Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

November 15, 1994

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Douglas V. Turner
Plant Manager
D-Graphics
Division of Jefferson Smurfit Corporation
3389 Powers Avenue
Jacksonville, Florida 32231

Dear Mr. Turner:

Attached is one copy of the Department's Intent to Issue a construction permit for an increase in the allowable emissions of volatile organic compounds for Press #5. The modification will occur at the existing facility located in Duval County.

Please submit any comments that you wish to have considered concerning the Department's proposed action to me.

Sincerely,

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

CHF/BM/rbm

Attachments

c: S. Pace, DCR&ESD
C. Kirts, NED
J. Harper, EPA
J. Bunyak, NPS
J. Manning, P.E.
J. Braswell, Esq., DEP
T. Cole, Esq., OHF&C

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

In the Matter of
Application for Permit by:

D-Graphics
3389 Powers Avenue
Jacksonville, Tampa, Florida 32231

DEP File No. AC 16-259725

INTENT TO ISSUE

The Department of Environmental Protection (Department) hereby gives notice of its intent to issue an air construction permit (copy attached). The Department is issuing this Intent to Issue for the reasons stated below.

The applicant, D-Graphics, requested an air construction permit on October 26, 1994, for an increase in the allowable emissions of volatile organic compounds (VOCs) for Press #5. The modification request was for an increase of 39.9 tons/year (TPY) of VOCs, which will result in an annual allowable emission limit of 130.5 TPY of VOCs for Press #5. The limit is for a calendar year (January 1 through December 31).

The Department has permitting jurisdiction under Chapter 403, Florida Statutes (F.S.), and Chapters 62-210 through 62-296 and 62-4, Florida Administrative Code (F.A.C.). The project is not exempt from permitting procedures. The Department has determined that the issuance of an air construction permit is necessary for federal enforceable reasons.

Pursuant to Section 403.815, F.S., and Rule 62-103.150, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Notice of Intent to Issue a Permit. The notice shall be published one time only within 30 days, in the legal ad section of a newspaper of general circulation in the area affected. For the purpose of this rule, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. Where there is more than one newspaper of general circulation in the county, the newspaper used must be the one with significant circulation in the area that may be affected by the permitting action. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address or telephone number listed below. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within seven days of publication. 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 proposed permit with the attached conditions unless a petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S.

Any 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, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant and the parties listed below must be filed within 14 days of receipt of this intent. Petitions filed by other persons must be filed within 14 days of publication of the public notice or within 14 days of receipt of this intent, whichever first occurs. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. 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, F.S..

The Petition shall contain the following information;

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;

(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;

(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;

(d) A statement of the material facts disputed by Petitioner, if any;

(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and,

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

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 position taken by it in this notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application/request have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office in General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under

Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

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

Copies furnished to:

S. Pace, DCR&ESD
C. Kirts, NED
J. Harper, EPA
J. Bunyak, NPS
J. Braswell, Esq., DEP
T. Cole, Esq., OHF&C

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 November 15, 1994.

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.

Charlotte J. Hayes 11/15/94
Clerk Date

State of Florida
Department of Environmental Protection
Notice of Intent to Issue

AC 16-259725

The Department of Environmental Protection (Department) hereby gives notice of its intent to issue an air construction permit to D-Graphics, 3389 Powers Avenue, Jacksonville, Duval County, Florida 32231, for a modification to increase the allowable emissions of volatile organic compounds (VOCs) for Press #5. The modification request was for an increase of 39.9 tons/year (TPY) of VOCs, which will result in an annual allowable emission limit of 130.5 TPY of VOCs for Press #5. The limit is for a calendar year (January 1 through December 31). Press #5 is subject to the requirements and conditions of a determination of Lowest Achievable Emission Rate, which was issued at an earlier permitting action.

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 (F.S). The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. 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, F.S.

The Petition shall contain the following information:
(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
(d) A statement of the material facts disputed by Petitioner, if any;
(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and,

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

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 position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, Florida Administrative Code.

The application is available for public inspection during 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 Regulation
111 South Magnolia Park Courtyard
Tallahassee, Florida 32301

Department of Environmental Regulation
Northeast District
7825 Baymeadows Way
Jacksonville, Florida 32256-4300

Duval County Regulatory & Environmental Services Division
421 West Church Street, Suite 412
Jacksonville, Florida 32202-4111

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

Technical Evaluation
and
Preliminary Determination

D-Graphics
Duval County
Jacksonville, Florida

Press #5 Modification
Department Permit Number: AC 16-259725

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

November 15, 1994

I. Application

A. Applicant

D-Graphics
3389 Powers Avenue
Jacksonville, Florida 32231

B. Project/Location/Classification

The Department received a complete application on October 26, 1994, for a permit to allow a 39.9 tons per year (TPY) increase in volatile organic compounds (VOCs) for Press #5 at the existing facility in Jacksonville, Duval County, Florida. The facility's SIC Code is 2754: Gravure Commercial Printing. UTM coordinates of the existing facility are Zone 17, 440.2 km E and 3348.2 km N.

II. Project Description

D-Graphics has requested an increase in the allowable VOC emissions by 39.9 TPY for Press #5. The emissions of VOCs will be collected and transported to an incinerator. The minimum collection/transport and destruction efficiencies were established through a LAER (lowest achievable emissions rate) determination. D-Graphics intends to install sweeps at various locations in the process in order to immediately capture VOC emissions as they are emitted, thus decreasing fugitive VOC emissions. Also, D-Graphics intends to install a permanent enclosure around Press #5 after the engineering design has been completed and approved.

The LAER determination established a minimum capture and transport efficiency of 80% and a minimum destruction efficiency of 95%.

III. Emissions

The existing facility's allowable VOC emissions are: Press #4 @ 195.1 TPY and Press #5 @ 90.6 TPY. The increase of 39.9 TPY of VOC allowables for Press #5 will establish a new allowable emission limit of 130.5 TPY VOCs for Press #5. The limitation is for a calendar year (January 1 through December 31).

IV. Rule Applicability

The proposed project is subject to preconstruction review in accordance with Chapter 403, Florida Statutes, and Chapters 62-210 through 297 and 62-4, Florida Administrative Code (F.A.C.). The proposed modification will occur in an area classified as transitional nonattainment for ozone, unclassifiable for PM_{10} and SO_2, and in the area of influence of the air quality maintenance area for particulate matter.

The proposed modification is subject to the emissions review requirements pursuant to Rule 62-212.300, F.A.C., Sources Not Subject to Prevention of Significant Deterioration or Nonattainment Requirements. The modification is subject to the LAER determination requirements and conditions for Press #5. Because the facility was constructed at the time that the area was classified as a nonattainment area for ozone, the VOC emissions would be limited in accordance with the RACT (reasonable available control technology) if it was not limited by a LAER determination.

The VOC collection/transport and destruction efficiencies shall be demonstrated in accordance with Rule 62-297.450, F.A.C., and shall be conducted twice every fiscal year (October 1 through September 30). Accounting of VOC emissions shall be verifiable on a 24-hour basis and shall be reported on a monthly basis in a quarterly report. The report shall be provided to the Duval County's Regulatory and Environmental Services Division. The quarterly reports shall be submitted by the 15th day after the end of the quarter (January-March, April-June, July-September, and October-December).

V. AIR QUALITY IMPACT ANALYSIS

Based on the increase in the VOC emissions of 39.9 TPY, the Department has reasonable assurance that the proposed project, as described in the report and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any AAQS or PSD increment.

VI. Conclusion

Based on the information provided by D-Graphics, the Department has "reasonable assurance" that the proposed modification to Press #5, as described in this evaluation, and subject to the conditions proposed herein, will not cause or contribute to a violation of any air quality standard, PSD increment, or any other technical provision of Chapters 62-210 through 297 and 62-4 of the Florida Administrative Code.

