedings or matter from which administrative appeal is taken, together with a copy of any such parts of the proceedings as were stenographically reported or transcribed from tapes, and as have been designated by the parties and certified by a notary public, the reporter, or other officer for inclusion in the record on appeal or review, and certified copies of the order, if any, of which review is sought. The Department may, at its discretion, substitute certified copies for original papers or documents in its possession.

(3) Preparation of Record. Upon tender or deposit by appellant of the estimated cost of preparation, the Department shall prepare the record in accordance with the designations of the parties. The cost of preparation, and reproduction,

Technical Evaluation
and
Preliminary Determination

Monsanto Company
Pensacola, Florida
Escambia County

Cryogenic Ammonia Handling and Storage Tank Flare System
File No. AC 17-127871

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

January 23, 1987

I. Project Description

A. Applicant

Monsanto Company
Post Office Box 12830
Pensacola, Florida 32575

B. Project and Location

On November 24, 1987, Monsanto Company submitted an application for permit to construct a cyrogenic ammonia handling and storage tank flare system at their existing facility located in Escambia County near the intersection of State Roads 292 and 297. The UTM coordinates of this facility are Zone 16, 479.96 km E and 3384.3 km N. The SIC code for the manufacture of nylon fiber is 2824.

The application was considered complete on receipt (December 22, 1986) of Monsanto's December 19, 1986, letter which provided additional information on the proposed project.

C. Process

The cryogenic ammonia handling and storage tank flare system is composed of piping, storage tank, refrigeration system, and a flare. Its primary purpose is to supply ammonia to the nitric acid plant. Nitric acid production is not being increased as a result of this project. During normal operation, ammonia gas is condensed by the refrigeration system and then returned to the process. Ammonia may be vented to the flare during power failures, tank startup, and shutdown. The flare, which has two natural gas fired pilot lights, will be designed to destroy over 95 percent of the ammonia that enters it. Emissions from the flare will be ammonia and the normal products of combustion.

The following table summarizes the emissions expected from the flare. It is based on the anticipated release of 1,000 lbs/hr and 60 TPY of ammonia.

Flare Emissions

Pollutant	lbs/hr	TPY
Nitrogen Oxides	2.54	0.28
Particulate Matter	0.004	0.011
Ammonia	50.0	3.0
Opacity	Maximum 5 percent	

II. Rule Applicability

A. State Regulations

The proposed project, construction of a cryogenic ammonia handling and storage tank flare system, is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Chapters 17-2 and 17-4, Florida Administrative Code.

The facility is situated in an area designated unclassifiable for sulfur dioxide (17-2.430) and attainment for the other criteria pollutants (17-2.420).

The plant is a major source of volatile organic compounds (17-2.100) because total permitted emissions of this pollutant exceed 100 TPY. The proposed project will not cause a significant emission rate increase (Table 500-2) of any criteria pollutant.

The facility is exempt from the Prevention of Significant Deterioration regulations because the proposed project will not cause a significant net emission increase of any criteria pollutant (17-2.500(2)(d)4.a.(ii)). It is exempt from new source review for nonattainment areas because the area is not designated nonattainment for any criteria pollutant (17-2.510(2)(a)1.).

The facility is subject to Rule 17-2.520, FAC, Sources Not Subject to Prevention of Significant Deterioration or Nonattainment Requirements. Emission standards for the source shall be based on the design calculations of the applicant. Higher emissions could subject the project to review under other regulations.

B. Federal Regulations

The proposed project, a minor modification to a major source, is not subject to review under federal PSD regulations because the modification will not result in a significant net emissions increase of any criteria pollutant. The nitric acid plant remains subject to 40 CFR 60, Subpart G, Standards of Performance for Nitric Acid Plants.

III. Technical Evaluation

The new ammonia storage tank will replace two existing ammonia storage tanks at this facility. The refrigeration unit will routinely capture and condense all ammonia vapors that are generated by heat gain in the storage tank or from the barges unloading into the storage tank. Ammonia that escapes from the process during power outage, tank startup or shutdown, and the

relief valves in the piping system are discharged into a collection header which returns the ammonia to the storage tank or the flare. The applicant estimates that up to 1,000 lbs/hr and 60 TPY of ammonia will be vented to the flare. By design, the flare will destroy over 95 percent of the ammonia. The emissions from the flare will be ammonia and the products of combustion of ammonia by a natural gas flame. The flare has two pilot lights which burn 100 SCFH on natural gas continuously. Up to 3000 CFH of natural gas could be used in the flare as a supplemental fuel to obtain the minimum gas heating value (200 Btu/SCF) needed for proper flare operation. The properly operated flare will have no visible emissions.

IV. Ambient Air Quality

A properly designed and operated flare will not have a significant impact on the environment. Modeling shows the maximum concentration of ammonia from the flare that the public will be subjected to will be 0.1 ppm, which is less than 2 percent of the TLV value for ammonia (25 ppm).

V. Conclusion

Based on the information contained in the application, the department has concluded that Monsanto Company can construct and operate the cryogenic ammonia handling and storage tank flare system in compliance with all air pollution control regulations. The department proposes to issue a permit to construct the system. The General and Specific Conditions listed in the proposed permit (attached) will assure compliance of the system with the department's air pollution control regulations.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

PERMITTEE:
Monsanto Company
P. O. Box 12830
Pensacola, Florida 32575

Permit Number: AC 17-127871
Expiration Date: January 1, 1990
County: Escambia
Latitude/Longitude: 30° 35' 59" N
87° 14' 50" W
Project: Cryogenic Ammonia Handling and Storage Tank Flare System

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Rule(s) 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the department and made a part hereof and specifically described as follows:

For the construction of an ammonia storage and handling system with emissions controlled by a 95 percent efficient utility flare (6" dia, 50' ht.) that uses natural gas fuel. The system will be located at the permittee's existing facility in Escambia County that is near the intersection of State Roads 292 and 297.

Construction shall be in accordance with the permit application and plan, documents, amendments, and drawings submitted, except as noted on pages 5 and 6 of the Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), which was received on November 24, 1986, by FDER Bureau of Air Quality Management.

2. Monsanto Company's December 19, 1986, letter received by BAQM on December 22, 1986.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the department will review this permit periodically and may initiate enforcement action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, unless specifically authorized by an order from the department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information:

a. a description of and cause of non-compliance; and

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

11. This permit is transferable only upon department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT)
( ) Determination of Prevention of Significant Deterioration (PSD).
( ) Compliance with New Source Performance Standards.

14. The permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

15. When requested by the department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. Ammonia vented to the flare shall not exceed 1,000 lbs/hr and 60 TPY without prior approval of the Department (Bureau of Air Quality Management).

2. The ammonia system may be used continuously, 8760 hrs/yr, if the flare is maintained and operated properly.

3. Visible emissions from the flare, as determined by DER Method 9 described in Rule 17-2.700(6)(a)9, FAC, shall not exceed 5% opacity.

4. The system shall not cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor (Rule 17-2.620(2), FAC).

PERMITTEE:
Monsanto Company

Permit Number: AC 17-127871
Expiration Date: January 1, 1990

SPECIFIC CONDITIONS:

5. Construction shall reasonably conform to the plans and specifications submitted in the application. The applicant shall report any delay in construction and completion of this project to the Department's Northwest District office.

6. The permittee shall submit a complete application for a permit to operate the ammonia storage and handling system, which must include a visible emissions test report and a manufacturer's guarantee of destruction efficiency of the flare selected by the permittee, to the DER Northwest District office at least 90 days prior to the expiration of this construction permit. The permittee may continue to operate this source, if it is in compliance with all conditions of this construction permit, until its expiration date.

7. Upon obtaining a permit to operate, the permittee will be required to submit annual operation reports to the DER Northwest District office which shall include, as a minimum: a recent visible emissions test report and an engineering estimate of the quantity of ammonia vented to the flare and the emissions from the flare (TPY) during the preceding 12 months.

Issued this_____day of_____, 19___

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

_____
Howard L. Rhodes, P.E.
Director, Division of Environmental Programs

____ pages attached

Monsanto

MONSANTO CHEMICAL COMPANY
P. O. Box 12830
Pensacola, Florida 32575
Phone: (904) 968-7000

VIA CERTIFIED MAIL

December 19, 1986

Mr. Clair H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

Dear Mr. Fancy:

The following information is provided in response to the request for additional information regarding the Ammonia Storage Flare. This information was requested in your letter to Mr. W. J. Board dated December 15, 1986.

Item 1

A detailed physical and operational description of the Cryogenic Ammonia Handling and Storage Tank Facility is provided as Attachment 1. The existing ammonia storage tanks will be dismantled.

Item 2

Production of the Nitric Acid Plant will not increase as a result of this project. Annual quantity of ammonia handled is not a factor affecting emissions. No ammonia will be flared during routine operations such as barge unloading or ammonia transfer to the Nitric Acid Plant. Ammonia flaring will result from non routine incidents such as loss of refrigeration due to mechanical malfunctions or power failures, and during initial tank filling at startup and during startups, and shutdowns associated with tank inspections.

Item 3

No brochure or manufacturer's guarantee is available at this time because both John Zinc, Inc. and McGill, Inc. are bidding on the flare system. Monsanto proposes to use the benzene flare criteria in lieu of specific ammonia flare criteria.

612.BPM

Monsanto

MONSANTO COMPANY
P. O. Box 12830
Pensacola, Florida 32575

Fold at line over top of envelope to the right of the return address

CERTIFIED

P 437 511 708

MAIL

VIA CERTIFIED MAIL

MR CLAIR H FANCY
DEPUTY CHIEF
BUREAU OF AIR QUALITY MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL REGULATION
TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE FL 32301-8241

The flare will conform to the following criteria applied to SOCMI requirements for flares for control of benzene leaks.

Criteria:

a) No visible emissions
(vendor specification)

b) Flame present at all times
(2 pilots provided)

c) 200 Btu/SCF minimum gas heating value (see Attachment 2)
(380 Btu/SCF calculated heating value)

d) Exit velocity less than 60 ft./sec.
(design exit velocity equals 32 ft./sec.)

e) The presence of a flare pilot flame shall be monitored using a thermocouple or equivalent.
(each pilot will be equipped with a thermocouple)

Item 4

Proper pilot operation will be ensured by employing thermocouples to detect that they are operating.

Flare efficiency will be assured by conforming to the EPA flare specifications listed in Item 3, above.

Ammonia feed rate cannot be measured, but the capacity of the flare is sized to be greater than the anticipated ammonia venting from the non routine conditions which could result in ammonia flaring. Acceptable flare performance will be confirmed by method 9 visible emissions test during the initial tank filling period.

Item 5

The ammonia vapor will be dry, so no correction for moisture is necessary. However, to be precise, a correction for ammonia temperature should be made to determine ACFM. The calculation below improves on the accuracy of the estimate in the original application.

$$\frac{1000 \text{ lbs. } NH_3}{\text{hr.}} \times \frac{1 \text{ lb. mole } NH_3}{17 \text{ lb. } NH_3} \times \frac{385 \text{ ft}^3 \text{ } NH_3}{1 \text{ lb. mole } NH_3}{}^{(1)} \times \frac{1 \text{ hr.}}{60 \text{ min.}}$$

$$\text{DSCFM} = \underline{377 \text{ SCFM}}$$

$$\text{ACFM} = 377 \times \frac{432°R}{528°R} = \underline{308 \text{ ACFM}}$$

(1) vol. of 1 lb. mole at STP, T = 20°C

If there are questions regarding this response, please contact me at 904/968-8725.

Sincerely,

Bruce P McLeod

Bruce P. McLeod
Senior Specialist
Environmental Control

cc: W. J. Board, Monsanto, Pensacola

612.BPM

ATTACHMENT 1

MONSANTO PENSACOLA

CYROGENIC AMMONIA HANDLING AND STORAGE TANK FLARE SYSTEMS

PHYSICAL AND OPERATIONAL DESCRIPTION

The Cryogenic Ammonia Handling and Storage Tank Flare System Project will design and construct facilities at the Monsanto, Pensacola plant, for the receipt, storage, and transfer of cryogenic ammonia. The facility will replace two semi-pressure ammonia storage spheres which will be dismantled. Two existing high pressure bullets will be mothballed for future use when the new tank is out of service for inspection.

The cryogenic ammonia storage tank is to be located as shown in Figure 2 appended to the original permit application. The design and construction of this tank and associated facilities will incorporate state-of-the-art technology in the safe handling and storage of ammonia. Refrigeration will be provided to maintain the storage tank temperature. A flare will be incorporated into the design to handle generated vapors during loss of refrigeration and during startup or shutdown of the storage facilities.

Ammonia will be transferred to the Nitric Acid Unit, Permit AO17-74429, and other small users, such as wastewater neutralization.

The ammonia storage tank will be supported by a suspended concrete pad/pile cap. The air space beneath the pad allows air circulation and eliminates any chance of frost-heave. A concrete wall, or dike, surrounds the tank to essentially its full vertical height and provides containment if a spill due to overflow or tank failure were to occur.

In the event of an electrical power failure, operating pressure of the storage tank is maintained by venting the evolved vapors from the tank and burning them in a gas pilot flare.

Use of a flare stack during a major power outage and during tank startup and shutdown will allow burning all vapors that build up in the storage tank.

Routinely, the refrigeration unit for vapor recovery will capture and condense all vapors that are generated due to heat gain in the storage tank or due to barge unloading into storage.

All pressure relief valves associated with the piping for barge unloading, refrigeration equipment, and the transfer pumps will discharge into a collection header which returns the ammonia to the vapor space of the storage tank or to the flare.

Pressure relief is accomplished by pressure control, sending excess vapor to the flare. Therefore,the probability of ammonia release during normal operation is extremely low.

Earthen berms will be provided to contain spills of liquid ammonia from piping or equipment external to the concrete dike wall.

ATTACHMENT 2

MONSANTO PENSACOLA

AMMONIA FLARE CRITERIA

During startup and shutdowns when purging inerts (air, N_2, etc.), the overall heating value of the gas stream may be less than 200 Btu/lb. In this event, supplement natural gas can be burned as necessary to assure acceptable flare performance. The amount of supplemental natural gas is expected to be no more than 3000 CFH. This would result in additional emissions as follows:

	Lbs/Yr	Tons/Yr
NOx	0.3	0.036
Particulate	0.0075	0.0009

(Basis AP 42 domestic boilers <10M Btu/Hr, see Calculation 1)

Monsanto reserves the right to meet alternate criteria demonstrated to result in acceptable flare performance or certified by the flare vendor.

CALCULATION 1

MONSANTO PENSACOLA

CALCULATION OF EMISSIONS FROM SUPPLEMENTAL GAS BURNING IN AMMONIA FLARE

AP 42 DOMESTIC BOILERS LESS THAN 10M BTU/HR

Particulates

$$\frac{2.5 \text{ lb particulates}}{10^6 \text{ft}^3} \times \frac{3000 \text{ ft}^3}{\text{hr}} = \frac{.0075 \text{ lbs}}{\text{hr}}$$

$$\frac{.0075 \text{ lbs}}{\text{hr}} \times \frac{10 \text{ days}}{\text{yr}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} \times \frac{24 \text{ hrs}}{\text{day}} = \frac{.0009 \text{ tons}}{\text{yr}}$$

NOx

$$\frac{100 \text{ lbs NOx}}{10^6 \text{ft}^3} \times \frac{3000 \text{ ft}^3}{\text{hr}} = \frac{0.3 \text{ lbs}}{\text{hr}}$$

$$\frac{0.3 \text{ lbs}}{\text{hr}} \times \frac{24 \text{ hrs}}{\text{day}} \times \frac{10 \text{ days}}{\text{yr}} \times \frac{1 \text{ ton}}{2000 \text{ lbs}} = \frac{.036 \text{ tons}}{\text{yr}}$$

PS Form 3811, July 1983 447-845

SENDER: Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☐ Show to whom, date and address of delivery.

2. ☐ Restricted Delivery.

3. Article Addressed to:
Mr. W. J. Board
Monsanto Company
P. O. Box 12830
Pensacola, Florida 32575

4. Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number
P 408 530 591

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X W Board

6. Signature – Agent
X

7. Date of Delivery DEC 16 1986

8. Addressee's Address *(ONLY if requested and fee paid)*

DOMESTIC RETURN RECEIPT

P 408 530 591

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. W. J. Board	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 12/15/86	

PS Form 3800, Feb. 1982

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

December 15, 1986

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. W. J. Board
S. E. Regional Director
Governmental Affairs
Monsanto Company
P. O. Box 12830
Pensacola, Florida 32575

Dear Mr. Board:

Re: Ammonia Storage Flare

The department has made a preliminary review of your application for a permit to construct an ammonia storage flare at Monsanto's facility located near Gonzalez, Escambia County, Florida. The following information is needed before the department can process this application.

1. Please provide a physical and operational description of the proposed cyrogenic ammonia handling and storage tank facility, including the proposed flare. Will the existing ammonia storage tanks be connected to the flare?

2. Will production of your nitric acid plant increase as a result of this project? What is the annual quantity of ammonia handled by this system (proposed, current actual, and permitted)?

3. Please provide a brochure, manufacture's guarantee, or Monsanto's specifications for the proposed flare.

4. What test measurements will Monsanto use to confirm the flare's ammonia feed, emissions, and efficiency?

5. Clarify how the ACFM and DSCM listed on page 6 of the application were determined.

Some general comments on model for your information follows:

Model results should address the impact within 360° of the source. When the model shows an exceedance on plant property, the impact should then be determined at the plant property line. Also, enclosed is an article on modeling the emissions from a flare. This is not an approved technique at this time.

The department will begin processing your application after we receive the information requested above. If you have any questions on this matter, please call Willard Hanks at (904)488-1344 or write to me at the letterhead address.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/WH/s

enclosure

cc: J. Preece
B. McLeod

ATTACHMENT #1

PROCEDURES FOR MODELING A FLARE

At certain types of industrial sources, flares are used to dispose of waste gases through combustion. As the gases are vented up a tall vertical pipe and then ignited at the top of the pipe, heat and other combustion products are released. Depending upon combustion efficiency, pollutant emissions may be important and dispersion modeling may be necessary.

Treatment of a flare as a point source is debatable in view of the differences between a flare and conventional combustion source. A recent study ("Observations of Plume Rise from Sour Gas Flares", Leahey and Davies, 1984), however, indicates that use of the standard Briggs plume rise formulas (i.e., 2/3 law) provides a good approximation of the plume rise from a flare. Consequently, it is reasonable to model flares as elevated point sources with appropriately chosen "stack" parameters. (Note, the stack exit parameters suggested by the Leahey and Davies study agree well with the parameters suggested by other approaches - e.g., see "User's Guide to the Texas Episodic Model", October 1979 and "Notes on Dispersion Modeling - Plume Rise of Flares", Trinity Consultants, 1984.)

The following steps are proposed for deriving the stack parameters for a flare:

STEP 1: Calculate the total heat release (H) of the flared gas based on the gas heat content and the gas consumption rate

STEP 2: Assume that 45% of H is released as sensible heat (Q_H)

$$Q_H(\text{cal/sec}) = 0.45 \times H(\text{cal/sec})$$

STEP 3: Calculate the effective stack diameter using the following formula*

$$d_s(\text{m}) = 9.88\text{x}10^{-4} \times [Q_H]^{1/2}$$

STEP 4: Final stack parameters for model input are as follows

h_s = height of flare stack
d_s = (calculated in STEP 3)
v_s = 20 m/sec
T_s = 1273 °K

---

*This formula was derived by combining two equations for the buoyancy flux parameter (i.e., $F = (gQ_H)/(\pi\rho c_p T_a)$ (Eq. 4.20, Briggs, 1969) and $F = gv_s(d^2/4)(1-T_a/T_s)$ (Turner, 1972)), solving for "d", and assuming T_a=293 °K, T_s=1273 °K, v_s=20 m/sec, ρ=1205 g/m^3, and c_p=0.24 cal/g°K.

EXAMPLE FLARE CALCULATION

GIVEN: Process flare X burns the following gas mixture

	AMOUNT (#/HR)	HEAT CONTENT (cal/#)	HEAT RELEASE (cal/sec)
N_2	30.0	0	0
H_2S	67.9	1.6×10^6	30,180
Organics	126.0	3.9×10^6	136,500
			166,680

STEP 1: H = 166,680 cal/sec

STEP 2: $Q_H = 0.45 \times H = 75{,}000$ cal/sec

STEP 3: $d_s = 9.88 \times 10^{-4} \times [Q_H]^{1/2} = 0.27$ m

STEP 4: Stack parameters are h_s=height of flare stack, d_s=0.27 m, v_s=20 m/sec, T_s=1273 °K

Monsanto

MONSANTO CHEMICAL COMPANY
P. O. Box 12830
Pensacola, Florida 32575
Phone: (904) 968-7000

November 20, 1986

Mr. Clair Fancy
Deputy Chief, Permitting
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

Dear Mr. Fancy:

Enclosed are two (2) construction permit applications submitted in quadruplicate for your consideration. I can be reached for questions at 904/968-8725.

Also enclosed is a letter of authorization for Mr. Board, Southeast Regional Director, Governmental Affairs, Pensacola plant.

Thank you for your assistance.

Sincerely,

B P McLeod

B. P. McLeod, Specialist
Environmental Control

Enclosures

587.BPM

Monsanto

MONSANTO FIBERS & INTERMEDIATES COMPANY
P. O Box 12830
Pensacola, Florida 32575
Phone: (904) 968-7000

May 29, 1986

SIGNATURE AUTHORIZATION FOR ENVIRONMENTAL PERMIT PROGRAM FORMS

The Southeast Regional Director, Governmental Affairs, of Monsanto's Pensacola Plant, is hereby authorized to sign permit applications, reports, and other documents required or requested by government environmental authorities.

R. F. Crone, Jr.
Plant Manager

RFC10

AC 17-127871

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHWEST DISTRICT
160 GOVERNMENTAL CENTER
PENSACOLA, FLORIDA 32501

DER

NOV 24 1986

BAQM

BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY
ROBERT V. KRIEGEL
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Air Pollution [X] New[1] [ ] Existing[1]

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

COMPANY NAME: Monsanto Company COUNTY: Escambia

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

SOURCE LOCATION: Street Intersection State Rds 292 & 297 City Gonzalez,Fl

UTM: East _____ North _____

Latitude 30 ° 35 ' 59 "N Longitude 87 ° 14 ' 50 "W

APPLICANT NAME AND TITLE: W. J. Board, S.E. Regional Director, Governmental Affairs

APPLICANT ADDRESS: P. O. Box 12830, Pensacola FL 32575

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Monsanto Company

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

*Attach letter of authorization

Signed: W J Board

W. J. Board, S.E. Regional Dir., Gov. Affairs
Name and Title (Please Type)

Date: 11/21/86 Telephone No. 904-968-7350

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

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

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

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Nº 76136

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from Monsanto Date Nov. 24, 1986

Address P.O. Box 12830, Pensacola, FL 32575 Dollars $ 400.00

Applicant Name & Address

Source of Revenue Same as above

Revenue Code 001031 Application Number AC 17-127871, -127872

By Patricia G. Adams

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

Signed Bruce P McLeod

Bruce P. McLeod

Name (Please Type)

Monsanto Company

Company Name (Please Type)

P. O. Box 12830, Pensacola, FL 32575

Mailing Address (Please Type)

Florida Registration No. 26956 Date: _____ Telephone No. 904/968-8725

SECTION II: GENERAL PROJECT INFORMATION

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

Cryogenic storage tank equipped with a flare for combustion of vented ammonia.

SEE SUPPLEMENT NO. 1

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

Start of Construction upon permit receipt Completion of Construction 2½ years after permit receipt.

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

$160,000 installed.

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

None

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr_____; if seasonal, describe:_____

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

1. Is this source in a non-attainment area for a particular pollutant? No

   a. If yes, has "offset" been applied? _____

   b. If yes, has "Lowest Achievable Emission Rate" been applied? _____

   c. If yes, list non-attainment pollutants. _____

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. No

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. No

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   a. If yes, for what pollutants?_____

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

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

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

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

Description	Contaminants: Type	Contaminants: % Wt	Utilization Rate - lbs/hr	Relate to Flow Diagram
Ammonia	N/A	N/A	N/A	See Figure 1

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

1. Total Process Input Rate (lbs/hr): N/A

2. Product Weight (lbs/hr): N/A

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

Name of Contaminant	Emission[1] Maximum lbs/hr	Emission[1] Actual T/yr	Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission lbs/yr	Potential[4] Emission T/yr	Relate to Flow Diagram
NOx	2.54	0.24	N/A	N/A	0	0	Stream 1
Particulates	0.004	.01	N/A	N/A	0	0	Stream 1
NH_3	50	3.0	N/A	N/A	120K	60	Stream 1
Opacity	5% or less		N/A	N/A	N/A		Stream 1

[1] See Section V, Item 2.

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

[3] Calculated from operating rate and applicable standard.

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

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
Utility Flare	NH_3	95+%	N/A	Vendor estimate

E. Fuels 100 SCFH/Pilot x 2 Pilots Continuous - Natural Gas

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Natural Gas	0.0002	0.0002	

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

Fuel Analysis: 1040 Btu/SCF Natural Gas

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

Other Fuel Contaminants (which may cause air pollution): _____

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

Annual Average _____ Maximum _____

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

Any liquid and solid waste will be disposed of via regulatorily approved procedures.

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

tack Height: 50 ft. Stack Diameter: 0.5 ft.

as Flow Rate: Approx. 380 ACFM Approx. 380 DSCFM Gas Exit Temperature: Approx. flame Temp. 2930 °F.

ater Vapor Content: 20 - 30 % (after combustion) Velocity: Approx. 32 FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

escription of Waste _____

otal Weight Incinerated (lbs/hr) _____ Design Capacity (lbs/hr) _____

pproximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

anufacturer _____

ate Constructed _____ Model No. _____

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel Type	Fuel BTU/hr	Temperature (°F)
Primary Chamber					
Secondary Chamber					

Stack Height: _____ ft. Stack Diamter: _____ Stack Temp. _____

Gas Flow Rate: _____ ACFM _____ OSCFM* Velocity: _____ FPS

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

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

[ ] Other (specify) _____

Brief description of operating characteristics of control devices:

Vented ammonia is directed via collection piping to the flare which is equipped with two continuously burning pilots. The ammonia is combusted to nitrogen and H_2O.

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

None expected.

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

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

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

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

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

[ ] Yes [ ] No

Contaminant	Rate or Concentration

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

[ ] Yes [ ] No

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

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

xplain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

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

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

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

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

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

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

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

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. _____ no. sites _____ TSP _____ ( ) SO^{2}* _____ Wind spd/dir

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

Other data recorded _____

Attach all data or statistical summaries to this application.

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

2. Instrumentation, Field and Laboratory

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

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location)_____

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

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

Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

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

- Applicants Maximum Allowable Emission Data

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

- Emission Data Used in Modeling

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

- Attach all other information supportive to the PSD review.

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

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

SECTION V SUMMARY

Item 1 Not applicable.

Item 2 See Calculations 1, 2, and 3

Item 3 See Section III

Item 4 Flare to be specified by vendor to achieve 1000 pph NH_3 combustion capacity.

Item 5 See Calculation 3

Item 6 See Figure 1

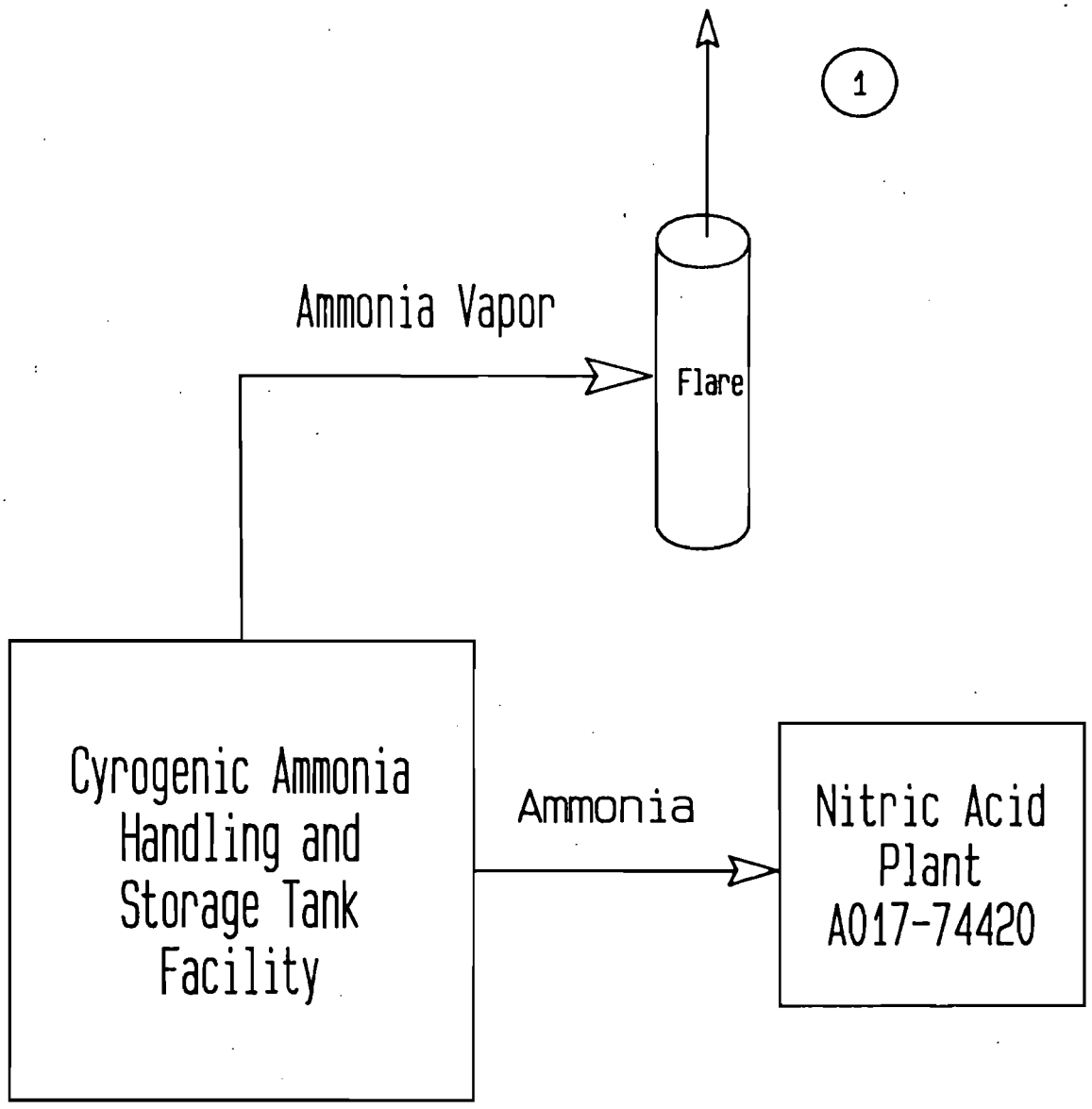
Item 7 See Figure 2

Item 8 See figures 1 and 2

MONSANTO PENSACOLA

Cryogenic Ammonia Handling and Storage Tank Flare Systems

FIGURE 1



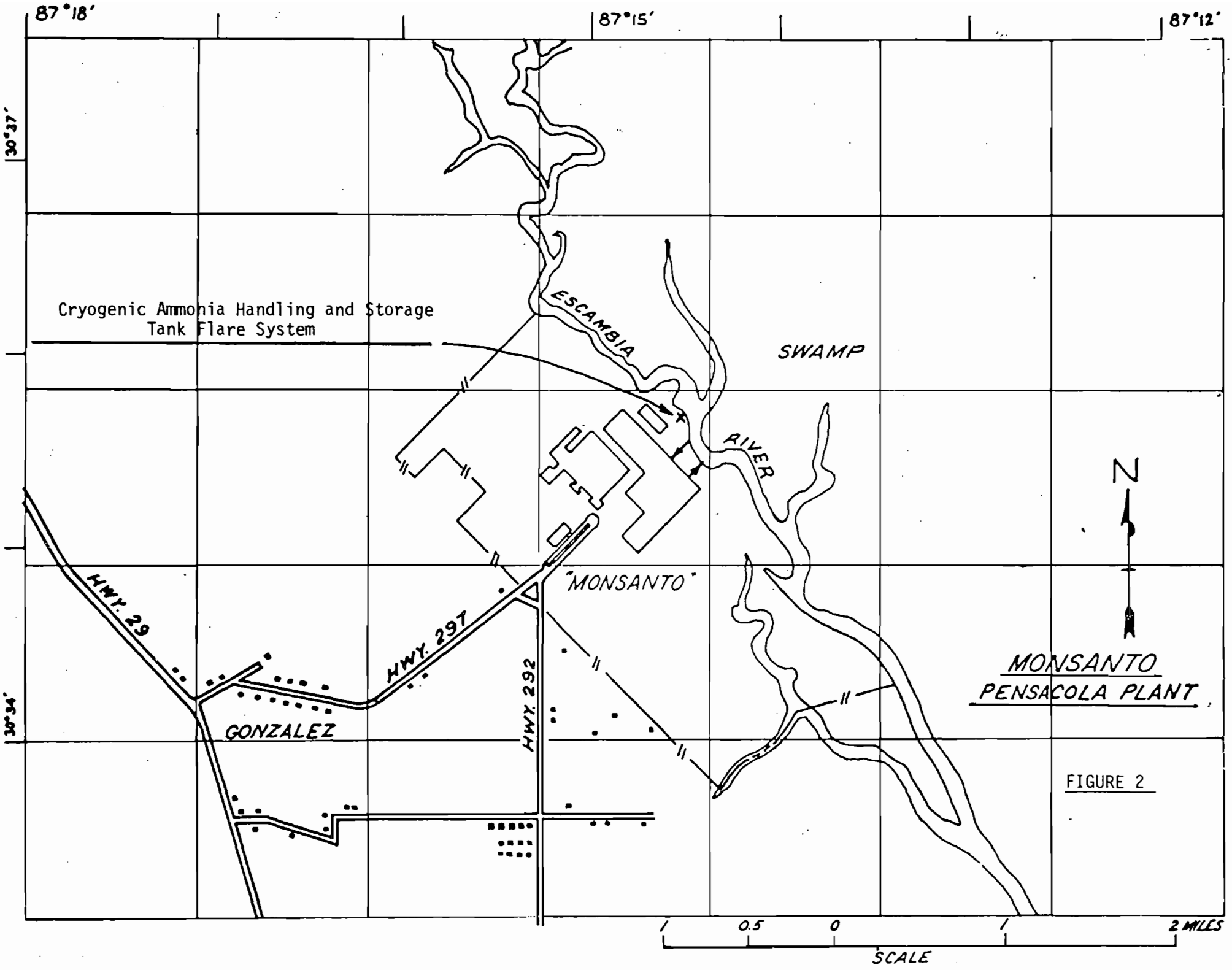

87°18'
87°15'
87°12'
30°37'
30°34'
Cryogenic Ammonia Handling and Storage
Tank Flare System
ESCAMBIA
SWAMP
RIVER
"MONSANTO"
HWY. 29
HWY. 297
HWY. 292
GONZALEZ
N
MONSANTO
PENSACOLA PLANT
1 0.5 0 1 2 MILES
SCALE

FIGURE 2

CALCULATION #1

MONSANTO PENSACOLA
AMMONIA FLARE

Calculation of NOx emission from natural gas burning - reference section 1.4-2, AP42.

NOx factor: $\frac{100 \text{ lb. NOx}}{10^6 \text{ ft.}^3 \text{ gas}}$ (from AP-42)

Heat input: $\frac{208{,}000 \text{ Btu}}{\text{Hr.}} = \frac{200 \text{ ft}^3 \text{ gas}}{\text{Hr.}}$

Lbs. NOx = $\frac{200 \text{ ft}^3 \text{ gas}}{\text{Hr.}} \times \frac{100 \text{ lbs. NOx}}{10^6 \text{ ft}^3 \text{ gas}}$

$\frac{0.02 \text{ lb.NOx}}{\text{Hr.}} = \frac{0.09 \text{ tons NOx}}{\text{Yr.}}$

Maximum NOx = 2 x expected NOx = 2 x 0.02 = $\frac{0.04 \text{ lb. NOx}}{\text{Hr.}}$

NOx from NH_3 Combustion

2.5 lbs. NOx per 1,000 lbs. of NH_3

$\frac{120\text{K lbs. } NH_3}{\text{Yr.}} \times \frac{2.5 \text{ lbs.}}{1\text{K lbs. } NH_3} \times \frac{1 \text{ ton}}{2000 \text{ lbs.}} = 0.15 \text{ tons/yr.}$

Total Emissions

Tons/Yr. = .09 + .15 = 0.24 Tons/Yr. NOx

Max Lbs./Hr. = .04 + 2.5 = 2.54 Lbs./Hr. NOx

CALCULATION #2

MONSANTO PENSACOLA

AMMONIA FLARE

Calculation of particulate emission from natural gas burning; reference section 1.4-2, AP 42.

Particulates factor: $\frac{10 \text{ lb. particulates}}{10^6 \text{ ft.}^3 \text{ gas}}$

Heat input = $\frac{208{,}00 \text{ Btu}}{\text{Hr.}}$ = $\frac{200 \text{ ft.}^3 \text{ gas}}{\text{Hr.}}$

Lb. particulates = $\frac{208 \text{ ft.}^3 \text{ gas}}{\text{Hr.}}$ x $\frac{10 \text{ lb. NOx}}{10^6 \text{ ft.}^3 \text{ gas}}$ =

.002 lb./hr. particulates = 0.01 tons/year

Maximum hourly particulates = 2 x expected particulates =

2 x .002 = 0.004 lb./hr.

CALCULATION #3

MONSANTO PENSACOLA

AMMONIA FLARE

Calculation of ammonia emissions

Flare will be 95+% efficient in combusting ammonia per vendor estimate.