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

PERMITTEE:
D-Graphics
3389 Powers Avenue
Jacksonville, Florida 32231

Permit Number: AC 16-259725
Expiration Date: May 15, 1995
County: Duval
Latitude/Longitude: 30°15'55"N
81°37'18"W
Project: Rotogravure Printing Press No. 5 Modification

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.); Chapters 62-210, 212, 272, 296 and 297, Florida Administrative Code (F.A.C.); and, Chapter 62-4, F.A.C. The above named permittee is hereby authorized to perform the work or operate the emission unit shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department of Environmental Protection (Department) and specifically described as follows:

This is for the modification of the existing facility to allow the permittee to operate the rotogravure printing press No. 5 an additional 1863 hours for a total of 6088 hours per calendar year. The maximum allowable volatile organic compound (VOC) emissions and volatile organic compounds applied to the substrate shall not exceed 130.5 (90.6 + 39.9) tons per calendar year and 178.6 pounds per hour, respectively. The overall capture efficiency, transport system efficiency and destruction efficiency of the emission control system was established in a LAER determination signed February 18, 1985, pursuant to Rule 62-212.500(4), F.A.C.

The emission unit shall be constructed/modified in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. Application to Modify an Air Pollution Source received on October 26, 1994.
2. Mr. Lloyd H. Stebbins's letter with Attachment received June 1, 1987.
3. Mr. Dale Twachtmann's letter dated June 8, 1987.
4. Mr. C. H. Fancy's letter dated November 7, 1994.
5. Mr. Douglas Turner's letter with enclosures received November 8, 1994.

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, F.S. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

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), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither 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 is not 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, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of F.S. and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall 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

GENERAL CONDITIONS:

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 and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

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

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

c. Sample or monitor 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 provide the Department with the following information:

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

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

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 for 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 involving the permitted source

GENERAL CONDITIONS:

arising under the F.S. or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

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

11. This permit is transferable only upon Department approval in accordance with Rules 62-4.120 and 62-30.300, F.A.C., 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 or a copy thereof shall be kept at the work site of the permitted activity.

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 (NSPS)
(X) Determination of Lowest Achievable Emission Rate (LAER)

14. The permittee shall comply with the following:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.

b. The permittee shall hold 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) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application

GENERAL CONDITIONS:

for this permit. These materials shall be retained 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 dates 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 corrected promptly.

SPECIFIC CONDITIONS:

1. This permit supersedes construction permit No. AC 16-089528.

2. The hours of operation for Press No. 5 shall not exceed 6088 hours per calendar year (January 1 through December 31) of run time.

3. The maximum allowable volatile organic compounds (VOC) applied to the substrate shall not exceed 178.6 pounds per hour and the maximum allowable VOC emissions shall not exceed 130.5 tons per calendar year.

4. The source is subject to the emission standards established through a LAER determination signed February 18, 1985, which requires 80% overall capture and transport efficiency of the VOC delivered to the substrate and 95% total destruction of all VOC delivered to the inlet of the catalytic incinerator. The total allowable VOC emissions for the Press No. 5 shall not exceed 130.5 tons per calendar year.

SPECIFIC CONDITIONS:

5. Capture efficiency shall be demonstrated using the procedures specified in Rule 62-297.450, F.A.C. A pre-compliance test meeting shall be scheduled with Duval County Regulatory and Environmental Services Department (R&ESD) at least 15 days prior to the compliance test to ensure that proper testing procedures will be followed.

6. Destruction efficiency of the catalytic incinerator shall be demonstrated by determining the inlet and outlet VOC concentrations using EPA Method 25A. Dividing the outlet concentration by the inlet concentration will provide the penetration. Destruction Efficiency = 1 - Penetration.

7. Compliance tests shall be performed at maximum operating conditions for single press and multiple press operations. A 95% total destruction of all VOC delivered to the inlet of the catalytic incinerator shall be demonstrated by these compliance tests.

8. The Department, R&ESD of Duval County, and EPA shall be notified, in writing, at least 15 days in advance of any EPA Method 25 compliance test.

9. The use of all coatings and solvents shall be recorded daily. Accounting of VOC emissions (42.9 lbs/hr or less) shall be verifiable on a 24-hour basis and shall be reported on a monthly basis in a quarterly report. This shall be done by documenting, through measurements and records, that the VOCs applied to the substrate do not exceed 178.6 lbs/hr and maintaining records to demonstrate that the VOC capture/transport and destruction system is maintained and operated properly. The report shall be provided to the Duval County's R&ESD. The quarterly reports shall be submitted by the 15th day after the end of the quarter (January-March, April-June, July-September, and October-December).

10. The permittee shall, within 10 days of issuance of this permit, surrender the air construction permits, AC 16-105518 for Press No. 2 and AC 16-093347 for Press No. 4, to the Department's Northeast District office.

11. The permittee shall, concurrent with any future modification (physical change in operation or method of operation at the facility that results in any increase in emissions of any air pollutant) or for any increase in printing capability, configure the existing Press No. 5 and any other presses being installed to ensure 100% capture (i.e., Permanent Total Enclosure that meets the

SPECIFIC CONDITIONS:

requirements of Procedure T as defined in Rule 62-297.440(7)(f), F.A.C.) of all VOC emissions. No operation of the modified system shall be allowed in the new configuration without total enclosure as described above.

12. In the event that no further modifications are made to the facility, the permittee shall take action to effect Permanent Total Enclosure that meets the requirements of Procedure T as defined in Rule 62-297.440(7)(f), F.A.C., not later than June 30, 1996.

13. Any changes effected under Specific Conditions 11 and 12, above, shall be done through a timely application for an air construction permit modification. Action by the Department shall reflect appropriate changes in the hourly and annual VOC emission rates and shall incorporate a minimum of 95 percent VOC destruction capability.

14. The permittee shall conduct a compliance stack test utilizing the capture method described in permit Specific Condition No. 5 and EPA Method 25A, as described in 40 CFR 60, Appendix A, not later than December 31, 1994, and no less frequently than every six months beginning with the date of the initial (late 1994) compliance test.

15. Testing of emissions shall be conducted with the emission unit (Press No. 5) operating at permitted capacity. Permitted capacity is defined as 90-100 percent of the maximum operating rate allowed by the permit. If it is impracticable to test at permitted capacity, then the emission unit may be tested at less than 90 percent of the maximum operating rate allowed by the permit. In this case, subsequent emission unit operation is limited to 110 percent of the test load until a new test is conducted. Once the emission unit is so limited, then operation at higher capacities is allowed for no more than 15 consecutive days for the purposes of additional compliance testing to regain the permitted capacity in the permit.

16. Operation of Press No. 5, prior to total enclosure, shall occur only with the curtains down and closed, except for parting of the curtains to enter and exit the press area as needed for operating the press.

17. The stack testing facilities shall be provided by the permittee pursuant to Rule 62-297.345, F.A.C.

SPECIFIC CONDITIONS:

18. This permit expires on May 15, 1995. The permittee shall submit a complete application for an operation permit to R&ESD of Duval County no later than February 15, 1995.

Issued this _____ day
of _____, 1994

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

_____
Howard L. Rhodes, Director
Division of Air Resources
Management

Attachment 1

(Available Upon Request)

Attachment 2

ESE

AN RMH COMPANY

ENVIRONMENTAL SCIENCE
AND ENGINEERING, INC.

May 21, 1987

DER

JUN 1 1987

BAQM

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

Subject: **Request for Approval of Alternate Source Emission Test Procedure**
Replace USEPA Reference Method 25 with Method 25A
Austill Packaging Company, Inc.
Jacksonville, Florida

Re: Construction Permits AC16-115518, AC16-093347, AC16-089528
For Presses 2, 4, and 5

Dear Mr. Fancy:

On behalf of Austill, we have prepared the attached request for approval to use USEPA Reference Method 25A in lieu of USEPA Method 25 for the determination of VOC emissions from Rotogravure Presses 2, 4, and 5.