Maximum instantaneous ammonia flow to the flare = 1,000 pph.

Maximum annual ammonia combusted = 60 tons.

Maximum NH_3 Emissions

1,000 pph x (1-.95) = 50 pph NH_3 vented

Average annual emissions

60 tons x (1-.95) = 3 tons/year

MONSANTO PENSACOLA

AMMONIA FLARE

SUPPLEMENT 1

Contents

PTPLU Modeling Run

(Worst case highest ground level concentration)

and

ISCST Modeling Run

(Worst cast ground level concentration at nearest exposure to the general public)

SUPPLEMENT 1 DISCUSSION

PTPLU

The attached PTPLU modeling run shows that the worst case ground level concentration of ammonia is expected to occur approximately 200 meters from the flare, with a maximum ammonia concentration of 1½ ppm. This concentration is well below the 8 hour TWA limit of 25 ppm. With normal wind directions, a 200 meter receptor distance will fall on the Monsanto plant property. Under some wind direction cases, the maximum would occur in the unpopulated Escambia River floodplain swamp.

ISCST

The attached ISCST modeling run shows that the worst case ground level concentration of ammonia at the nearest point of exposure to the general public (1600 meters to the southwest) is approximately 0.1 ppm, which is well below the 8 hour TWA of 25 ppm.

1 PTPLU (VERSION 81036)
AN AIR QUALITY DISPERSION MODEL IN
SECTION 3. MODELS PROPOSED SEP80 FOR 81 GUIDELINES.
IN UNAMAP (VERSION 4) DEC 80
SOURCE: FILE 13 ON UNAMAP MAGNETIC TAPE FROM NTIS.

PTPLU NH3 FLARE - 50 PPH EMISSION

0 >>>INPUT PARAMETERS<<<

SOURCE		***OPTIONS***	***METEOROLOGY***	
EMISSION RATE =	6.30 (G/SEC)	IF = 1, USE OPTION	AMBIENT AIR TEMPERATURE =	294.00 (K)
STACK HEIGHT =	15.38 (M)	IF = 0, IGNORE OPTION	ANEMOMETER HEIGHT =	10.00 (M)
STACK DIAM. =	0.15 (M)	IOPT(1) = 0 (GRAD PLUME RISE)	MIXING HEIGHT =	5000.00 (M)
EXIT VELOCITY =	9.80 (M/SEC)	IOPT(2) = 1 (STACK DOWNWASH)	WIND PROFILE EXPONENTS =	A: .10, B: .15, C: .20
STK GAS TEMP =	1883.00 (K)	IOPT(3) = 1 (BUOY. INDUCED DISP.)		D: .25, E: .30, F: .30
			RECEPTOR HEIGHT =	2.00 (M)

>>>CALCULATED PARAMETERS<<<

VOLUMETRIC FLOW = 0.18 (M**3/SEC) BUOYANCY FLUX PARAMETER = 0.48 (M**4/SEC**3)

ANALYSIS OF CONCENTRATION AS A FUNCTION OF STABILITY AND WIND SPEED

0

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)	****EXTRAPOLATED WINDS**** WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)
1	0.50	1.0902E-03	0.195	40.1	0.52	1.0952E-03	0.191	39.1
1	0.80	1.0961E-03	0.155	30.8	0.84	1.0912E-03	0.152	30.2
1	1.00	1.0639E-03	0.140	27.8	1.04	1.0551E-03	0.137	27.2
1	1.50	9.5362E-04	0.120	23.6	1.57	9.3874E-04	0.119	23.3
1	2.00	8.4649E-04	0.111	21.6	2.09	8.2925E-04	0.109	21.3
1	2.50	7.5539E-04	0.105	20.3	2.61	7.3750E-04	0.104	20.1
1	3.00	6.7987E-04	0.098	19.5	3.13	6.6271E-04	0.097	19.3

0

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)	****EXTRAPOLATED WINDS**** WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)
2	0.50	1.0760E-03	0.275	40.1	0.53	1.0871E-03	0.265	38.6
2	0.80	1.1095E-03	0.213	30.8	0.85	1.1052E-03	0.206	29.9
2	1.00	1.0883E-03	0.189	27.8	1.07	1.0783E-03	0.183	27.0
2	1.50	9.9441E-04	0.160	23.6	1.60	9.7352E-04	0.156	23.1
2	2.00	8.9250E-04	0.145	21.6	2.13	8.6707E-04	0.142	21.2
2	2.50	8.0223E-04	0.136	20.3	2.67	7.7520E-04	0.134	20.0
2	3.00	7.2556E-04	0.130	19.5	3.20	6.9834E-04	0.129	19.2
2	4.00	6.0599E-04	0.123	18.5	4.27	5.8009E-04	0.122	18.3
2	5.00	5.1873E-04	0.119	17.9	5.33	4.9479E-04	0.117	17.7

0

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)	****EXTRAPOLATED WINDS**** WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)
3	2.00	9.5443E-04	0.213	21.6	2.18	9.1871E-04	0.208	21.1
3	2.50	8.5952E-04	0.200	20.3	2.72	8.2140E-04	0.196	19.9
3	3.00	7.7841E-04	0.191	19.5	3.27	7.3994E-04	0.188	19.2
3	4.00	6.5128E-04	0.181	18.5	4.36	6.1457E-04	0.178	18.2
3	5.00	5.5812E-04	0.174	17.9	5.45	5.2413E-04	0.171	17.7
3	7.00	4.3422E-04	0.166	17.1	7.63	4.0711E-04	0.164	16.9
3	10.00	3.2922E-04	0.158	16.5	10.90	3.0686E-04	0.157	16.3
3	12.00	2.8327E-04	0.156	16.2	13.08	2.6339E-04	0.154	16.1
3	15.00	2.3411E-04	0.153	15.9	16.35	2.1714E-04	0.152	15.9

0 ****EXTRAPOLATED WINDS****

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)
4	0.50	9.09[illegible]	0.775	40.1	0.56	9.3524E-04	0.718	37.6
4	0.80	9.85[illegible]	0.570	30.8	0.89	9.8820E-04	0.536	29.3
4	1.00	9.84[illegible]	0.503	27.8	1.11	9.7500E-04	0.476	26.5
4	1.50	9.21[illegible]	0.416	23.6	1.67	8.9328E-04	0.398	22.8
4	2.00	8.38[illegible]	0.373	21.6	2.23	8.0193E-04	0.359	20.9
4	2.50	7.60[illegible]	0.347	20.3	2.78	7.2054E-04	0.336	19.8
4	3.00	6.92[illegible]	0.329	19.5	3.34	6.5132E-04	0.321	19.1
4	4.00	5.83[illegible]	0.308	18.5	4.45	5.4341E-04	0.301	18.2
4	5.00	5.01[illegible]	0.300	17.9	5.57	4.6409E-04	0.297	17.6
4	7.00	3.9123E-04	0.287	17.1	7.80	3.6109E-04	0.283	16.9
4	10.00	2.9723E-04	0.275	16.5	11.14	2.7229E-04	0.271	16.3
4	12.00	2.5595E-04	0.269	16.2	13.36	2.3376E-04	0.267	16.1
4	15.00	2.1170E-04	0.264	15.9	16.70	1.9274E-04	0.262	15.8
4	20.00	1.6426E-04	0.259	15.7	22.27	1.4906E-04	0.258	15.6

****EXTRAPOLATED WINDS****

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)
5	2.00	2.7771E-04	0.999	33.9	2.28	2.5669E-04	0.978	33.1
5	2.50	2.4224E-04	0.958	32.6	2.84	2.2351E-04	0.932	31.8
5	3.00	2.1617E-04	0.921	31.5	3.41	1.9918E-04	0.895	30.9
5	4.00	1.7990E-04	0.867	30.1	4.55	1.6540E-04	0.844	29.4
5	5.00	1.5549E-04	0.831	29.0	5.69	1.4272E-04	0.810	28.4

****EXTRAPOLATED WINDS****

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	EFFECT HT (M)
6	2.00	2.8222E-04	1.594	30.7	2.28	2.6091E-04	1.545	30.1
6	2.50	2.4626E-04	1.511	29.6	2.84	2.2725E-04	1.464	29.0
6	3.00	2.1978E-04	1.447	28.8	3.41	2.0251E-04	1.405	28.2
6	4.00	1.8289E-04	1.356	27.6	4.55	1.6812E-04	1.318	27.1
6	5.00	1.5802E-04	1.293	26.7	5.69	1.4499E-04	1.260	26.2

(1) THE DISTANCE TO THE POINT OF MAXIMUM CONCENTRATION IS SO GREAT THAT THE SAME STABILITY IS NOT LIKELY TO PERSIST LONG ENOUGH FOR THE PLUME TO TRAVEL THIS FAR.

(2) THE PLUME IS OF SUFFICIENT HEIGHT THAT EXTREME CAUTION SHOULD BE USED IN INTERPRETING THIS COMPUTATION AS THIS STABILITY TYPE MAY NOT EXIST TO THIS HEIGHT. ALSO WIND SPEED VARIATIONS WITH HEIGHT MAY EXERT A DOMINATING INFLUENCE.

(3) NO COMPUTATION WAS ATTEMPTED FOR THIS HEIGHT AS THE POINT OF MAXIMUM CONCENTRATION IS GREATER THAN 100 KILOMETERS FROM THE SOURCE.

MONSANTO PENSACOLA

AMMONIA FLARE

Table 1

ISCST Receptor Locations

Point Number	Angle Degrees	Radius Miles	Radius Meters
1	170	2.05	3299
2	180	1.90	3058
3	190	1.70	2736
4	200	1.50	2414
5	210	1.40	2253
6	220	1.35	2173
7	230	1.35	2173
8	240	1.40	2253
9	250	1.20	1931
10	260	1.65	2655
11	260	1.35	2173
12	270	1.40	2253
13	280	1.25	2012
14	290	1.15	1851
15	300	1.10	1770

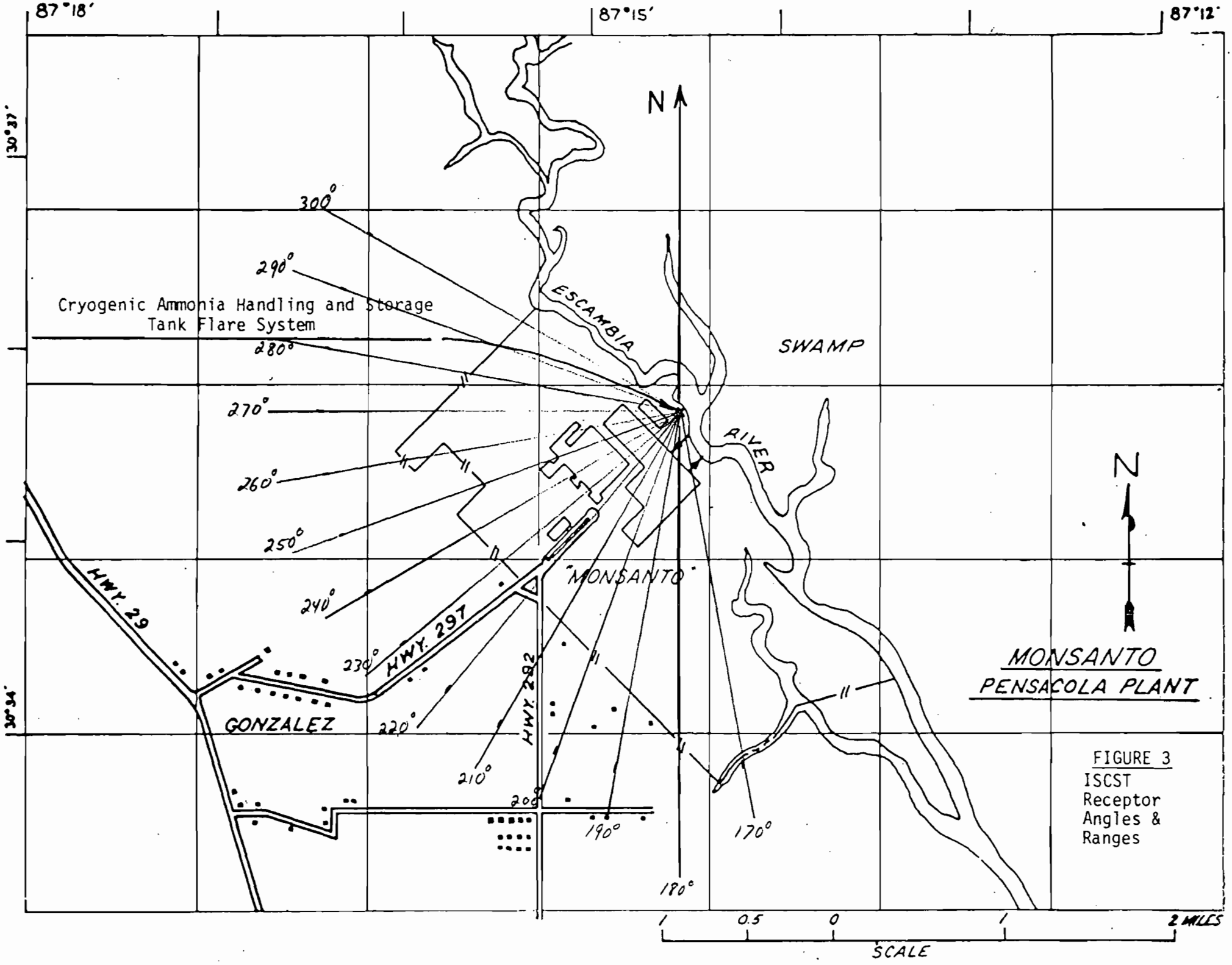


FIGURE 3
ISCST
Receptor
Angles &
Ranges

1

*** NH3 FLARE EMISSION - 50 PPH: PROPERTY LINE RECEPTORS ***

CALCULATE (CONCENTRATION=1,DEPOSITION=2)	ISW(1) =	1
RECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POLAR=2 OR 4)	ISW(2) =	2
DISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2)	ISW(3) =	2
TERRAIN ELEVATIONS ARE READ (YES=1,NO=0)	ISW(4) =	0
CALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0)	ISW(5) =	0
LIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2)	ISW(6) =	1
COMPUTE AVERAGE CONCENTRATION (OR TOTAL DEPOSITION)		
WITH THE FOLLOWING TIME PERIODS:		
HOURLY (YES=1,NO=0)	ISW(7) =	0
2-HOUR (YES=1,NO=0)	ISW(8) =	0
3-HOUR (YES=1,NO=0)	ISW(9) =	0
4-HOUR (YES=1,NO=0)	ISW(10) =	0
6-HOUR (YES=1,NO=0)	ISW(11) =	0
8-HOUR (YES=1,NO=0)	ISW(12) =	1
12-HOUR (YES=1,NO=0)	ISW(13) =	0
24-HOUR (YES=1,NO=0)	ISW(14) =	0
PRINT 'N'-DAY TABLE(S) (YES=1,NO=0)	ISW(15) =	0
PRINT THE FOLLOWING TYPES OF TABLES WHOSE TIME PERIODS ARE		
SPECIFIED BY ISW(7) THROUGH ISW(14):		
DAILY TABLES (YES=1,NO=0)	ISW(16) =	0
HIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0)	ISW(17) =	1
MAXIMUM 50 TABLES (YES=1,NO=0)	ISW(18) =	0
METEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2)	ISW(19) =	1
RURAL-URBAN OPTION (RURAL=0,URBAN MODE 1=1,URBAN MODE 2=2)	ISW(20) =	0
WIND PROFILE EXPONENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(21) =	1
VERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(22) =	1
SCALE EMISSION RATES FOR ALL SOURCES (NO=0,YES>0)	ISW(23) =	0
PROGRAM CALCULATES FINAL PLUME RISE ONLY (YES=1,NO=2)	ISW(24) =	1
PROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1)	ISW(25) =	1
NUMBER OF INPUT SOURCES	NSOURC =	1
NUMBER OF SOURCE GROUPS (=0,ALL SOURCES)	NGROUP =	0
TIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS)	IPERD =	0
NUMBER OF X (RANGE) GRID VALUES	NXPNTS =	0
NUMBER OF Y (THETA) GRID VALUES	NYPNTS =	0
NUMBER OF DISCRETE RECEPTORS	NXWYPT =	15
SOURCE EMISSION RATE UNITS CONVERSION FACTOR	TK =	.14380E+04
ENTRAINMENT COEFFICIENT FOR UNSTABLE ATMOSPHERE	BETA1 =	0.600
ENTRAINMENT COEFFICIENT FOR STABLE ATMOSPHERE	BETA2 =	0.600
HEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED	ZR =	10.00 METERS
LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA	IMET =	9
DECAY COEFFICIENT FOR PHYSICAL OR CHEMICAL DEPLETION	DECAY =	0.0
SURFACE STATION NO.	ISS =	3855
YEAR OF SURFACE DATA	ISY =	75
UPPER AIR STATION NO.	IUS =	12884
YEAR OF UPPER AIR DATA	IUY =	75
ALLOCATED DATA STORAGE	LIMIT =	43500 WORDS
REQUIRED DATA STORAGE FOR THIS PROBLEM RUN	MIMIT =	350 WORDS

1

*** NH3 FLARE EMISSION - 50 PPH: PROPERTY LINE RECEPTORS ***

*** METEOROLOGICAL DAYS TO BE PROCESSED ***
(IF=1)

```
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1
```

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.0	.0	.0	.0	.0	.0
B	.0	.0	.0	.0	.0	.0
C	.0	.0	.0	.0	.0	.0
D	.0	.0	.0	.0	.0	.0
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

*** RANGE,THETA COORDINATES OF DISCRETE RECEPTORS ***
(METERS,DEGREES)

```
(  3299.0,   170.0), (  3058.0,   180.0), (  2736.0,   190.0), (  2414.0,   200.0), (  2253.0,   210.0),
(  2173.0,   220.0), (  2173.0,   230.0), (  2253.0,   240.0), (  1931.0,   250.0), (  2655.0,   260.0),
```

(2173.0, 260.0), (2253.0, 270.0), (2012.0, 280.0), (1851.0, 290.0), (1770.0, 300.0),
(

1

*** NH3 FLARE EMISSION - 50 PPH: PROPERTY LINE RECEPTORS ***

*** SOURCE DATA ***

SOURCE NUMBER	T Y P E	W A K E	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (GRAMS/SEC) TYPE=2 (GRAMS/SEC) *PER METER**2	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	HEIGHT (METERS)	TEMP. TYPE=0 (DEG.K); VERT.DIM TYPE=1 (METERS)	EXIT VEL. TYPE=0 (M/SEC); HORZ.DIM TYPE=1,2 (METERS)	DIAMETER TYPE=0 (METERS)	BLDG. HEIGHT TYPE=0 (METERS)	BLDG. LENGTH TYPE=0 (METERS)	BLDG. WIDTH TYPE=0 (METERS)
1	0	0	0	0.63000E+01	0.0	0.0	10.0	25.40	1883.00	9.80	0.15	0.0	0.0	0.0

1

HIGH 8-HR SGROUP# 1

*** NH3 FLARE EMISSION - 50 PPH: PROPERTY LINE RECEPTORS ***

* HIGHEST 8-HOUR AVERAGE CONCENTRATION PARTS PER MILLION (VOL) *
* FROM ALL SOURCES *
* FOR THE DISCRETE RECEPTOR POINTS *

- RNG -	- DIR -	CON.	(DAY,PER.)	- RNG -	- DIR -	CON.	(DAY,PER.)
3299.0	170.0	0.08860	(226, 1)	3058.0	180.0	0.08160	(153, 1)
2736.0	190.0	0.13526	(329, 1)	2414.0	200.0	0.10006	(180, 1)
2253.0	210.0	0.09156	(117, 1)	2173.0	220.0	0.06256	(268, 3)
2173.0	230.0	0.10151	(24, 2)	2253.0	240.0	0.04000	(213, 3)
1931.0	250.0	0.06654	(250, 3)	2655.0	260.0	0.10817	(111, 3)
2173.0	260.0	0.11700	(111, 3)	2253.0	270.0	0.07509	(253, 1)
2012.0	280.0	0.10834	(311, 1)	1851.0	290.0	0.05492	(24, 3)
1770.0	300.0	0.05213	(301, 3)				

1

2ND HIGH 8-HR SGROUP# 1

*** NH3 FLARE EMISSION - 50 PPH: PROPERTY LINE RECEPTORS ***

* SECOND HIGHEST 8-HOUR AVERAGE CONCENTRATION PARTS PER MILLION (VOL) *
* FROM ALL SOURCES *
* FOR THE DISCRETE RECEPTOR POINTS *

- RNG -	- DIR -	CON.	(DAY,PER.)	- RNG -	- DIR -	CON.	(DAY,PER.)
3299.0	170.0	0.07120	(225, 3)	3058.0	180.0	0.05827	(335, 3)
2736.0	190.0	0.07761	(292, 3)	2414.0	200.0	0.05556	(344, 3)
2253.0	210.0	0.06761	(301, 1)	2173.0	220.0	0.04804	(321, 3)

2173.0	230.0	0.05602	(165, 1)	2253.0	240.0	0.03937	(171, 1)
1931.0	250.0	0.05819	(347, 1)	2655.0	260.0	0.07952	(241, 3)
2173.0	260.0	0.08933	(241, 3)	2253.0	270.0	0.03928	(19, 2)
2012.0	280.0	0.04317	(202, 1)	1851.0	290.0	0.05392	(28, 1)
1770.0	300.0	0.05067	(307, 3)				

Monsanto

WORKING FUND ACCOUNT
MONSANTO COMPANY
PENSACOLA, FLORIDA

720 06996 62-20/311

11-04-86

$100.00

EXACTLY ONE HUNDRED DOLLARS

PAY TO THE ORDER OF ▶ DEPARTMENT OF ENVIRONMENTAL REGULATION

Citibank (Delaware)

C A Simmons
Maria A. Saladarriaga

[redacted]

MONSANTO COMPANY, PENSACOLA, FLORIDA

-45 11-04-86 THE ATTACHED CHECK IS IN PAYMENT OF THE FOLLOWING: 720 06996

DEPARTMENT OF ENVIRONMENTAL REGULATION

MEMO	DATE	INVOICE NO.	AMOUNT	DEDUCTIONS & DISCOUNT	NET
onstruction Permit pplication Fee for mmonia Flare - . McLeod	11-04-86		$100.00		$100.00

DETACH BEFORE DEPOSITING

CH 142

Monsanto

WORKING FUND ACCOUNT
MONSANTO COMPANY
PENSACOLA, FLORIDA

720 06995 62-20/311

11-04-86

$100.00

EXACTLY ONE HUNDRED DOLLARS

PAY TO THE ORDER OF ▶ DEPARTMENT OF ENVIRONMENTAL REGULATION

Citibank (Delaware)

C A Simmons
Maria A. Saladarriaga

[redacted]

MONSANTO COMPANY, PENSACOLA, FLORIDA

-45 11-04-86 THE ATTACHED CHECK IS IN PAYMENT OF THE FOLLOWING: 720 06995

DEPARTMENT OF ENVIRONMENTAL REGULATION

MEMO	DATE	INVOICE NO.	AMOUNT	DEDUCTIONS & DISCOUNT	NET
onstruction Permit pplication Fee for urnout Furnace - . McLeod	11-04-86		$100.00		$100.00

DETACH BEFORE DEPOSITING

CH 142

AC 17-127872

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHWEST DISTRICT
160 GOVERNMENTAL CENTER
PENSACOLA, FLORIDA 32501

DER

NOV 24 1986

BAQM

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

ROBERT V. KRIEGEL
DISTRICT MANAGER

* APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Construction [X] New[1] [ ] Existing[1]

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

COMPANY NAME: Monsanto Company COUNTY: Escambia

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) 529A-Nylon Pyrolysis oven

SOURCE LOCATION: Street Intersection State Rds 292 & 297 City

UTM: East North

Latitude 30 ° 35 ' 28 "N Longitude 87 ° 14 ' 25 "W

APPLICANT NAME AND TITLE: W. J. Board, S.E. Dir., Governmental Affairs

APPLICANT ADDRESS: P. O. Box 12830, Pensacola FL 32575

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Monsanto Company

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

*Attach letter of authorization

Signed: W J Board

W. J. Board, S.E.Dir., Gov. Affairs

Name and Title (Please Type)

Date: 11/21/86 Telephone No. 904/968-7350

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

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

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

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

Signed Bruce P. McLeod, P.E.

Bruce P. McLeod, P.E.
Name (Please Type)

Monsanto Company
Company Name (Please Type)

P. O. Box 18230, Pensacola, FL 32575
Mailing Address (Please Type)

Florida Registration No. 26956 Date: 11/20/86 Telephone No. 904/968-8725

SECTION II: GENERAL PROJECT INFORMATION

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

Purchase and install a nylon pyrolysis oven with integral afterburner. Unit will be a Pollution Control Products Co. unit IGG 88 (see attached brochure).

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

Start of Construction _____ Completion of Construction _____

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

No separate pollution control systems. Afterburner is integral to the pyrolysis unit.

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

Identical to Permit AC17-104180 except unit described herein has approximately one-half of the capacity of the AC17-104180 unit.

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr_____; if seasonal, describe:_____

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

1. Is this source in a non-attainment area for a particular pollutant? No

   a. If yes, has "offset" been applied? _____

   b. If yes, has "Lowest Achievable Emission Rate" been applied? _____

   c. If yes, list non-attainment pollutants. _____

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. No

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. No

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   a. If yes, for what pollutants?_____

   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

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

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

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

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Nylon	N/A		15	

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

1. Total Process Input Rate (lbs/hr): _____

2. Product Weight (lbs/hr): _____

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

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
NOx	6.15(a)	2.1	N/A	N/A	6.15	2.1	
Particulates	0.005(c)	0.01	N/A	N/A	0.005	0.01	
Opacity	5% or less		5% or less	5% or less	N/A		

See Section V, Item 2.

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

Calculated from operating rate and applicable standard.

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

(a) See calculation #1
(b) 17-2.600(1) (a)
(c) See calculation #2
(d) Control device integral to the process so actual = potential emissions.

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

Name and Type (Model & Serial No.)	Contaminent	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
See supplements 1 and 2				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
See Section IV			

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

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

Other Fuel Contaminants (which may cause air pollution): _____

_____

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

Annual Average _____ Maximum _____

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

_____

_____

_____

_____

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

tack Height: _____ ft. Stack Diameter: _____ ft.

as Flow Rate: _____ ACFM _____ DSCFM Gas Exit Temperature: _____ °F.

ater Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated	See Supplement 2						
Uncontrolled (lbs/hr)							

escription of Waste Nylon Polymer

otal Weight Incinerated (lbs/hr) See Supplement 1 Design Capacity (lbs/hr) See supplement 1

pproximate Number of Hours of Operation per day 24 day/wk 7 wks/yr. 52

anufacturer Pollution Control Products Co., Dallas, Texas

ate Constructed _____ Model No. IG 88

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel Type	Fuel BTU/hr	Temperature (°F)
Primary Chamber	83 $ft.^3$	100,000	nat. gas	200,00	800 F
Secondary Chamber	6.54 $ft.^3$	150,000	nat. gas	400,000	1,400 F

Stack Height: 70 ft. above grade ft. Stack Diameter: 14" OD,10" ID Stack Temp. 1,400 F

Gas Flow Rate: 169 (@1,400 °F ACFM 40 DSCFM* Velocity: 13.3 FPS

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

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

[ ] Other (specify) _____

Brief description of operating characteristics of control devices:

The exhaust from the oven passes through the afterburner which is controlled between 1400-1500°F by controlling the rate of nylon degradation by means of a variable rate water quench spray.

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

Any ash residue from the nylon would be disposed of in compliance with solid waste and RCRA regulations.

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

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

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

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

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

[ ] Yes [ ] No

Contaminant	Rate or Concentration

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

[ ] Yes [ ] No

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

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

xplain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

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

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

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

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

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

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

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

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. _____ no. sites _____ TSP _____ ( ) SO_2* _____ Wind spd/dir

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

Other data recorded _____

Attach all data or statistical summaries to this application.

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

2. Instrumentation, Field and Laboratory

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

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location)_____

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

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

Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

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

Applicants Maximum Allowable Emission Data

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

Emission Data Used in Modeling

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

Attach all other information supportive to the PSD review.

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

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

SECTION V SUMMARY

Item 1. Not applicable
See Supplement 1

Item 2. See Supplements 1 & 2 and
Calculations 1 & 2

Item 3. Noted in Section III-C footnote

Item 4. See Supplements 1 & 2

Item 5. See Supplement 2

Item 6. See Supplement 1

Item 7. See Figure 1

Item 8. See Figure 1

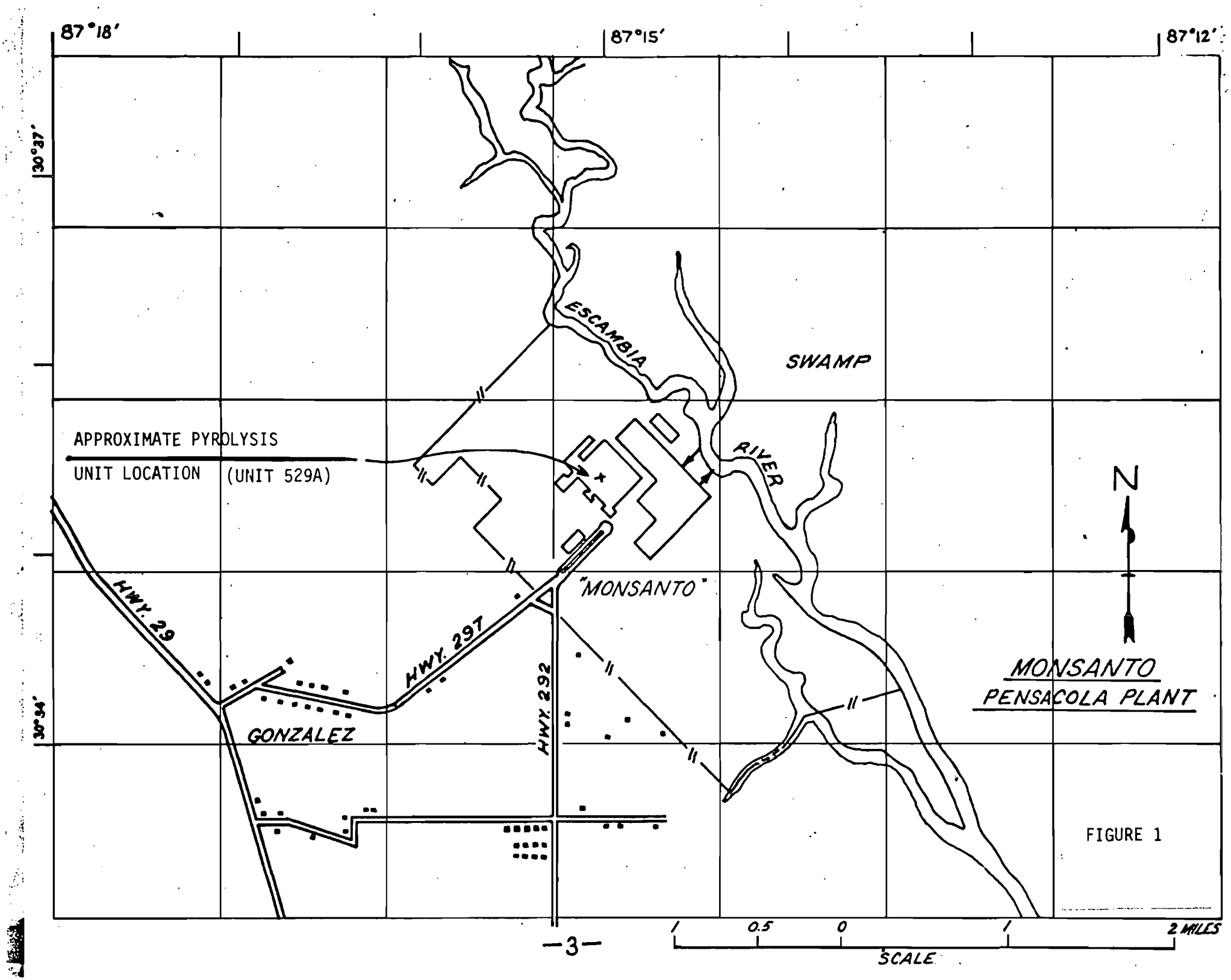

87°18'
87°15'
87°12'
30°37'
30°34'
ESCAMBIA
SWAMP
RIVER
APPROXIMATE PYROLYSIS
UNIT LOCATION (UNIT 529A)
"MONSANTO"
HWY. 29
HWY. 297
HWY. 292
GONZALEZ
N
MONSANTO
PENSACOLA PLANT
0.5
0
2 MILES
SCALE

FIGURE 1

CALCULATION #1

MONSANTO PENSACOLA
NYLON POLYMERIZATION EQUIPMENT

Calculation of NOx emission from natural gas burning - reference section 1.4-2, AP42.

NOx factor: $\frac{100 \text{ lb. NOx}}{10^6 \text{ ft.}^3 \text{ gas}}$ (from AP-42)

Heat input: $\frac{250{,}000 \text{ Btu}}{\text{Hr.}} = \frac{240 \text{ ft}^3 \text{ gas}}{\text{Hr.}}$

Lbs. NOx = $\frac{240 \text{ ft}^3 \text{ gas}}{\text{Hr.}} \times \frac{100 \text{ lbs. NOx}}{10^6 \text{ ft}^3 \text{ gas}}$

$\frac{0.024 \text{ lb.NOx}}{\text{Hr.}} = \frac{0.1 \text{ tons NOx}}{\text{Yr.}}$

Maximum NOx = 2 x expected NOx = 2 x 0.024 = $\frac{0.05 \text{ lb. NOx}}{\text{Hr.}}$

Calculation of NOx from organic nitrogen (assuming all organic nitrogen converted to NOx)

$\frac{15 \text{ lb.}}{\text{Hr.}} \times \frac{28}{226}$ (fraction nitrogen in nylon) x

$\frac{46 \text{ (MW NOx)}}{14 \text{ (MW Nitrogen)}} = \frac{6.1 \text{ lb. NOx}}{\text{Hr.}}$

$\frac{10{,}000 \text{ lb nylon.}}{\text{Yr.}} \times \frac{28}{226} \times \frac{46}{14} \times \frac{1 \text{ ton}}{2{,}000 \text{ lbs.}} =$

2.0 tons/year

SECTION III C EMISSIONS

Maximum hourly lbs/hr. NOx = 0.05 + 6.1 = 6.15 lb./hr. NOx

Actual tons/yr. NOx = 0.1 + 2.0 = 2.1 tons/yr. NOx

CALCULATION #2

MONSANTO PENSACOLA

NYLON POLYMERIZATION EQUIPMENT

Calculation of particulate emission from natural gas burning; reference section 1.4-2, AP 42.

Particulates factor: $\frac{10 \text{ lb. particulates}}{10^6 \text{ ft.}^3 \text{ gas}}$

Heat input = $\frac{250{,}00 \text{ Btu}}{\text{Hr.}}$ = $\frac{240 \text{ ft.}^3 \text{ gas}}{\text{Hr.}}$

Lb. particulates = $\frac{240 \text{ ft.}^3 \text{ gas}}{\text{Hr.}}$ x $\frac{10 \text{ lb. NOx}}{10^6 \text{ ft.}^3 \text{ gas}}$ =

.0024 lb./hr. particulates = 0.01 tons/year

Maximum hourly particulates = 2 x expected particulates =

2 x .0024 = 0.005 lb./hr.

SUPPLEMENT #1

MONSANTO, PENSACOLA

DISCUSSION OF NYLON POLYMER OVEN

AFTERBURNER CONTROL

Gas flow and air flow are held constant in both the oven section (primary chamber) and in the afterburner section (secondary chamber).

The afterburner temperature is factory set to achieve 1400° minimum temperature. This is not a field adjustable parameter.

As pyrolysis gases reach the afterburner, the afterburner temperature rises because of the heating value of these materials.

Pyrolysis rate in the primary chamber is controlled by water quenching. The rate of water flow is adjusted to maintain 1400-1500° afterburner temperature.

The primary chamber gas burners will not operate unless the secondary chamber (afterburner) burners are operating.

PROCESS DESCRIPTION

External oven dimensions are 57" wide x 83" long x 73" high. Nylon is heated in the primary chamber to between 800-900°F where it degrades to volatile compounds. These materials exit through the afterburner which provides 1/2 second residence time at a minimum temperature of 1400°F.

INCINERATION RATE

Maximum nylon per charge is 100 lbs. Maximum nylon burn off rate is 15 lbs./hr. Maximum annual nylon incineration capacity is 10,000 lbs.

Clean your plastics extruder hardware and other polymer or adhesive production equipment the easy way with a

CONTROLLED PYROLYSIS™ CLEANING FURNACE

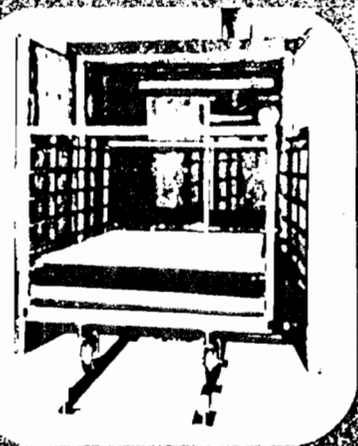
THIS FURNACE REMOVES PLASTICS AND COATINGS OF CONVENTIONAL HYDROCARBONS FROM METAL PARTS BY THERMAL PYROLYSIS (CLEANING WITH HEAT). THE PARTS ARE HEATED TO 800-900°F (427-482°C) IN A OXYGEN-DEFICIENT ATMOSPHERE AND THE PLASTICS ARE DECOMPOSED TO VOLATILE SMOKE. THE SMOKE PASSES THROUGH A COMBUSTION CHAMBER AND IS RAISED TO 1400°F (760°C) FOR A MINIMUM OF ONE-HALF SECOND WITH SUFFICIENT AIR TO COMPLETELY BURN IT BEFORE VENTING TO THE ATMOSPHERE. THE DISCHARGED EFFLUENT CONSISTS PRIMARILY OF CARBON DIOXIDE AND WATER VAPOR WHICH ARE INVISIBLE, ODORLESS, AND HARMLESS.