The request was first submitted on April 7, 1987, to Mr. Khurshid Mehta of the Jacksonville BES Division, whose April 24, 1987, response indicated that the Florida Administrative Code provides for requesting exceptions to specified emission test procedures and approval of alternate procedures according to 17-2.700(3)(a), (b), and (c), FAC.

We trust that this submittal is complete and request that it be reviewed as soon as possible. Upon approval, we request that the three referenced construction permits be modified by amendment to incorporate the alternate procedure. Meanwhile, if any questions arise during the review, I can be reached at (904)739-2007.

Very truly yours,

Lloyd H. Stebbins, P.E.
Manager
Industrial Environmental Department
Jacksonville Regional Office

LHS/cdb

cc: Ernest E. Frey
Khurshid Mehta

Request for Approval of Alternate Source Emission Test Procedure

Replace USEPA Reference Method 25 with Method 25A (40 CFR 60, Appendix A)

86023-0000

The construction permits for three rotogravure printing presses require VOC testing in accordance with USEPA Reference Method 25, "Determination of Total Gaseous Nonmethane Organic Emissions as Carbon". Method 25 has become unnecessarily complex, unduly burdensome and very costly. During a July, 1986 compliance test, USEPA Method 25A, "Determination of Total Gaseous Organic Concentration Using a Flume Ionization Detector" was conducted simultaneously with Method 25. Based on a favorable demonstration and the other arguments presented herein, we respectfully request that the three construction permits be amended to allow the use of Method 25A in lieu of Method 25.

1. Specific sources and permit numbers for which exception is requested [17-2.700(3)(b)1, FAC]:

   The request applies to three rotogravure presses at Austill:

Press No.	Permit No.
2	AC16-105518
4	AC16-093347
5	AC16-089528

2. Specific provision of Section 17-2.700 from which an exception is sought [17-2.700(3)(b)2, FAC]:

The request seeks an exception to the use of USEPA Reference Method 25 [17-2.650(1)(f)16] for determining VOC emissions from each source and from the common catalytic incinerator which is used to control emissions. All three construction permits require 80% overall capture and transport efficiency of the VOC delivered to the substrate and 95% total destruction of all VOC delivered to the inlet of the catalytic incinerator.

3. The basis for the exception [17-2.700(3)(b)3, FAC]:

EPA method 25 has proven to be unduly burdensome and extraordinarily difficult to conduct in the field for several reasons including:

- It is inherently an extremely complex procedure. The unusual level of complexity has been commonly recognized by consultants and also by USEPA personnel.
- Method 25 is especially difficult when coupled with requirements to demonstrate both capture efficiency and destruction efficiency.
- The level of complexity has been further increased at Austill because of the requirements to conduct the tests for both individual and combined press operations.

The procedure is sufficiently difficult that very few testing firms are qualified to perform it. Even fewer firms are qualified to perform both the testing and the laboratory analytical work. Experience has repeatedly indicated that even the most highly qualified testing firms encounter frequent procedural errors and difficulties which prolong the test period and add substantial cost burdens to the efforts.

The difficulties of determining capture efficiency have been well documented in a memorandum from Mr. James Berry, EPA, Chief Chemical Applications Section, to Mr. Doug Cook, EPA Region IV, dated July 7, 1980, (Attachment 1). This memo says in part:

> As you are aware, there is no official EPA test method for measuring capture efficiency. In fact, we have gotten somewhat poor results when we have tried to measure this in actual plant tests.

To date, there is still no official or standardized method for measuring capture efficiency. In addition, the physical configuration of rotogravure printing presses is such that evaluating capture efficiencies in a reproducible manner is exceedingly difficult to achieve.

The extreme complexity of the Method 25 protocol is further underscored by the USEPA's publishing in the Federal Register [FR-Volume 51, No. 216, November 7, 1986, Page 40448 ff], "Standards of Performance for New Stationary Sources; Revision of Method 25 of Appendix A", a proposed new protocol for this procedure. The large number of changes proposed by the EPA is described in approximately nineteen pages of the Federal Register. (Refer to Attachment 2.) It is clear that changes of this magnitude would not be recommended by the EPA unless their five years of experience led the rulemakers to conclude that the changes are necessary. Indeed, a subsequent conversation, on December 15, 1986, with the author of the proposed EPA rule, Mr. Gary McAlister (Attachment 3), revealed that there had been many problems with this test procedure nationwide since it was first established in October, 1980. Mr. McAlister added that some consultants refused to use the procedure. He explained that the problems were sufficiently widespread that the USEPA had no difficulty justifying the time and expense to prepare the recently proposed rules. He added that tests sponsored by the USEPA revealed the same difficulties as reported by others in privately run tests.

The large number of changes recommended by the USEPA have not yet been promulgated. However, the mere consideration of the multitude of changes coupled with the above considerations clearly demonstrates that EPA Method 25 is overly burdensome for use at Austill.

For these reasons we request an exception to the use of Method 25 at Austill for VOC compliance determinations.

4. The alternate procedure for which approval is sought and a demonstration that such alternate procedure shall be adequate to demonstrate compliance with the operating permits [17-2.700(3)(b)4, FAC]:

Approval is requested for using USEPA Method 25A (40 CFR 60, Appendix A, Method 25A, "Determination of Gaseous Organic Concentration Using a Flame Ionization Analyzer") in lieu of Method 25.

EPA Method 25A is a procedure which is easier to conduct, much less prone to testing errors, and proven to produce results correlating very well with results from EPA Method 25. On August 15, 1986, data from the compliance tests of July 1986

were submitted to the agency along with comparative data for Method 25 and 25A, summarized in the table below:

SUMMARY OF RESULTS

COMPARISON OF METHODS 25 AND 25A FOR VOC'S

AT

AUSTILL PACKAGING COMPANY

Date	Press No.	Capture Efficiency %		Destruction Efficiency %	
		Method No. 25	Method No. 25A	Method No. 25	Method No. 25A
7/26/86	2	105.1	104.0	98.4	98.9
7/26/86	4	95.3	99.0	96.4	98.4
7/25/86	5	83.6	96.1	96.5	98.2
7/25/86	2,4, & 5	107.6	100.8	96.6	97.8

The comparison of Method 25 and Method 25A in the table reveals excellent agreement for both capture and destruction efficiencies, even though Method 25A yielded slightly higher destruction efficiencies. The average destruction efficiency for the four test conditions was 97.0% for Method 25 and 98.3% for Method 25A.

The apparent anomalies of capture efficiencies greater than 100% in the table above could be the result of any or all of the following:

- The collection system may have captured solvent vapors from other parts of the plant or from open vapor containers during the test run.
- Inaccuracies in the gas volume measurements may have resulted in a positive bias.
- Inaccuracies in the analytical work could have resulted in a positive bias.
- Inlet duct temperatures may have been low enough to allow some of the solvent to condense on the duct walls, and then vaporize when the duct was reheated at a later time.

Considering the complexity of the application, the extraordinary difficulty of performing a satisfactory Method 25 test, and the favorable correlation of the above tests, we respectfully request approval to use Method 25A for compliance testing at Austill Packaging in place of Method 25.

ATTACHMENT 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

DATE: JUL 07 1980

SUBJECT: Determination of Capture Efficiency

FROM: James Berry, Chief
Chemical Applications Section, CPB (MD-13)

TO: Doug Cook
EPA Region IV

This is in response to your telephone call requesting an acceptable technique to measure the capture efficiency of hoods used in the control of surface coating operations. As you are aware, there is no official EPA test method for measuring capture efficiency. In fact we have gotten somewhat poor results when we have tried to measure this in actual plant tests. We have asked EPA's Office of Research and Development to develop a test method for this. Even though a standardized test method does not now exist, the technique outlined below will theoretically give an acceptable measure of capture efficiency.

A technique for measuring capture efficiency is needed because the VOC that is not captured by the hoods can represent a significant portion of the total VOC emitted to the atmosphere. The VOC not captured by the hoods could, in some cases, exceed the allowable emission rate established in the SIP's, even assuming 100 percent of the VOC which is captured by the hoods and directed to the control device is destroyed or recovered.