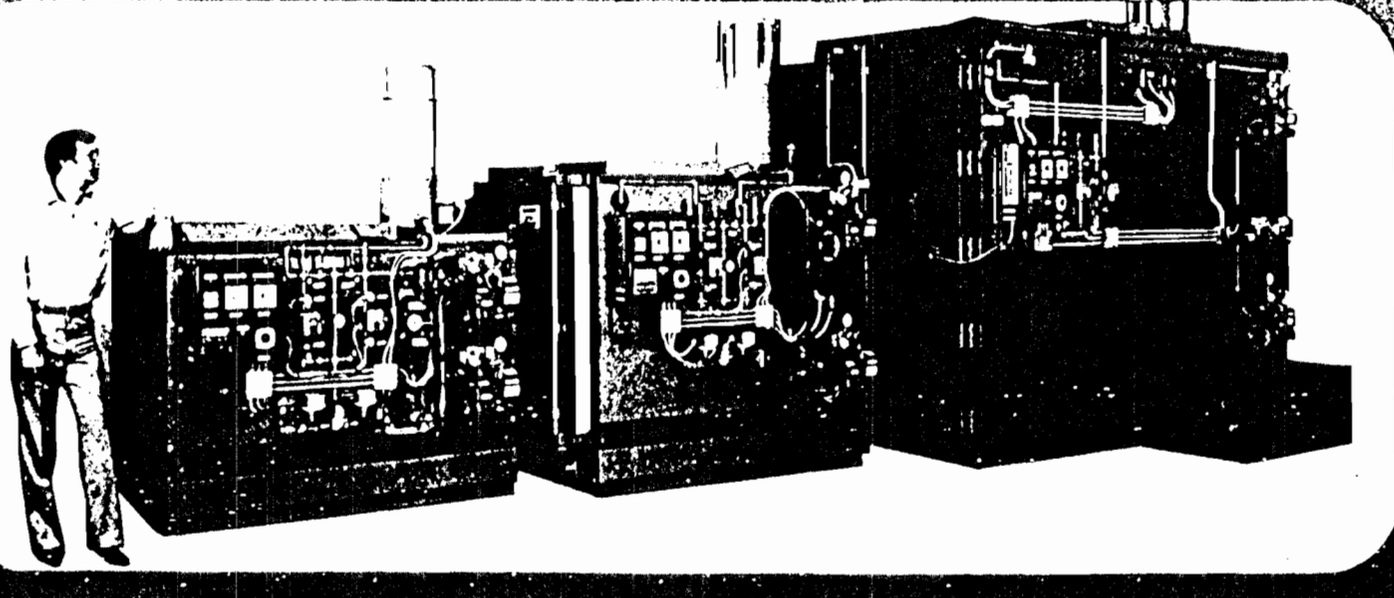
PLASTICS WHICH WILL MELT AND FLOW DURING CLEANING DRAIN FROM THE PARTS INTO A COOL COLLECTION CHAMBER WHERE THE PLASTIC SOLIDIFIES AND CAN BE EASILY REMOVED. THIS FEATURE ALLOWS SIGNIFICANTLY SHORTER CLEANING TIMES FOR METAL PARTS CONTAMINATED WITH RELATIVELY LARGE AMOUNTS OF PLASTIC.

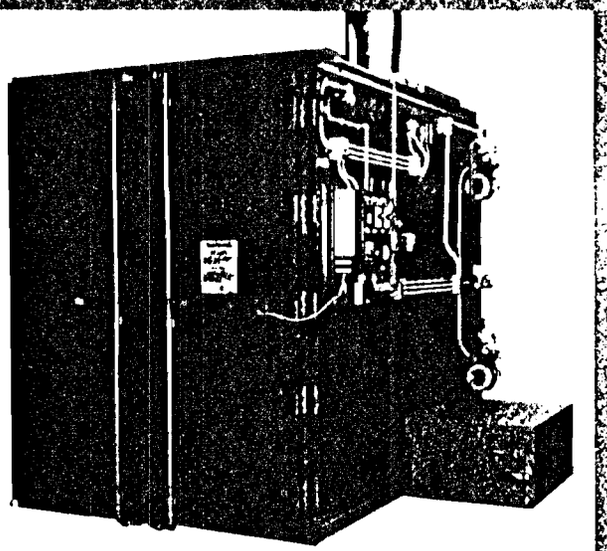
INTERIOR VOLUMES

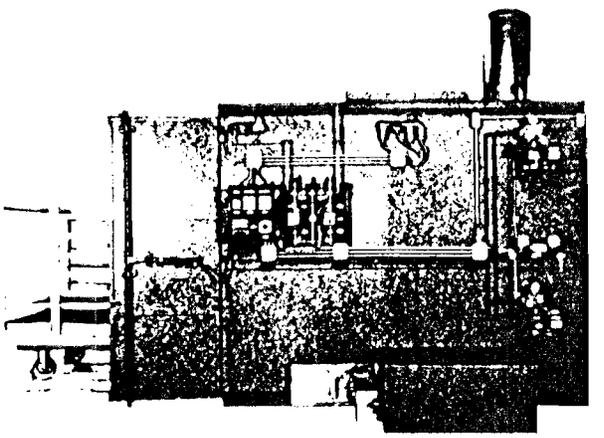
27 to 340 CUBIC FEET

Available in a wide range of sizes. Seven standard models with interior dimensions 3' wide × 3' high × 3' deep up to 7' × 7' × 7'. Custom sizes also available. Heavy duty carts are designed to hold a variety of parts and rolls outside the furnace on removable tracks for easy loading and unloading.

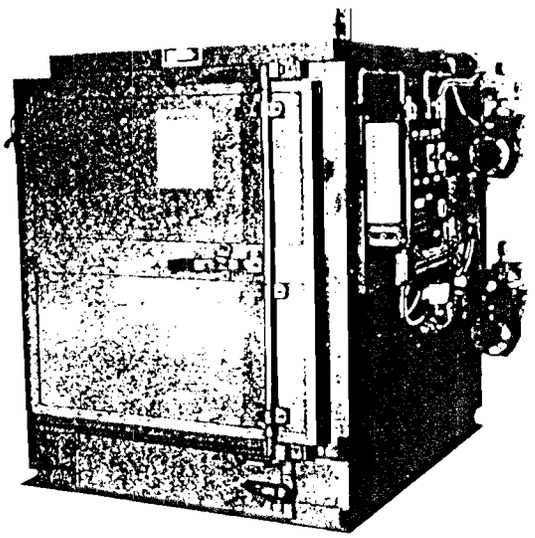


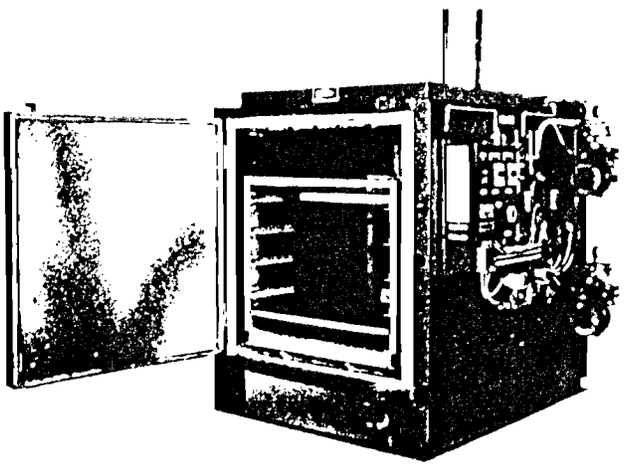






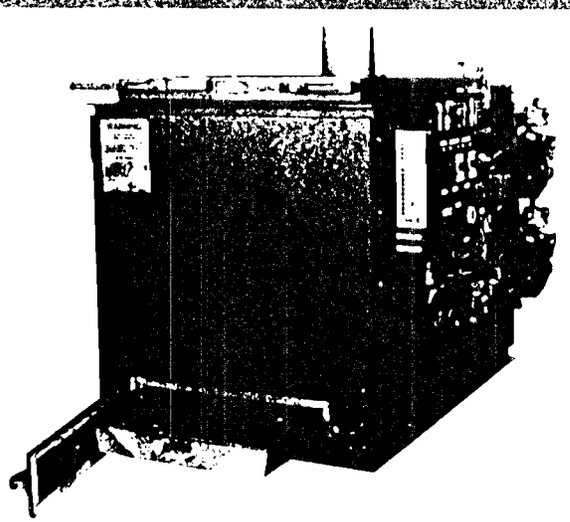
IGG-88, 150, 260, 290, and 340 have collection chambers on side. Carts roll out on removable tracks for easy loading/unloading. IGG-260 shown.

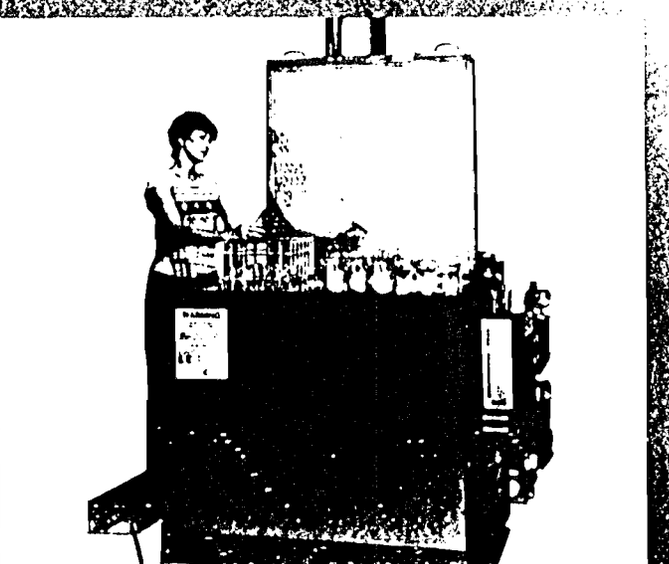




Front loading IGG-52 has collection chamber under furnace.

Cart rolls out on removable tracks. (not shown)





SPECIFICATIONS AND DATA

CABINET: Heavy-gauge sheet steel supported by structural steel angles and channels. All-welded construction with sealed seams to prevent air leakage gives maximum fuel economy and safety.

FLOOR: Hard castable refractory, 3" thick, reinforced with structural steel channels.

DOORS: Equipped with cam-type lock assemblies, tad-pole sealing gaskets, and stay-open hooks. Doors open slightly over 90°. Door switch ensures door(s) are open during timed purge before burners are ignited.

EXPLOSION RELIEF: Required on all furnaces and ovens. Unique gravity-sealed top relief automatically opens to relieve excess pressure, then closes, preventing air from reaching combustible material. Conventional spring-latched front doors or blow-out panels used for explosion relief do not provide this important safety feature because, once opened, such doors or panels do not close to keep out air, and material inside will burn freely.

INSULATION: Walls are covered with 4" of a two-layered light-weight ceramic fiber blanket insulation anchored on stainless steel pins, stainless wire mesh, and stainless locking washers. Contains no asbestos and has superior properties to asbestos or fiberglass. Hot face insulation rated at 2300°F (1260°C) and one inch is equivalent to 9" of conventional refractory or firebrick with one-tenth the weight, making these furnaces much lighter in weight and much faster to heat with less fuel. Ceilings and doors are covered with 3" of the two layered insulation. Special outer sheet metal panels with air insulating construction reduce the outer wall temperatures of the sides and back to a minimum.

VENT STACK: Made in 36" long light-weight sections for easy erection. Galvanized metal exterior lined with high-temperature ceramic fiber in hard form. Sections snap together. Adjustable-pitch roof flashing, storm collar, and rain cap furnished with stack.

FUELS: Natural gas, propane gas, or #2 fuel oil. Minimum input 250,000 BTU/hr. to maximum 375,000 BTU/hr. Gas pressure required 7 inches water column (.18 meter). Gas train equipped with approved low and high gas pressure switches, electric main safety gas shut-off valve, and test cock.

ELECTRICAL SERVICE: 110-125 volts, 50-60 hertz, single-phase, 7 ampere draw. Optional transformers available for other voltages.

WATER SUPPLY: Minimum pressure 40 psi (2 atmos.); maximum 100 psi (6 atmos.) for water injection system. Minimum flow rate 0.3 gpm (1.2 liter/min.) to 0.9 gpm (3.6 liter/min.). Water spray injection is intermittent, on demand from temperature controllers, not continuous.

NORMAL CLEANING TIME: Typically 2-4 hours plus cooling time. Actual cleaning times vary with the amount of metal and polymer loaded to furnace. Time adjustable 0-12 hours.

NORMAL CLEANING TEMPERATURE: 800-900°F (427-482°C). Two dual-set point temperature controllers, range 0-2000°F (-18°C to 1093°C) with Fahrenheit and Celsius scales.

POLLUTION STANDARDS: Meets latest E.P.A. Federal Standards for Incinerators.

SAFETY AND HEALTH STANDARDS: Meets latest O.S.H.A. Federal Standards.

INSURANCE STANDARDS: Meets most state and local codes.

MODEL NO.	OUTSIDE DIMENSIONS						DOOR OPENING				INSIDE DEPTH FRONT TO BACK		CART INSIDE DIMENSIONS						APPROX. SHIP. WT.	
	WIDTH		DEPTH		HEIGHT		WIDTH		HEIGHT				WIDTH		DEPTH		HEIGHT			
	IN.	M.	IN.	M.	IN.	M.	IN.	M.	IN.	M.	IN.	M.	IN.	M.	IN.	M.	IN.	M.	LBS	KGS
IGG 27	45	1.14	65	1.65	52	1.32	34	0.86	36	0.91	36	0.91	25	0.64	32	0.82	28	0.71	1960	890
IGG 52	51	1.30	71	1.80	65	1.66	40	1.02	45	1.14	48	1.22	31	0.79	45	1.14	32	0.82	2340	1061
PROPOSED UNIT → IGG 88	57	1.45	83	2.11	73	1.85	46	1.17	60	1.52	52	1.32	37	0.94	48	1.22	36	0.91	3770	1710
IGG 150	69	1.75	95	2.41	85	2.16	58	1.47	72	1.83	64	1.63	49	1.24	60	1.52	48	1.22	4960	2250
IGG 260	75	1.91	119	3.02	98	2.49	64	1.63	84	2.13	88	2.24	55	1.40	84	2.13	60	1.52	6670	3025
IGG 290	81	2.06	119	3.02	98	2.49	70	1.78	84	2.13	88	2.24	61	1.55	84	2.13	60	1.52	6870	3116
IGG 340	93	2.36	119	3.02	98	2.49	82	2.08	84	2.13	88	2.24	73	1.85	84	2.13	60	1.52	7190	3261
IGG 391	93		131		98		82		84		100		73		96		60		7500	

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SUPPLEMENT #2

MONSANTO PENSACOLA

DISCUSSION OF AFTERBURNER EFFICIENCY

See pages 172 and 181 (attached) from the Air Pollution Engineering Manual, Publication AP-40, US-EPA.

These sections show that 1/2 second residence time at a minimum of 1400°F can be expected to yield 95+% destruction efficiency.

AIR POLLUTION ENGINEERING MANUAL

SECOND EDITION

U.S. ENVIRONMENTAL PROTECTION AGENCY

CHAPTER 5

CONTROL EQUIPMENT FOR GASES AND VAPORS

AFTERBURNERS

Afterburners, also called vapor incinerators, are air pollution control devices in which combustion converts the combustible materials in gaseous effluents to carbon dioxide and water. The combustible materials may be gases, vapors, or entrained particulate matter and may contribute opacity, odor, irritants, "fallout" materials, photochemical reactivity, and toxicity to the effluents. In many cases, an afterburner can be designed and operated at an efficiency high enough to eliminate or reduce the opacity, odor, irritants, and fallout and also the photochemically reactive and toxic qualities of the effluent to levels required for compliance with air pollution standards.

The two types of afterburners in use are (1) direct flame and (2) catalytic. Direct-flame afterburners, sometimes called direct-fired afterburners, depend upon flame contact and relatively high temperatures to burn the combustible materials. Catalytic afterburners operate by preheating the contaminated effluent to a predetermined temperature (usually lower than the operating temperature of the direct-flame afterburner) and then promoting further oxidation of the combustibles by bringing them into contact with a catalyst. In Los Angeles County, which has standards for emissions of organic materials (Rule 66), afterburners are essentially all of the direct-flame type.

DIRECT-FLAME AFTERBURNERS

Direct-flame afterburners consist of a refractory-lined chamber (which may vary in cross-sectional size along its length), one or more burners, temperature indicator-controllers, safety equipment, and sometimes heat-recovery equipment such as heat exchangers. Figures 98 through 106 show external views of direct-flame afterburners and illustrate the diversity of shapes and processes that can be vented.

DESIGN PRINCIPLES

An efficient direct-flame afterburner design must provide for (1) contact between the air contaminants and the burner flame, (2) adequate time for the combustion process, (3) sufficiently high temperature in the afterburner for the complete oxidation of the combustibles, and (4) adequate velocities to insure that mixing take place without quenching combustion.

The operation of direct-flame afterburners is relatively simple. The contaminated gases are delivered to the afterburner by an exhaust system. The gases are mixed thoroughly with the burner flames in the upstream part of the unit and then pass through the remaining part of the chamber where the combustion process is completed, prior to being discharged to the atmosphere. Figure 107 shows a sectional view of a typical afterburner.

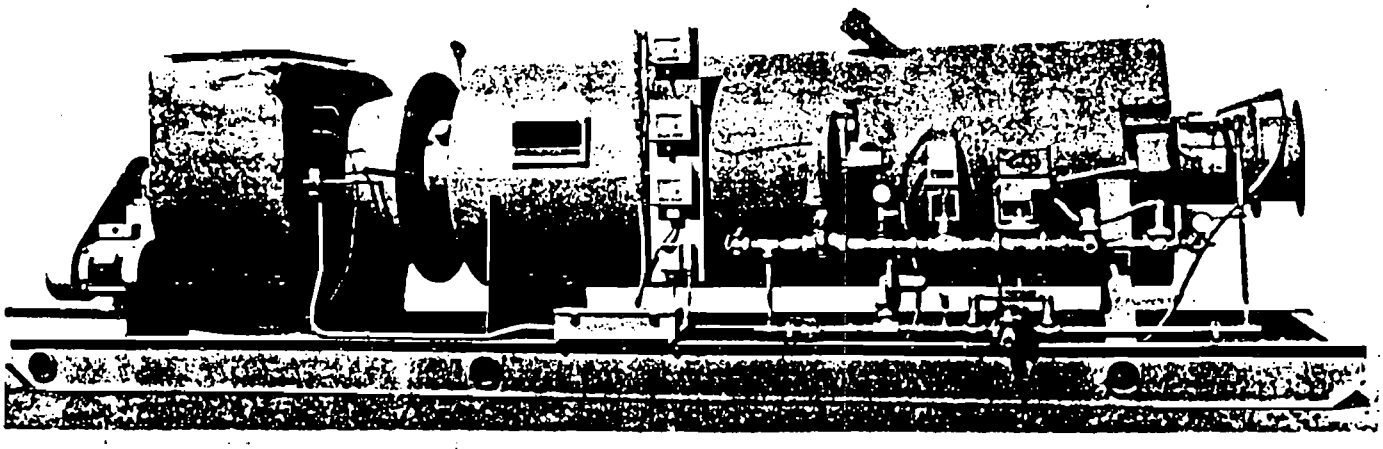

Figure 98. External view of direct-flame afterburner (Gas Processors, Inc., Brea, Calif.).

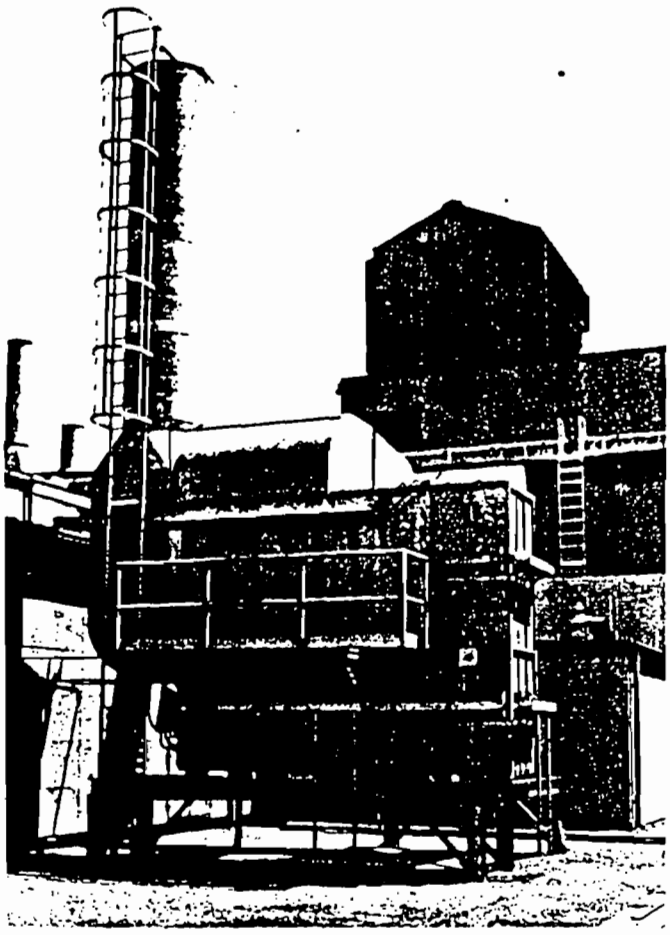

Figure 99. Direct-flame afterburner venting automotive assembly plant oven (GM Assembly Division, General Motors Corporation, Van Nuys, Calif.).

AFTERBURNER CHAMBER

The afterburner chamber may be cylindrical or rectangular in cross section and is constructed of refractory materials inside of a mild-steel shell. The refractory may be fire brick or castable refractory material. The chamber consists of a mixing section and a combustion section. The mixing section must provide for intimate contact between the contaminated gases and the burner flame. This area, therefore, is designed to provide high-velocity flow to insure turbulence and hence good mixing. Usual velocities for this zone vary between 25 and 50 feet per second (fps).

The portion of the chamber downstream of the mixing section is called the combustion chamber, and the velocity in this section is usually 20 to 40 fps. The overall retention time of the gases flowing through the unit should be 0.3 to 0.5 second. Afterburner discharge temperatures range from 1000° to 1500° F, depending upon the particular air-pollution problem. Table 51 indicates recommended temperature ranges for various types of equipment. Higher afterburner discharge temperatures than those shown in this table will result in higher afterburner efficiencies.

GAS BURNERS FOR AFTERBURNERS

Among the several types of gas burners used successfully are nozzle-mixing premixing, multi-port, and mixing-plate burners. Nozzle-mixing, premixing, and multi-port burners are described in the burner section of this manual. Mixing-plate burners have been specifically developed for afterburner applications. Figures 108, 109, and 110 show burners of this type. These burners consist of a pipe with orifices for natural gas and vanes or plates, which are perforated or shaped in a variety of ways to give good mixing between a contaminated air stream and the natural gas fuel. Most of the contaminated gases go through the burner.

The choice of burner type and the arrangement of the burners in the afterburner vary widely. The exact method of burner placement depends not only on the burner type, but also on the design consideration that the contaminated gases be in intimate contact with the burner flame. Maximum afterburner efficiency occurs when all of the contaminated material passes through the burner. In contrast, efficiencies are much lower when the contaminated air and burner flame mix far outside the burner. Very low efficiency is associated with minimum flame contact.

Gas burner arrangements, sources of combustion air, and methods for securing flame contact with the contaminated air are discussed below.

Mixing-Plate Burner (Figures 108, 109, and 110)

Mixing-plate burners usually are placed across the inlet section of the afterburner body. All air for combustion of the natural gas originates from the contaminated air stream.

Intimate flame contact is secured by positioning the burners and "profile plates" to force the maximum amount of contaminated air through the burner and burner flames. Profile plates, usually made of stainless steel, are installed around the burner between the afterburner walls and the burners. A space of 1 to 2 inches remains between the plate and the burner. The extremely high velocity (200 fpm) ensures that the contaminated air not flowing through the burner will mix with the burner flames.

Multi-Port Burners

Multi-port burners usually are installed across a section of the afterburner separate from the main afterburner chamber. All air for combustion is taken from the contaminated air stream. However, most multi-port burners are not capable of handling all of the contaminated stream through the

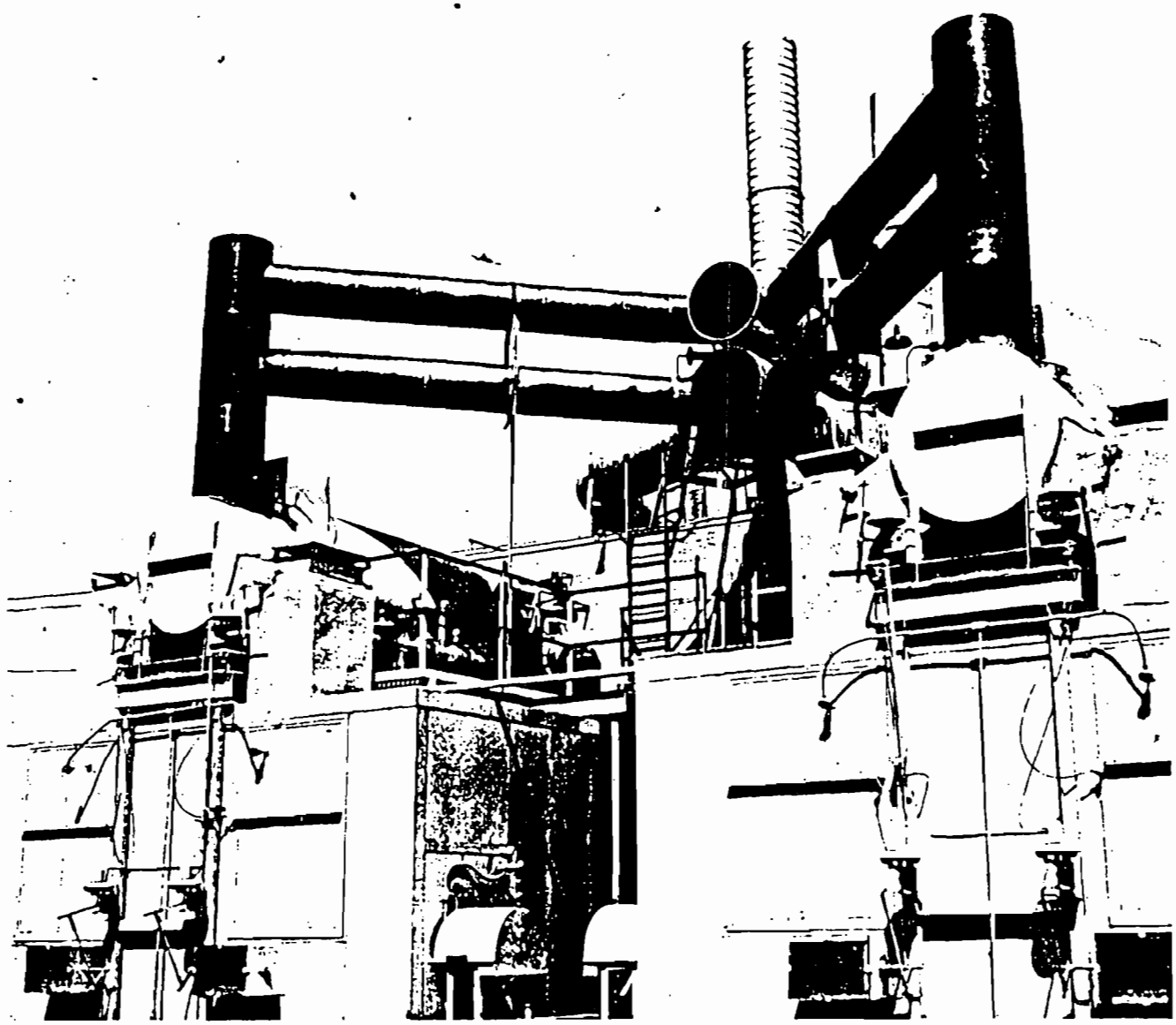

Figure 100. Two direct-flame afterburners controlling venting of organic emissions (American Cyanamid Co., Azusa, Calif.).

burner. Therefore, some of the air must be by-passed around the burner and then thoroughly mixed downstream with burner flames in a restricted and baffled area. For this reason, afterburners with multi-port burners may not be as efficient as units with mixing-plate burners. Efficiency of afterburners with multi-port burners will be influenced by the amount of contaminants that by-pass the burner.

Nozzle Mixing and Premixing Burners

The operation of these two types of burners is somewhat similar. They are arranged to fire tangentially into a cylindrical afterburner. Several burners or nozzles are required to ensure complete flame coverage. In addition, multiple nozzles may be arranged to fire along the length of the afterburner. Air for combustion of the fuel can be taken from outside air or from the contaminated air stream.

Mixing between the contaminated gases and the burner flame is achieved in a smaller cross-sectional area of the afterburner (called the mixing section). Tangentially fired afterburners may have the contaminated gases introduced tangentially or along the major axis of the cylinder.

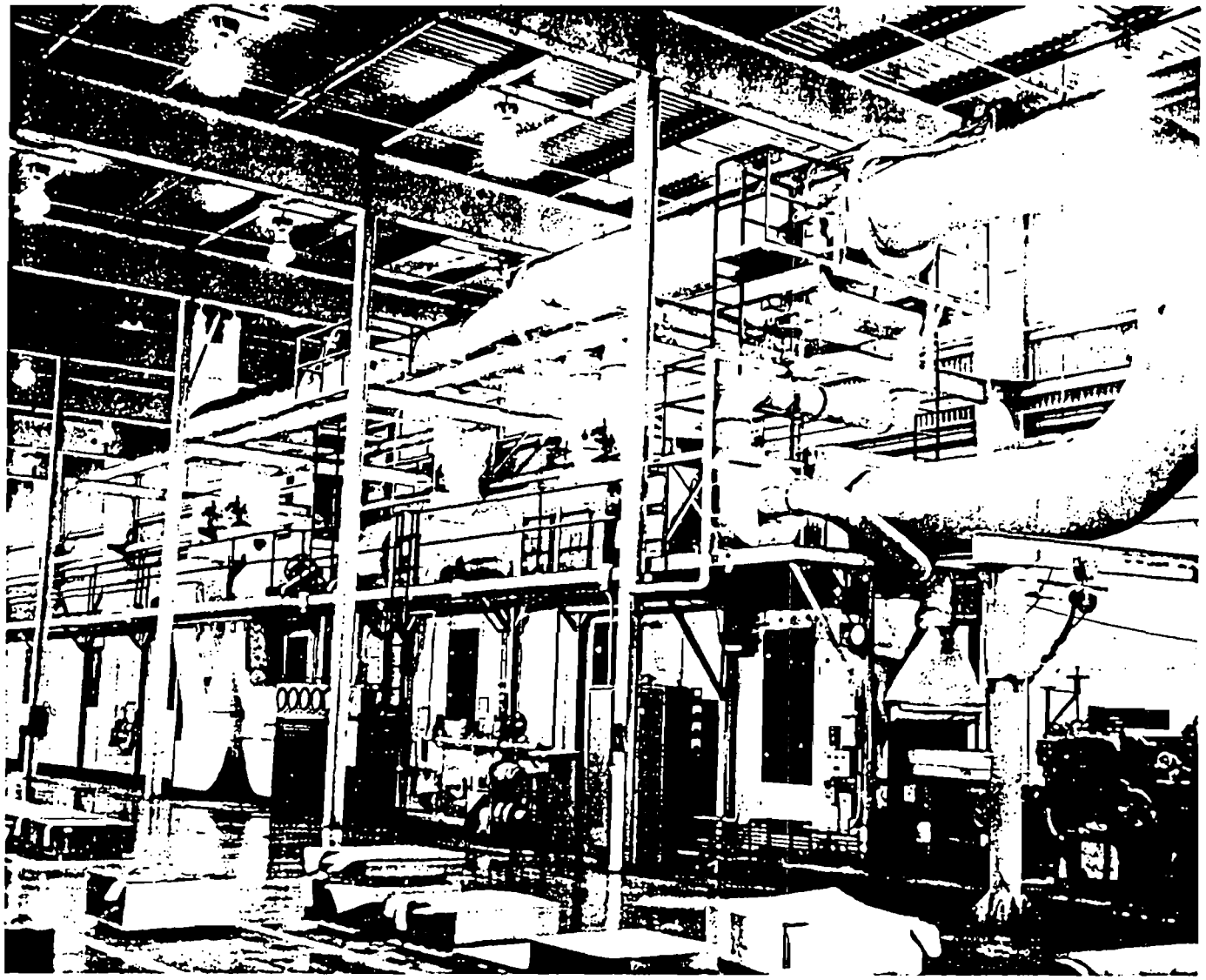

Figure 101. Direct-flame afterburner venting metal sheet lithographing line (American Can Co., Los Angeles, Calif.).

Refractory baffles and orifices also may be required to give the best possible mixing between flame and contaminated gases.

SOURCES OF COMBUSTION AIR FOR GAS BURNERS

As mentioned above, combustion air may be taken from the contaminated air stream or from ambient air. If the contaminated stream contains sufficient oxygen for combustion of the fuel and combustible contaminants, then additional oxygen is not required. Mixing-plate and multi-port burners supply the correct volume of air automatically. Premix and nozzle-mix burners require a blower and air-gas ratio controls to meter the proper mixture and combustion air. The combustion air for these burners comes from the contaminated air stream by branch ducting from the main exhaust duct. Using this contaminated air for combustion results in higher afterburner efficiency and fuel savings of 20 to 30 percent.

OIL FIRING OF AFTERBURNERS

Oil firing of afterburners is feasible provided that proper design practice is followed and good flame contact is assured. Although oil firing is possible, it may be undesirable from the standpoint of overall air pollution emissions. The combustion of oil produces oxides of sulfur from the sulfur-containing oil and may produce oxides of nitrogen greater than those from gas-fired units. For these reasons, oil firing may not be desirable for many locales or should be restricted, i.e., used only for periods when fuel gas is not available.

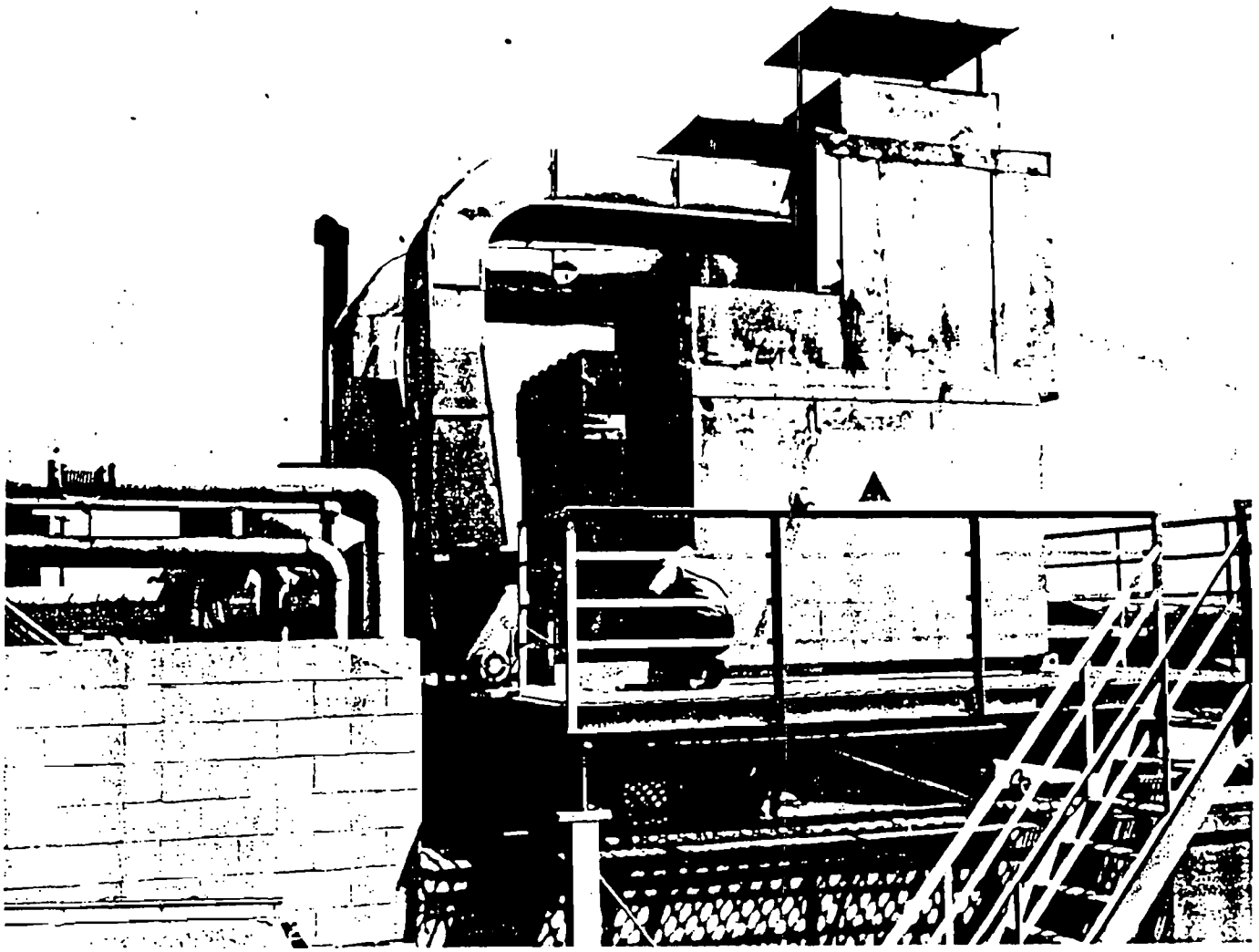

Figure 102. Direct-flame afterburner venting resin impregnating line (Synthane-Taylor Corporation, LaVerne, Calif.).