When carbon adsorbers are used, it is not necessary to determine capture efficiency since the VOC recovered can be compared directly to the emission standard. Our estimates for capture capability for web processes used in the CTG reports have been reinforced by observations by our engineers of overall control levels as high as 90-94 percent when carbon adsorbers are used. Since overall control is the product of the capture efficiency and the control device efficiency, even if we assume the carbon adsorbers are 100 percent efficient (which they're not), hood capture efficiencies of greater than 90 percent are demonstrated.

When incinerators are used, determination of compliance is more involved. A general procedure would be as follows. An example is provided as an attachment.

1. Calculate a potential emission rate in mass/time based on VOC content of the coating and amount of coating used.

2. Calculate an allowable emission rate in mass/time based on the SIP standard. (This can be tricky; less volume of coating is required since the solids content is greater.)

3. Determine the required reduction in VOC.

4. Measure the inlet concentration and flow rate to the incinerator and calculate the inlet emission rate in mass/time. If this is less than the required reduction, obviously the source is in violation, since enough emissions will not be destroyed in the incinerator to give the required reduction. This will result if an undesirably large portion of the emissions are emitted as fugitives.

5. If the inlet VOC mass flow rate is greater than the required reduction, measure the outlet concentration and flow rate for the incinerator and calculate the outlet emission rate in mass/time.

6. By difference, determine if the required reduction is achieved.

To measure the VOC concentration before and after the incinerator, two approaches are available: (1) FID; or (2) Reference Method 25.

If the FID is used, it must be calibrated with the solvent in the coating. This calibration will provide a good measure on the inlet to the incinerator, but it will not be accurate for the outlet. The outlet of an incinerator contains oxygenated compounds which have a depressed response in the FID. Therefore, outlet readings will be low compared to absolute values. An FID might be used for an easy to make measurement to check for non-compliance. If the FID shows the source to be in violation then, it undoubtedly will be in violation. If the FID shows that the incinerator outlet emissions are equal to or slightly less than the allowable emission level, the results will be somewhat in doubt. Method 25 may be resorted to in this case. An advantage of the FID is that measurements are easy to make and can be taken over a period of time, perhaps leading to a better measure of average emission rates compared to the short-term sampling with Reference Method 25.

If Reference Method 25 is used, VOC concentrations are made in terms of mass of carbon atoms (C). To compare the measured values with the allowable emission rates, the measured values must be corrected to mass VOC or the other terms must be corrected to mass C. This is done by obtaining formulation data for the solvents and calculating a mass VOC to C ratio. If the solvent formula is C_4H_8O, for example, the mass VOC to mass C ratio is 72/48 or 1.5. The major advantage of Reference Method 25 over the FID is that Reference Method 25 gives an accurate reading on the incinerator outlet. The need for this accuracy depends on incinerator efficiency and how close the emissions are to the standard. With low incinerator efficiency, an accurate measure of outlet emissions is more important than with a high incinerator efficiency.

Remember, however, that even a high efficiency control device would be ineffective if the capture device were very inefficient. The effectiveness of the control system is equally dependent on its two components, the capture and control devices. Because of the large number of sources which must come into compliance with a variety of State regulations in the near future, it probably is more realistic for a State to initially plan on determining compliance with the capture requirements of their regulations on the basis of engineering judgment. Recognizing that 90% capture means that almost all emissions must be contained and delivered to

the control device, it should be possible for an enforcement official to make some judgment that a system does or does not approach perfect capture. It would be well to train each enforcement person by having him inspect a web process that uses a carbon adsorber control device for which the overall recovery has actually been measured and found to be high. Its associated capture system would obviously have to be good. Ultimately, however, the enforcer and industry must recognize that achievement of emission limits based on 90% capture requires almost total containment of the emissions. Very little can be permitted to escape the control system.

Attachment

cc: CAS
Dave Patrick
Barry Perlmutter, Region V
Tom Williams

ATTACHMENT

DETERMINATION OF COMPLIANCE BY A COATING OPERATION WHICH CONTROLS EMISSIONS WITH AN AFTERBURNER

Step 1. Determine the VOC emission rate from the process based on the VOC content of the coating and the rate of coating usage. (VOC content can be taken from the coating manufacturer's formulation or it can be determined by EPA Method 24.) Then calculate the solids content of the coating.

Coating Feed Rate	x	Factor to Convert Waterborne Coatings to Solvent Borne Equivalent	x	Coating Solvent Content	=	Actual Solvent Emission Rate	(Eq.
$\frac{\text{Gal Coating}}{\text{hr}}$	x	$\frac{\text{Gal Coating less } H_2O}{\text{Gal coating}}$	x	$\frac{\text{\# VOC}}{\text{Gal Coating less } H_2O}$	=	$\frac{\text{\# VOC}}{\text{hr}}$	

As an example, consider the case of a coater using 100 gal/hr of a conventional solvent borne coating containing 5 pounds VOC per gallon of coating. Since a solvent borne coating contains no measurable amount of water, the units "gal coating less H_2O" and "gal coating" are synonymous and equation 1 becomes:

$$\frac{100 \text{ gal coating}}{\text{hr}} \times \frac{5\# \text{ VOC}}{\text{gal coating}} = \frac{500\# \text{ VOC}}{\text{hr}} \qquad \text{(Eq. 2)}$$

The solids content of this coating is then calculated by difference: (Assume the density of the solvent is 7.36 #/gal.)

$$\frac{5\# \text{ VOC}}{\text{gal coating}} \times \frac{1 \text{ gal VOC}}{7.36\# \text{ VOC}} = \frac{.68 \text{ gal VOC}}{\text{gal coating}} \qquad \text{(Eq. 3)}$$

1 gal coating - 0.68 gal VOC = 0.32 gal solids (Eq. 4)

Step 2. Determine the allowable exhaust rate based on use of a complying coating and calculate its solids content. Assume the regulation contains an emission limitation of 2.5 #VOC/gal coating less H_2O which, if we use the same solvent density, is equivalent to:

$$\frac{2.5\# \text{ VOC}}{\text{gal coating}} \times \frac{1 \text{ gal VOC}}{7.36\# \text{ VOC}} = \frac{0.34 \text{ gal VOC}}{\text{gal coating}} \qquad \text{(Eq. 5)}$$

The solids content is again calculated by difference.

1 gal coating - 0.34 gal VOC = .66 gal solids (Eq. 6)

If the facility used a complying coating with 66% solids instead of 32%, far fewer gallons of coating would be required to coat a specified article. Assuming both coatings are applied at the same transfer efficiency, the volume of complying coating required to coat at the same production rate would be:

$$\frac{100 \text{ gal noncomplying coating}}{\text{hr}} \times \frac{.32}{.66} = \frac{49 \text{ gal complying coating}}{\text{hr}} \quad (1$$

Therefore, the allowable emission rate is:

$$\frac{49 \text{ gallons complying coating}}{\text{hr}} \times \frac{2.5\# \text{ VOC}}{\text{gal complying coating}} = \frac{121\# \text{ VOC}}{\text{hr}} \quad (1$$

Step 3. Determine the required VOC reduction.

Actual emission rate - allowable rate = reduction required

$$500 \frac{\# \text{ VOC}}{\text{hr}} - 121 \frac{\# \text{ VOC}}{\text{hr}} = 379 \text{ lbs VOC/hr} \quad (E$$

Step 4. Measure the mass flow rate of VOC to the incinerator using a flame ionization detector calibrated with the solvent in the coating feed to the coating line. If the measured VOC mass flow rate is less than or equal to 379 pounds per hour, the capture system is deficient and the source is not in compliance. (This assumes the control device could never achieve perfect control.)

Step 5. If the mass flow rate of VOC to the incinerator is greater than 379 pounds per hour, the destruction efficiency of the incinerator should be determined using the Total Gaseous Non-Methane Organics detector (Reference Method 25). The incinerator must be efficient enough to destroy no less than 379 pounds per hour of VOC in order for the coater to be in compliance.