AFTERBURNER CONTROLS

Afterburner operating controls usually consist of a shielded thermocouple located in the discharge of the afterburner and an indicating-controlling pyrometer, which is coupled to the thermocouple. The pyrometer electrically or pneumatically controls gas and combustion air valves to modulate the amount of fuel fed to the afterburner. The mode of operation is fully modulating or high-low. The on-off control mode is undesirable since there are substantial periods when no burner flame is present with accompanying very low afterburner efficiency.

Safety controls consists of (1) flame safety devices to prove the presence of pilot burner flame, (2) timing devices to ensure that the afterburner is purged of combustibles before burner ignition, (3) high-temperature-limit controls to limit the afterburner temperature to a safe limit, and (4) pressure switches to detect low gas and air pressures and shut down the unit if pressures become too low.

DIRECT-FLAME AFTERBURNER EFFICIENCY

Afterburner efficiency is defined as:

$$\text{Efficiency (\%)} = \frac{(\text{lb contam/hr in}) - (\text{lb contam/hr out})}{\text{lb contaminant/hr in}} \times 100$$

As mentioned earlier, the efficiency of an afterburner is a function of retention time, operating temperature, flame contact, and velocity. There is no quantitative mathematical relationship that relates efficiency to these variables because the kinetics of the combustion process are complex and the flow in afterburners is not easily defined. Assuming good design, the following generalizations may be made with respect to afterburner efficiency:

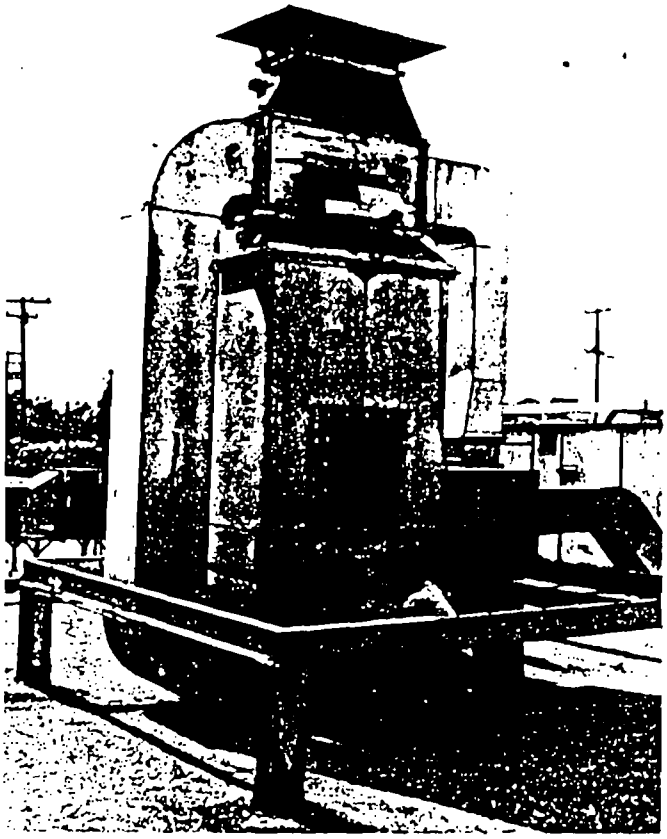

Figure 103. Direct-flame afterburner venting printing system (Avery Label Company, Div. of Avery Products Corporation; Monrovia, Calif.).

1. Overall efficiency increases with increasing afterburner operating temperature. Figure 111 illustrates this point.

2. Overall efficiency decreases if excessive preheat is given to the contaminated gases entering the afterburner.

3. Overall efficiency increases with increased flame contact between the contaminated gases and the burner flame.

4. Efficiency increases with retention time for retention times of less than 1 second.

5. Efficiency is a function of the afterburner design, and the inlet concentration of organic materials. No direct comparison can be made from one design to another.

6. An afterburner rarely attains 90 percent efficiency below 1300° F if the generation of carbon monoxide in the afterburner is included.

Tables 52 and 53 show typical data from tests on a large and a small afterburner.

In moderately efficient afterburners organic materials frequently decrease across the afterburner, but carbon monoxide levels increase. While this indicates some oxidation of organic materials, the materials discharged from the afterburner may be considerably more photochemically reactive, odorous, or irritating than the organic materials entering the afterburner. Thus, there may not be an overall improvement in the environment. In addition, the venting of carbon monoxide to the atmosphere is undesirable.

DIRECT-FLAME AFTERBURNER DESIGN PROBLEM

Given:

Source of air contaminants - paint bake oven

Oven effluent air volume - 4000 scfm

Contaminated air temperature at afterburner inlet - 300° F

Concentration of solvent - 300 ppm

Required afterburner efficiency - 90%

Problem:

Determine dimensions of afterburner, burner type, operating temperature, and required natural gas input.

1. Burner selection:

   The afterburner inlet gases will be relatively low in concentration (300 ppm). In addition, 90 percent efficiency based on carbon is required by Rule 66, which demands the best flame contact possible. On these bases, select a mixing plate burner.

2. Temperature selection:

   The 90 percent efficiency requirement dictates the choice of 1400° F as the minimum required operating temperature.

3. Burner capacity:

   a. Net heat required to raise contaminate air stream to 1400° F from 300° F

      Assumed properties of air:

      Enthalpy at 1400° F = 26.13 Btu/scf (see Table D4 in Appendix D)

      Enthalpy at 300 °F = 4.42 Btu/scf (See Table D-4 in Appendix D)

      Net enthalpy = 21.71 Btu/scf

      $Q_{net} = (4000)(60)(21.71) = 5.2 \times 10^6$ Btu/hr

   b. Natural gas input required:

      The hypothetical available heat for natural gas with 0% outside primary

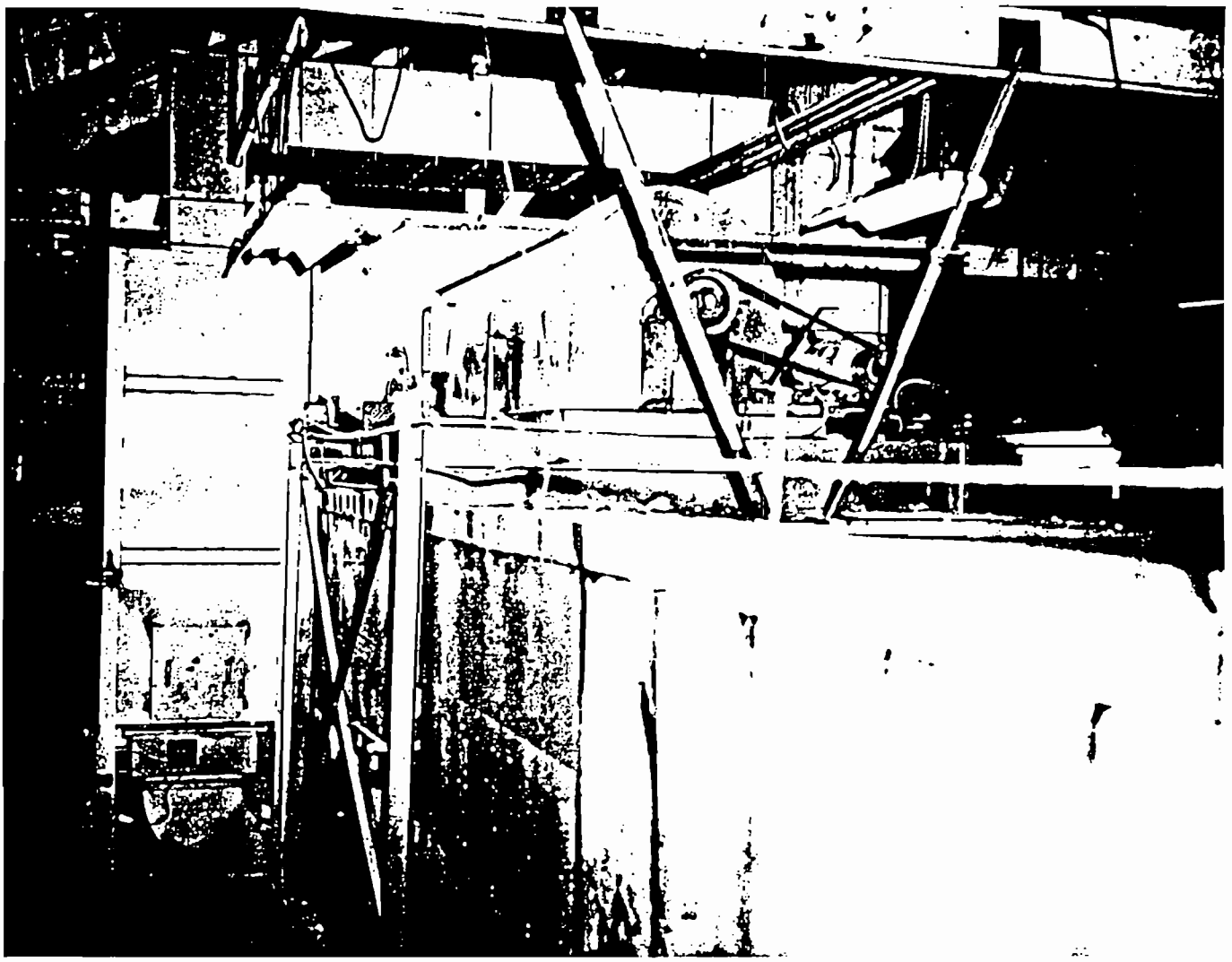

Figure 104. Direct-flame afterburner venting paint baking oven (Weber Show Case and Fixture, Div. of Walter Kidde and Company, Inc., Los Angeles, Calif.).

air = 939 Btu/ft^3 (see Table C1 in Appendix C)

Natural gas input =

$$\frac{Q_{net}}{\text{Hypothetical available heat}} =$$

$$\frac{5.2 \times 10^6}{939} = 5,550 \text{ ft}^3/\text{hr}$$

4. Combustion chamber diameter:

   Chamber is assumed to be cylindrical

   a. Volume of gases in afterburner:

      Vol = Oven effluent air - effluent used for combustion products from combustion of natural gas.

      (1) Air for combustion of natural gas in (3b) above:

      Air required = 10.36 ft^3/ft^3 natural gas (see Table D7 in Appendix D)

      $$\frac{(5,550)\ (10.36)}{60} = 959 \text{ scfm}$$

      (2) Products from combustion of natural gas:

      Combustion products = 11.45 scfm/ft^3 natural gas (see Table D7 in Appendix D)

      $$\frac{(5,550)\ (11.45)}{60} = 1060 \text{ scfm}$$

      (3) Volume of gases in afterburner:

      4000 - 959 + 1060 = 4100 scfm

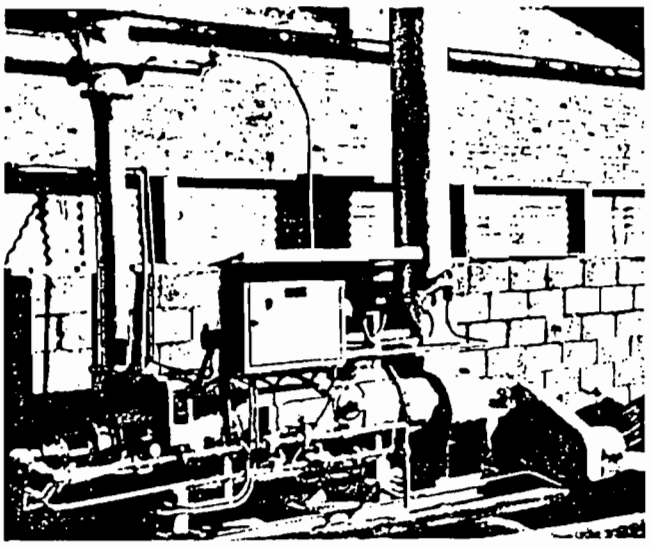

Figure 105. Direct-flame afterburner venting three varnish cooking kettles and a thinning station (National Paint and Varnish Co., Los Angeles, Calif.).

(4) Volume of gases at 1400° F (1860° R):

$$\frac{(4100)\ (1860)}{(60)\ (520)} = 244 \text{ cfs}$$

b. Diameter of afterburner:

Velocities of 20 to 40 fps are satisfactory.

Assume 30 fps.

Afterburner cross section = (244) (1/30) = 8.1 ft^2

Diameter corresponding to 8.1 ft^2 =

$$\sqrt{\frac{8.1}{0.785}} = 3.2 \text{ ft}$$

5. Combustion chamber length:

Retention times of 0.3 to 0.5 second are adequate.

Assume 0.5 second.

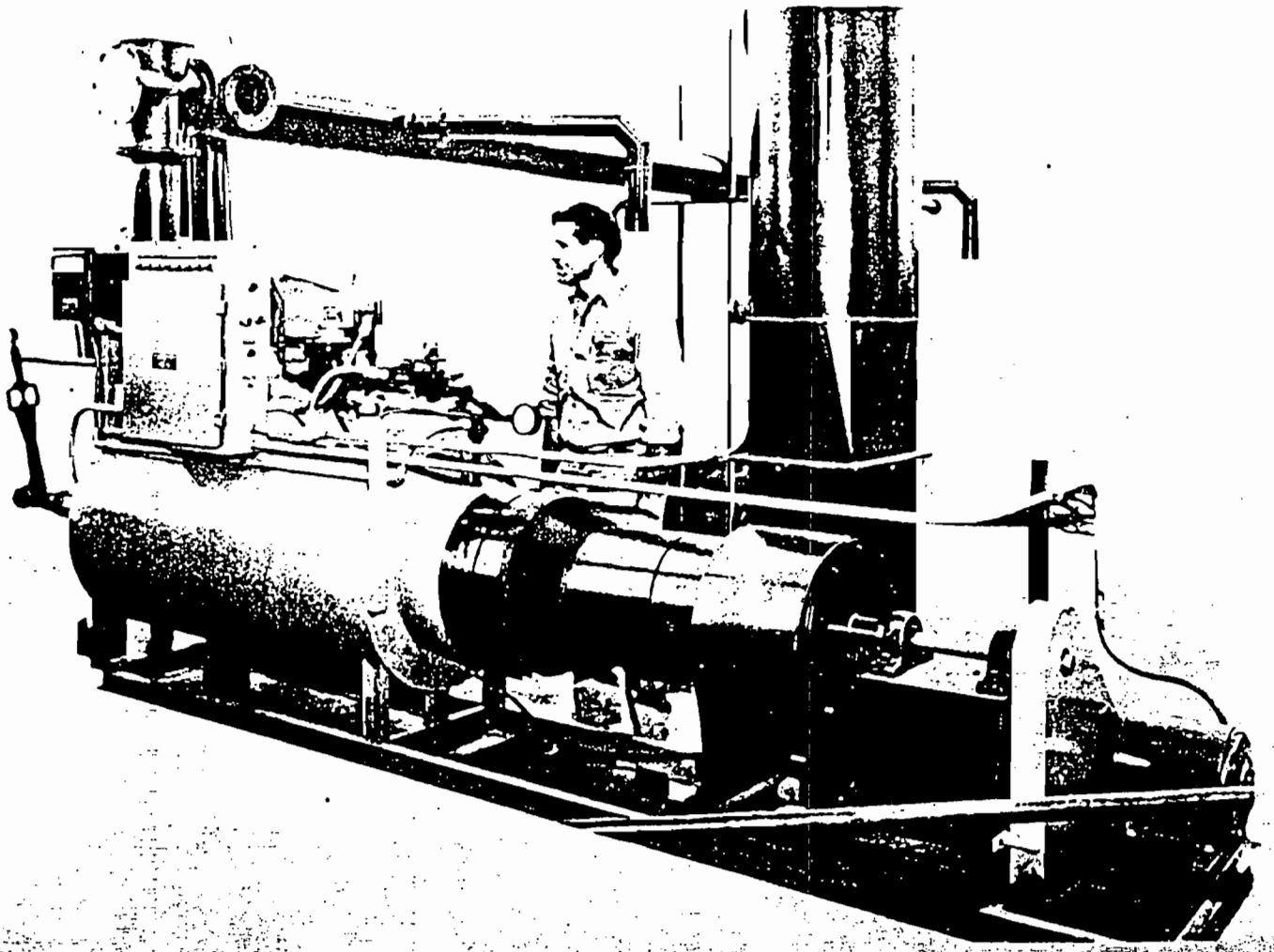

Figure 106. Direct-flame afterburner with induced-draft fan, all mounted on an integral frame and ready for shipment (Hirt Combustion Engineers, Montebello, Calif.).

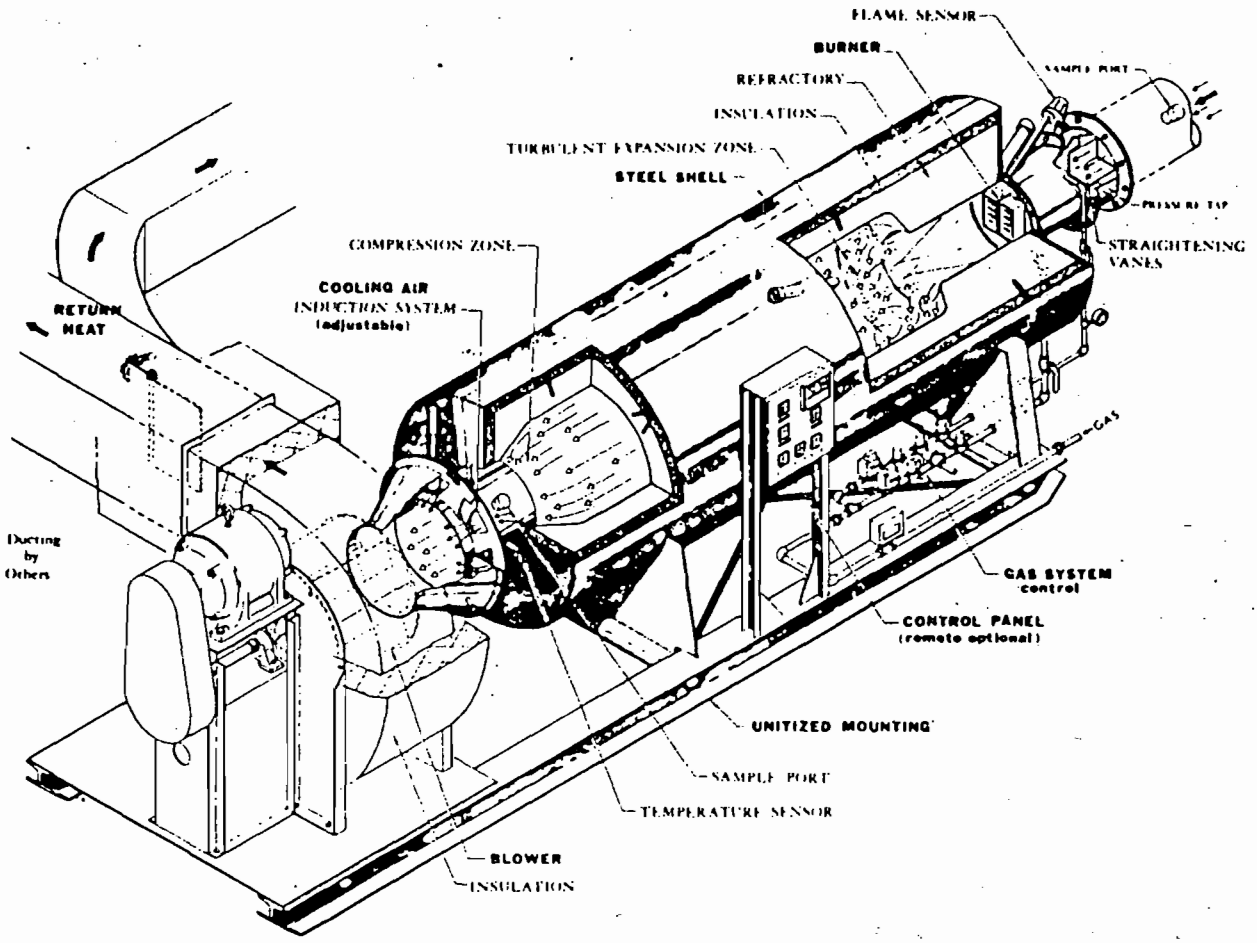

Figure 107. Sectional view of direct-flame afterburner (Gas Processors, Inc., Brea, Calif.).