40 CFR Part 60

[OAR-FRL-3085-9]

Standards of Performance for New Stationary Sources; Revision of Method 25 of Appendix A

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: This proposed rule would amend Method 25, "Determination of Total Gaseous Nonmethane Organic Emissions as Carbon," of Appendix A of 40 CFR Part 60. This method is being revised to improve its precision and reliability.

A public hearing will be held, if requested, to provide interested persons an opportunity for oral presentation of data, views, or arguments concerning the revised method.

DATES: *Comments.* Comments must be received on or before January 21, 1987.

Public Hearing. If anyone contacts EPA requesting to speak at a public hearing by November 28, 1986, a public hearing will be held December 22, 1986, beginning at 10:00 a.m. Persons interested in attending the hearing should call the contact mentioned under ADDRESSES to verify that a hearing will be held.

Request to Speak at Hearing. Persons wishing to present oral testimony must contact EPA by November 28, 1986.

ADDRESSES: *Comments.* Comments should be submitted (in duplicate if possible) to: Central Docket Section (LE-131), Attention: Docket Number A-86-05, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460.

Public Hearing. If anyone contacts EPA requesting a public hearing, it will be held at EPA's Office of Administration Auditorium, Research Triangle Park, North Carolina. Persons interested in attending the hearing or wishing to present oral testimony should notify Mr. Gary McAlister, Emission Measurement Branch (MD-19), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-2237.

Docket. Docket No. A-86-05, containing supporting information used in developing the proposed rulemaking, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street SW., Washington, DC 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Roger T. Shigehara or Mr. Gary McAlister, Emission Measurement Branch (MD-19), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-2237.

SUPPLEMENTARY INFORMATION:

I. The Rulemaking

On October 3, 1980 (45 FR 65956), EPA published Method 25, "Determination of Total Gaseous Nonmethane Organic Emissions as Carbon." Shortly after publication, testers began to report erratic results with the method and suggested a number of different causes for the imprecision. As a result, EPA began a program to review the test method in March 1982. The EPA has completed the review and is now proposing revisions to Method 25, which will make the method simpler, more reliable, and more precise.

The results of the various studies on Method 25 are summarized in the following reports, which are included in the docket:

1. Evaluation of Trap Recovery Design, EMB Project No. 82SFS-1.

2. Preparation of Method 25 Sampling Equipment and Determination of Limit of Detection and Limit of Quantitation, EMB Project No. 82SFS-1.

3. Evaluation of Method 25 Condensate Trap Packing Material, EMB Project No. 82SFS-1.

4. Oxidation Catalyst Screening and Evaluation Study, ESED Project No. 82SFS1-4-2.

5. Quality Control Procedures Evaluation, ESED Project No. 82SFS1-4-3.

6. Condensate Trap Development and Evaluation, ESED Project No. 82SFS1-4-4.

7. Trap Recovery Procedures Evaluation, ESED Project No. 82SFS1-4-5.

8. Evaluation of Particulate Filters, ESED Project No. 82SFS1-5-2.

The studies showed that the basic operating principle of Method 25 was sound, but some changes in equipment design and operating practices would improve the reliability of the method. These changes can best be discussed by dividing the method into three parts: Sampling, sample recovery, and analysis.

The major changes in the sampling equipment are the addition of a heated filter, a redesigned condensate trap, and a different packing material for the condensate trap. The purpose of the filter is to remove organic particulate matter from the sample and, thus, eliminate a potential source of imprecision. The filter is heated to a temperature of 120° C (248° F) to be consistent with Method 5 for particulate matter. The new trap design is a simple U-tube which may be more easily and cheaply produced than the current design. It also provides a faster and more complete sample recovery than the existing trap while showing equal collection efficiency. The new packing material is quartz wool, which shows better durability and collection efficiency than the currently specified stainless steel packing.

The major changes in the sample recovery system are a new oxidation catalyst, a simplified recovery system, and lower operating temperatures. The new oxisation catalyst has proven to be very durable and to provide 100 percent oxidation efficiency for a wide variety of organic compounds at much lower operating temperatures than the current catalyst. The redesigned recovery system has eliminated some of the tubing and valving and, thus, reduced the potential for sample loss during recovery and decreased recovery times. The lower temperatures for sample recovery will increase the life expectancy of the recovery system materials and simplify the operation of the system.

The major change in the sample analysis system is a new separation column for the nonmethane organics analyzer. This new column provides separation of carbon monoxide, carbon dioxide, and methane from a wider

range of organic compounds than the currently specified column.

In addition to these major changes, there are a number of minor changes, particularly in the area of quality assurance and calibration.

This rulemaking does not impose emission measurement requirements beyond those specified in the current regulations, nor does it change any emission standard. Rather, the rulemaking would simply revise test procedures associated with emission measurement requirements that would apply irrespective of this rulemaking.

II. Administrative Requirements

A. *Public Hearing*

A public hearing will be held, if requested, to discuss the proposed test method in accordance with section 307(d)(5) of the Clean Air Act. Persons wishing to make oral presentations should contact EPA at the address given in the "ADDRESSES" section of this preamble. Oral presentations will be limited to 15 minutes each. Any member of the public may file a written statement with EPA before, during, or within 30 days after the hearing. Written statements should be addressed to the Central Docket Section address given in the "ADDRESSES" section of this preamble.

A verbatim transcript of the hearing and written statements will be available for public inspection and copying during normal working hours at EPA's Central Docket Section in Washington, DC (see "ADDRESSES") section of this preamble.

B. Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered by EPA in the development of this proposed rulemaking. The principal purposes of the docket are: (1) To allow interested parties to identify and locate documents so that they can effectively participate in the rulemaking process and (2) to serve as the record in case of judicial review (except for interagency review materials) [section 307(d)(7)(A)].

C. Office of Monagement ond Budget Review

Under Executive Order 12291, EPA must judge whether a regulation is "major" and, therefore, subject to the requirement of a regulatory impact analysis. This regulation is not major because it will not have an annual effect on the economy of $100 million or more; it will not result in a major increase in costs or prices; and there will be no significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of U.S.-based enterprises to compete with foreign-based enterprises in domestic or export markets.

This regulation was submitted to the Office of Management and Budget (OMB) for review as required by Executive Order 12291. Any written comments from OMB and any written EPA responses are available in the docket.

D. Regulatory Flexibility Act Compliance

Pursuant to the provisions of 5 U.S.C. 605(b), I hereby certify that this attached rule, if promulgated, will not have any economic impact on small entities because no additional costs will be incurred.

List of Subjects in 40 CFR Part 60

Air Pollution control, Intergovernmental relations, Reporting and Recordkeeping requirements, Incorporation by reference, Automobile surface coating, Large appliance surface coating, Beverage can coating, and Metal coil coating.

Dated: October 24, 1986.

Don R. Clay,

Acting Assistant Administrator for Air and Radiation.

PART 60—[AMENDED]

It is proposed that 40 CFR Part 60 be amended by revising Method 25 of Appendix A as follows:

1. The authority citation for Part 60 continues to read as follows:

Authority: Sec. 101, 111, 114, 116, and 301 of the Clean Air Act, as amended (42 U.S.C. 7401, 7411, 7414, 7416, 7601).

2. By revising Method 25 of Appendix A to read as follows:

Appendix A—Reference Method

* * * * *

Method 25—Determination of Total Gaseous Nonmethane Organic Emissions as Carbon

1. Applicability and Principle

1.1 Applicability. This method applies to the measurement of volatile organic compounds (VOC) as total gaseous nonmethane organics (TGNMO) as carbon in source emissions. Organic particulate matter will interfere with the analysis and, therefore, a particulate filter is required.

When carbon dioxide (CO_2) and water vapor are present together in the stack, they can produce a positive bias in the sample. The magnitude of the bias depends on the concentrations of (CO_2) and water vapor. As a guideline, multiply the (CO_2) concentration, expressed as volume percent, by the water vapor concentration. If this product does not exceed 100, the bias can be considered insignificant. For example, the bias is not significant for a source having 10 percent (CO_2) and 10 percent water vapor, but it might be significant for a source having 10 percent (CO_2) and 20 percent water vapor.