Table 51. RECOMMENDED AFTERBURNER OPERATING TEMPERATURES

Operation	Recommended temperature, ° F
Carpet laminating	1200 - 1400
Core oven	1400
Cloth carbonization	1800
Deep fat fryers	1200
General opacity problems	1200 - 1400
Odor control	1300 - 1500
Oil and grease smoke	1200 - 1400
Paint bake ovens	1200 - 1500
Pipe wrapping	1400
Rendering operations	1200
Smokehouse	1200
Solvent control	1300 - 1500
Varnish cookers	1200
Vinyl plastisol curing	1200 - 1400

Length = (retention time) (velocity)

= (0.5)(30) = 15 ft

Summary of design:

Burner type--Mixing plate

Afterburner temperature = 1400° F

Burner input = 5,550 cfh

Afterburner diameter = 3.2 ft

Afterburner chamber length = 15 ft

CATALYTIC AFTERBURNERS

A catalytic afterburner consists of a preheat burner section, a chamber containing catalyst, temperature indicator-controllers, safety equipment, and heat recovery equipment. Figures 112 through 115 show various arrangements of catalytic afterburners.

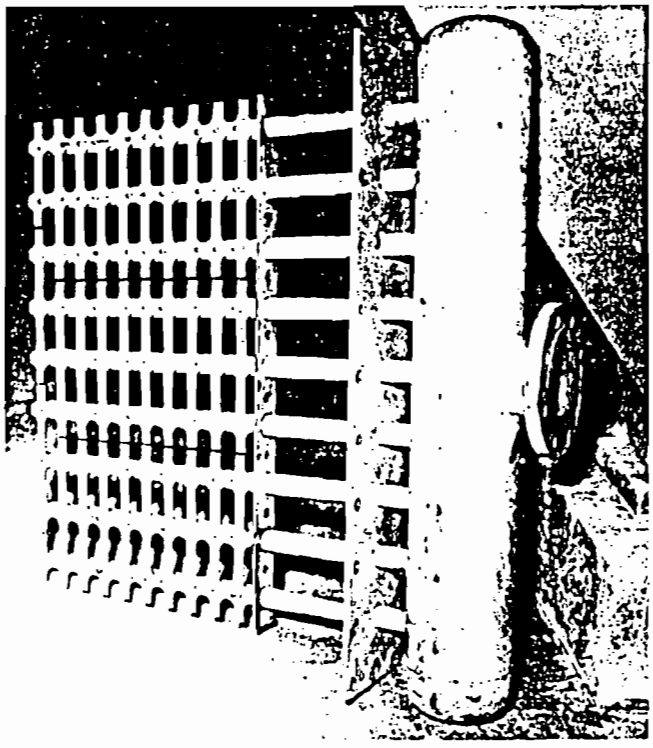

Figure 108. Mixing plate burner (J.T. Thorpe, Inc., Los Angeles, Calif.).

OPERATION

A catalyst is a substance that changes the rate of a chemical reaction and does not appear to change chemically in doing so. In the case of afterburners, the catalyst functions to promote the oxidation reactions at a somewhat lower temperature than occurs in a direct-flame afterburner. The catalyst usually is platinum combined with other metals and deposited in porous form on an inert substrate. The substrate may be in the form of rods, honeycomb, or ribbons. In any case, the objective is to present the maximum catalyst surface area to the contaminated gases.

In operation, the contaminated gases delivered to the afterburner first enter the preheat zone, where they are heated to the temperature required to sustain the catalytic combustion. The preheat zone temperature varies with the composition and type of contaminants to be oxidized, but is generally in the range of 650° to 1100° F. A substantial portion of the overall efficiency of the afterburner can be attributed to the burner in the preheated zone. The preheated gases then flow through the catalytic elements, where the remaining contaminants are burned. The combustion reaction is exothermic, resulting in an increase of catalyst temperature--the greater the concentration of

Figure 109. Mixing plate burner (Maxon Premix Burner Co., Inc., Muncie, Ind.).

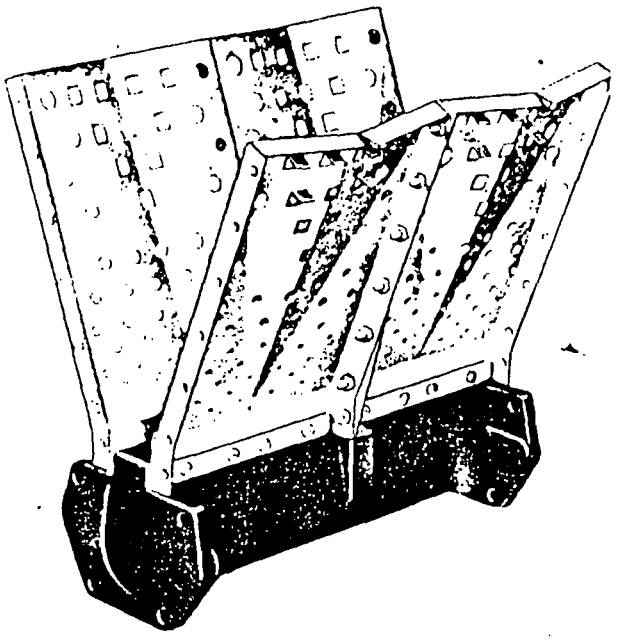

Figure 110. Schematic drawing of mixing plate burner (Maxon Primix Burner Co., Inc., Muncie, Inc.).

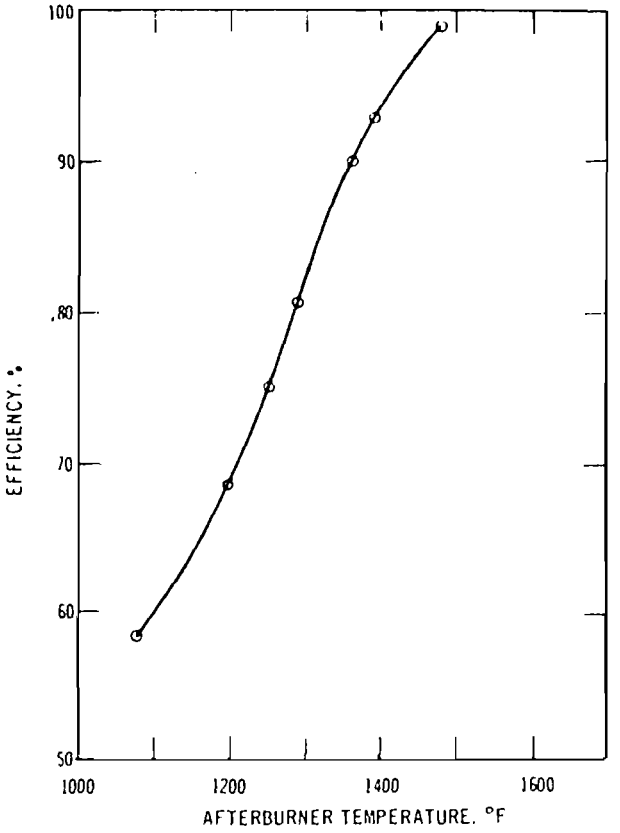

Figure 111. Direct-flame afterburner efficiency as a function of temperature.

combustible material, the higher the catalyst temperature. Under some conditions it is possible to reduce the preheat temperature of the entering gases after the reaction has been initiated.

EFFICIENCY

The efficiency of catalytic afterburners is a function of many variables. These include surface area of the catalyst, catalyst type, uniformity of flow of the gases through the catalyst bed, nature of the material being burned, oxygen concentration, volume of gases per unit of catalyst, and temperature of the unit.

The efficiency of a catalytic afterburner deteriorates as the unit is used, and periodic replacement of the elements is required. This replacement time varies widely, depending upon the service of the unit, from a few months to 2 years. In addition, the performance of the catalyst is seriously affected by materials that "poison" the catalyst. Some of these are mercury, arsenic, zinc, and lead. Substances that coat the catalytic elements such as resin solids and solid oxides must be avoided since these materials will seal off the catalyst from the gases to be treated.

Catalytic afterburners may not be capable of meeting local efficiency requirements, such as 90 percent conversion of the carbon in the organic materials to carbon dioxide. New catalysts recently made available may increase the afterburner efficiency at relatively high inlet concentrations (greater than 5000 ppm as carbon). At lower concentrations, the catalytic afterburner efficiency decreases markedly even at discharge temperatures as high as 1100° F. Catalytic afterburners operating at less than 900° to 1000° F may exhaust gases that are odorous and eye irritating. This problem appears to be due to the incomplete oxidation of the organic material, resulting in aldehydes, ketones, and organic acids.

RECOVERY OF HEAT FROM AFTERBURNER EXHAUST GASES

The heat discharge in the afterburner exhaust gases frequently can be recovered, and thus the overall cost of afterburner operation may be reduced. Some of the heat recovery schemes that have been used successfully include:

1. Heat exchangers to heat the contaminated gases before entry into the afterburner.

Table 52. TYPICAL ANALYSIS OF EMISSIONS ENTERING AND LEAVING LARGE DIRECT-FIRED AFTERBURNER

	Temperature			
	1400° F		1500° F	
	In	Out	In	Out
CO_2, ppm	6,300	22,000	6,600	27,000
CO, ppm	59	230	65	21
Organics as CO_2, ppm	1,568	235[a]	1,591	70
Volume (dry basis), scfm	11,950	11,800	12,000	11,800
Organics (as carbon), lb/hr	35.6	5.26	36.2	1.6
Afterburner efficiency, %	85		96	

[a]Includes increase of CO across afterburner.

Table 53. TYPICAL ANALYSIS OF EMISSIONS ENTERING AND LEAVING SMALL DIRECT-FIRED AFTERBURNER

	Temperature			
	1300° F		1400° F	
	In	Out	In	Out
CO_2, ppm	1,950	19,000	2,000	23,500
CO, ppm	8	110	9	24
Organics as CO_2, ppm	521	122[a]	408	33[a]
Volume (dry basis), scfm	2,240	2,200	2,240	2,200
Organics (as carbon), lb/hr	2.21	0.50	1.74	0.14
Afterburner efficiency, %	77		92	

[a]Includes increase of CO across afterburner.

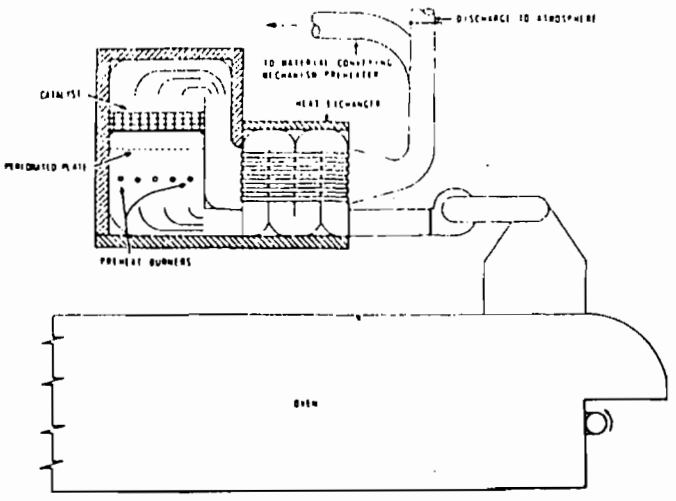

Figure 112. Typical catalytic afterburner utilizing indirect heat recovery.

2. Heat exchangers to heat air as a source of heat for the equipment generating the contaminated gases.

3. Venting of the afterburner gases to other process equipment such as waste heat boilers, water dry-off ovens, and vaporizers.

PREHEATING OF AFTERBURNER INLET GASES

Use of a heat exchanger for preheating the contaminated gases entering the afterburner is one of the most commonly used methods of recovery of heat from afterburner exhaust gases. The usual method is to use a shell-and-tube heat exchanger with the gases to be heated on the tube side and the afterburner discharge gases on the shell side. There may be one or two passes on the tube side and one pass on the shell side. In heat exchange

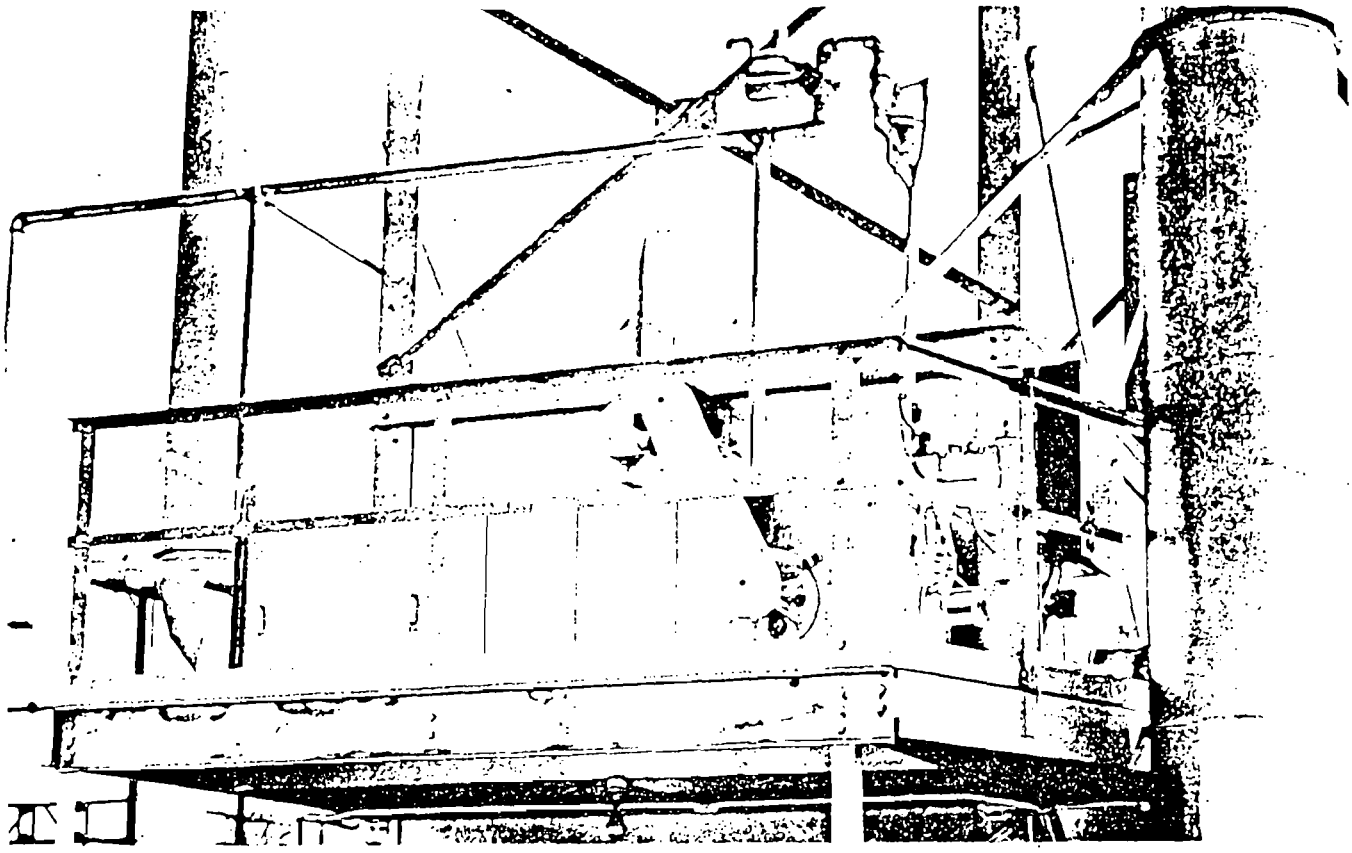

Figure 113. A catalytic afterburner used to control a foundry core baking oven (Catalytic Combustion Corporation, Detroit, Michigan).

terminology, a pass is the number of times an individual stream exchanges heat with another stream. The temperature of the heated, contaminated gas leaving the exchanger usually is about midway between the cool gases entering the exchanger and the temperature of the gases vented to the exchanger from the afterburner.

The stream entering the afterburner should not be preheated to too high a temperature. Excessive preheat will substantially reduce the amount of burner flame present and thus lower the efficiency.

BOILERS USED AS AFTERBURNERS

Fireboxes of boilers and fired heaters can be used, under proper conditions, as afterburners to incinerate combustible air contaminants. This use is unique in that a basic source of air contaminants, a boiler, is used to control pollutants from another source. Boiler firebox conditions approximate those of a well-designed afterburner, provided there are adequate temperature, retention time, turbulence, and flame. Oxidizable contaminants, including smoke and organic vapors and gases, can be converted essentially to carbon dioxide and water in boiler fireboxes.

The discussion of this section is limited to the control of low-calorific-value gases and vapors with common types of steam and hot water boilers and heaters. When appreciable heat is contained in the contaminated gases, the firebox is usually of special design to take advantage of the heat potential. These latter units, commonly known as waste heat boilers, are discussed in Chapter 9.

Completely satisfactory adaptations of boilers for use as afterburners are not common. All aspects of operation should be thoroughly evaluated before this method of air pollution control is used. The primary function of a boiler is to supply steam or hot water, and whenever its use as a control device conflicts with this function, one or both of its purposes will suffer. Some advantages and disadvantages of boilers used as afterburners are shown in Table 54.

CONDITIONS FOR USE

The determination to use a boiler as an afterburner demands that the following conditions exist:

1. The air contaminants to be controlled must be almost wholly combustible since a boiler