This method is not the only method that applies to the measurement of TGNMO. Costs, logistics, and other practicalities of source testing may make other test methods more desirable for measuring VOC contents of certain effluent streams. Proper judgment is required in determining the most applicable VOC test method. For example, depending upon the molecular weight of the organics in the effluent stream, a totally automated semicontinuous nonmethane organics (NMO) analyzer interfaced directly to the source may yield accurate results. This approach has the advantage of providing emission data semicontinuously over an extended time period.

Direct measurement of an effluent with a flame ionization detector (FID) analyzer may be appropriate with prior characterization of the gas stream and knowledge that the detector responds predictably to the organic compounds in the stream. If present, methane (CH_4) will, of course, also be measured. The FID can be applied to the determination of the mass concentration of the total molecular structure of the organic emissions under any of the following limited conditions: (1) Where only one compound is known to exist; (2) when the organic compounds consist of only hydrogen and carbon; (3) where the relative percentages of the compounds are known or can be determined, and the FID responses to the compounds are known; (4) where a consistent mixture of the compounds exists before and after emission control and only the relative concentrations are to be assessed; or (5) where the FID can be calibrated against mass standards of the compounds emitted (solvent emissions, for example).

Another example of the use of a direct FID is as a screening method. If there is enough information available to provide a rough estimate of the analyzer accuracy, the FID analyzer can be used to determine the VOC content of an uncharacterized gas stream. With a sufficient buffer to account for possible inaccuracies, the direct FID can be a useful tool to obtain the desired results without costly exact determination.

In situations where a qualitative/quantitative analysis of an effluent stream is desired or required, a gas chromatographic FID system may apply. However, for sources emitting numerous organics, the time and expense of this approach will be formidable.

1.2 Principle. An emission sample is withdrawn from the stack at a constant rate through a heated filter and a chilled condensate trap by means of an evacuated sample tank. After sampling is completed, the TGNMO are determined by independently analyzing the condensate trap and sample tank fractions and combining the analytical results. The organic content of the condensate trap fraction is determined by oxidizing the NMO to CO_2 and quantitatively collecting the effluent in an evacuated vessel; then a portion of the CO_2 is reduced to CH_4 and measured by an FID. The organic content of the sample tank fraction is measured by

injecting a portion of the sample into a gas chromatographic column to separate the NMO from carbon monoxide (CO), CO_2, and CH_4; the NMO are oxidized to CO_2, reduced to CH_4, and measured by an FID. In this manner, the variable response of the FID associated with different types of organics is eliminated.

2. Apparatus

2.1 Sampling. The sampling system consists of a heated probe, heated filter, condensate trap, flow control system, and sample tank (Figure 25–1). The TGNMO sampling equipment can be constructed from commercially available components and components fabricated in a machine shop. The following equipment is required:

2.1.1 Heated Probe. 6.4-mm (1/4-in.) Outside diameter (OD) stainless steel tubing with a heating system capable of maintaining a gas temperature at the exit end of at least 129°C (265°F). The probe shall be equipped with a thermocouple at the exit end to monitor the gas temperature.

A suitable probe is shown in Figure 25–1. The nozzle is an elbow fitting attached to t front end of the probe while the thermocou is inserted in the side arm of a tee fitting attached to the rear of the probe. The prob is wrapped with a suitable length of high temperature heating tape, and then covere with two layers of glass cloth insulation an one layer of aluminum foil.

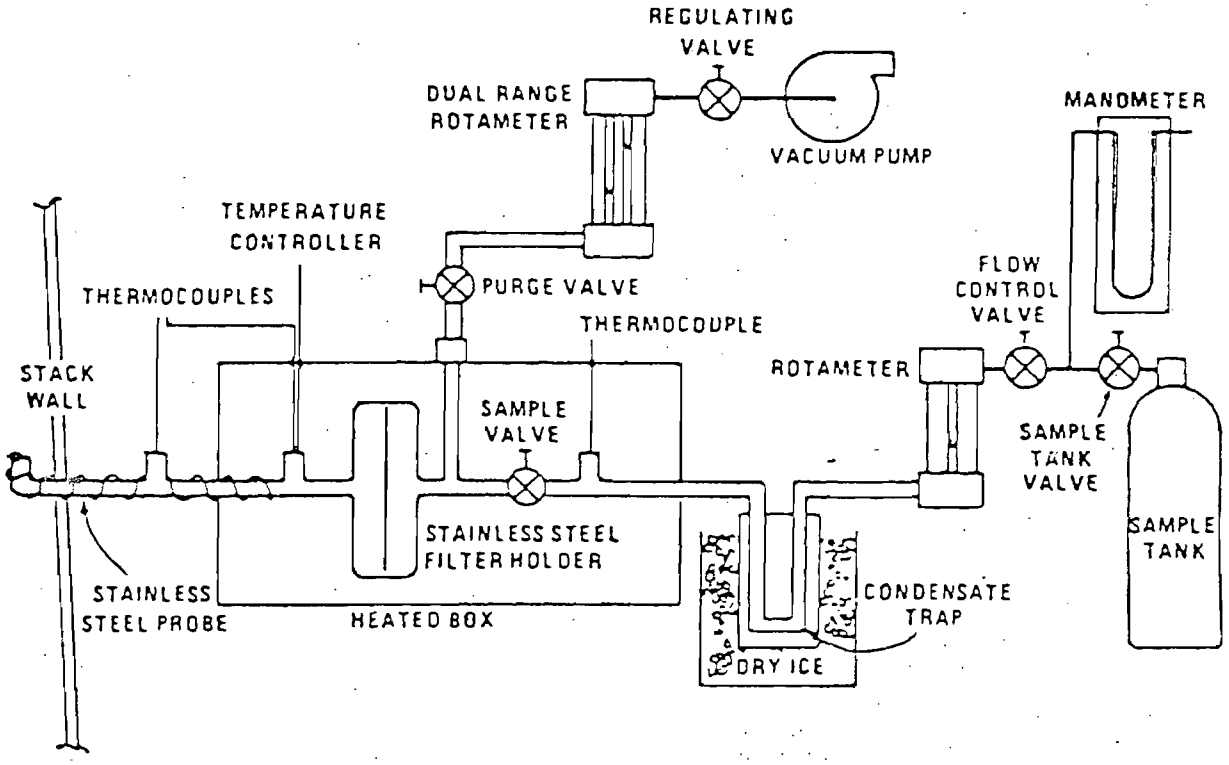

Figure 25-1. Sampling train.

Note.—If it is not possible to use a heating system for safety reasons, an unheated system with an in-stack filter may be a suitable alternative.

2.1.2 Filter Holder. 25-mm (15/16-in.) Inside diameter (ID) Gelman filter holder with 303 stainless steel body and 316 stainless steel support screen with the Viton O-ring replaced by a Teflon O-ring.

Note.—Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

2.1.3 Filter Heating System. A metal box consisting of an inner and an outer shell separated by insulating material with a heating element in the inner shell capable of maintaining a gas temperature at the filter of 121±3°C (250±5°F).

A suitable heating box is shown in Figure 25–2. The outer shell is a metal box that measures 102 mm x 280 mm x 292 mm (4 in. x 11 in. x 11½ in.), while the inner shell is a metal box measuring 76 mm x 229 mm x 241 mm (3 in. x 9 in. x 9½ in.). The inner box is supported by 13-mm (½-in.) phenolic rods. The void space between the boxes is filled with fiberfrax insulation which is sealed in place by means of a silicon rubber bead around the upper sides of the box. A removable lid made in a similar manner, wi a 25-mm (1-in.) gap between the parts, is us to cover the heating chamber.

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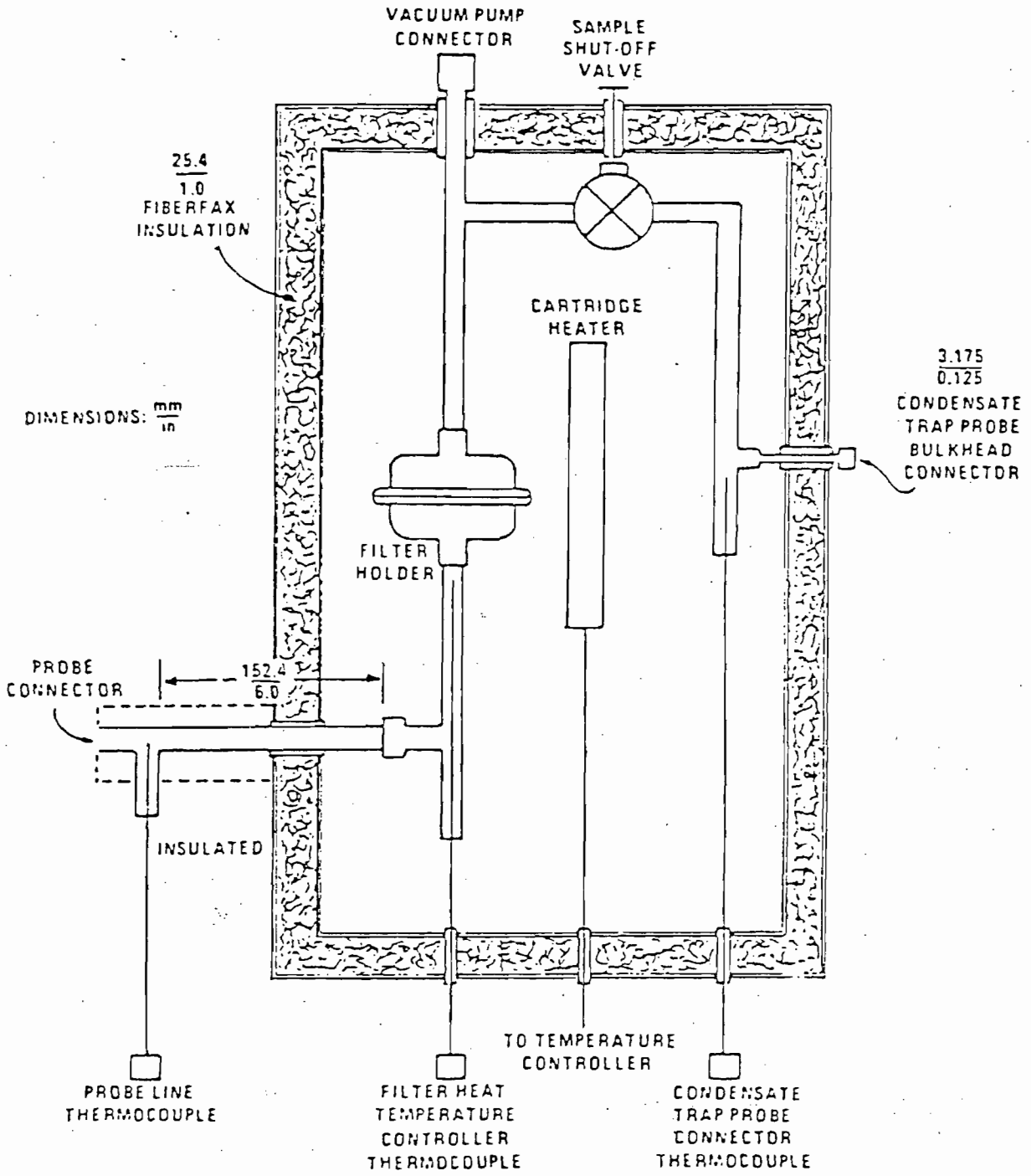

Figure 25-2. Out-of-stack filter box.

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The inner box is heated with a 250-watt cartridge heater, shielded by a stainless steel shroud. The heater is regulated by a thermostatic temperature controller which is set to maintain a temperature of 121°C as measured by a thermocouple in the gas line just before the filter. An additional thermocouple is used to monitor the temperature of the gas behind the filter.

Note.—If it is not possible to use a heating for safety reasons, an unheated system with an in-stack filter may be a suitable alternative.

2.1.4 Condensate Trap. 9.5-mm (3/8-in.) OD 316 stainless steel tubing bent into a U-shape. Exact dimensions are shown in figure 25–3. The tubing shall be packed with coarse quartz wool, to a density of approximately 0.11 g/cc before bending. While the condensate trap is packed with dry ice in the Dewar, an ice bridge may form between the arms of the condensate trap making it difficult to remove the condensate trap. This problem can be prevented by attaching a steel plate between the arms of the condensate trap in the same plane as the arms to completely fill the intervening space.

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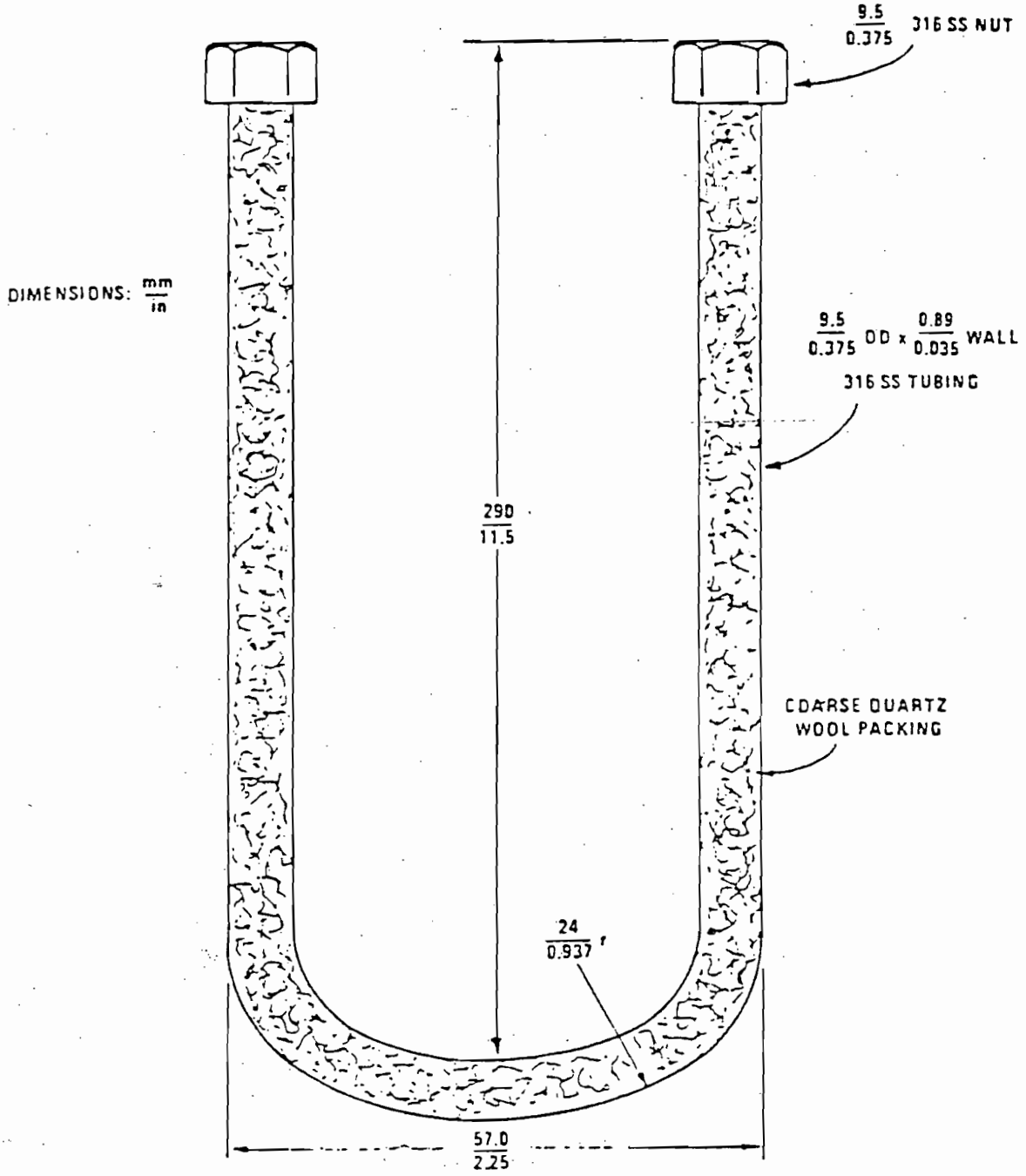

Figure 25-3. Condensate trap.

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2.1.5 Valve. Stainless steel control valve for starting and stopping sample flow.

2.1.6 Metering Valve. Stainless steel valve for regulating the sample flow rate through the sample train.

2.1.7 Rotameter. Glass tube with stainless steel fittings, capable of measuring sample flow in the range of 60 to 100 cc/min.

2.1.8 Sample Tank. Stainless steel or aluminum tank with a minimum volume of 4 liters.

2.1.9 Mercury Manometer or Absolute Pressure Gauge. Capable of measuring pressure to within 1 mm Hg in the range of 0 to 900 mm.

2.1.10 Vacuum Pump. Capable of evacuating to an absolute pressure of 10 mm Hg.

2.2 Condensate Recovery Apparatus. T system for the recovery of the organics captured in the condensate trap consists of heat source, oxidation catalyst, nondispers infrared (NDIR) analyzer and an intermedi collection vessel (ICV). Figure 25-4 is a schematic of a typical system. The system shall be capable of proper oxidation and recovery, as specified in Section 5.1. The following major components are required:

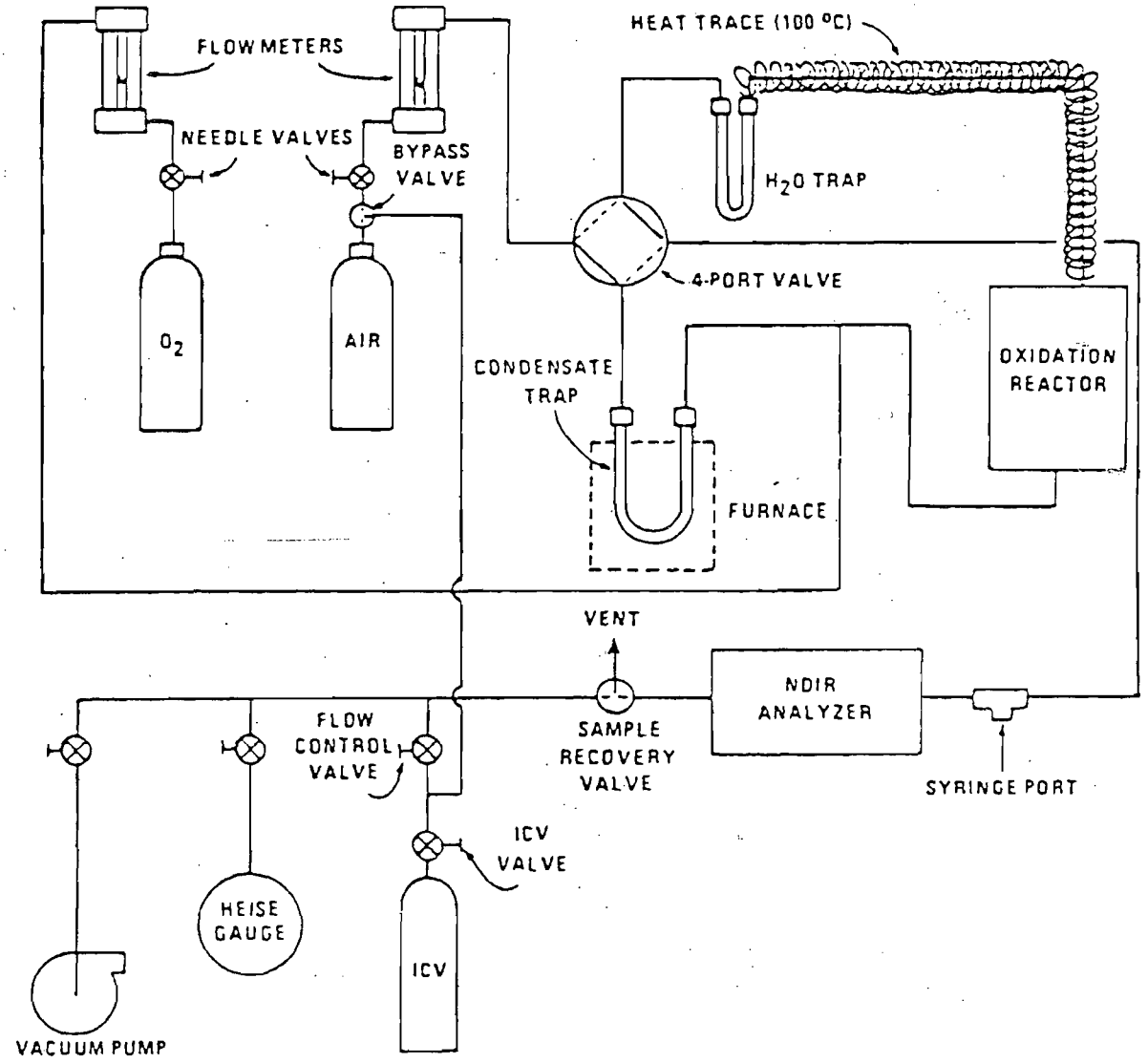

Figure 25-4. Condensate recovery system.

2.2.1 Heat Source. Sufficient to heat the condensate trap (including connecting tubing) to a temperature of 200 °C. A system using both a heat gun and an electric tube furnace is recommended.

2.2.2 Heat Tape. Sufficient to heat the connecting tubing between the water trap and the oxidation catalyst to 100 °C.

2.2.3 Oxidation Catalyst. A suitable length of 9.5 mm (3/8-in.) OD Inconel 600 tubing packed with 15 cm (6 in.) of 3.2 mm (1/8 in.) diameter 19 percent chromia on alumina pellets. The catalyst material is packed in the center of the catalyst tube with quartz wool packed on either end to hold it in place. The catalyst tube shall be mounted vertically in a 650 °C tube furnace.

2.2.4 Water Trap. Leak proof, capable of removing moisture from the gas stream.

2.2.5 Syringe Port. A 6.4-mm (¼-in.) OD stainless steel tee fitting with a rubber septum placed in the side arm.

2.2.6 NDIR Detector. Capable of indicating CO_2 concentration in the range of zero to 5 percent, to monitor the progress of combustion of the organic compounds from the condensate trap.

2.2.7 Flow-Control Valve. Stainless steel, to maintain the trap conditioning system near atmospheric pressure.

2.2.8 Intermediate Collection Vessel. Stainless steel or aluminum, equipped with a female quick connect. Tanks with nominal volumes of at least 6 liters are recommended.

2.2.9 Mercury Manometer or Absolute Pressure Gauge. Capable of measuring pressure to within 1 mm Hg in the range of 0 to 900 mm.

2.2.10 Syringe. 10-ml gas-tight glass syringe equipped with an appropriate needle.

2.3 NMO Analyzer. The NMO analyzer is a gas chromatograph (GC) with backflush capability for NMO analysis and is equipped with an oxidation catalyst, reduction catalyst, and FID. Figures 25–5 and 25–6 are schematics of a typical NMO analyzer. This semicontinuous GC/FID analyzer shall be capable of: (1) Separating CO, CO_2, and CH_4 from NMO, (2) reducing the CO_2 to CH_4 and quantifying as CH_4, and (3) oxidizing the NMO to CO_2, reducing the CO_2 to CH_4 and quantifying as CH_4, according to Section 5.2. The analyzer consists of the following major components:

BILLING CODE 6560-50-M

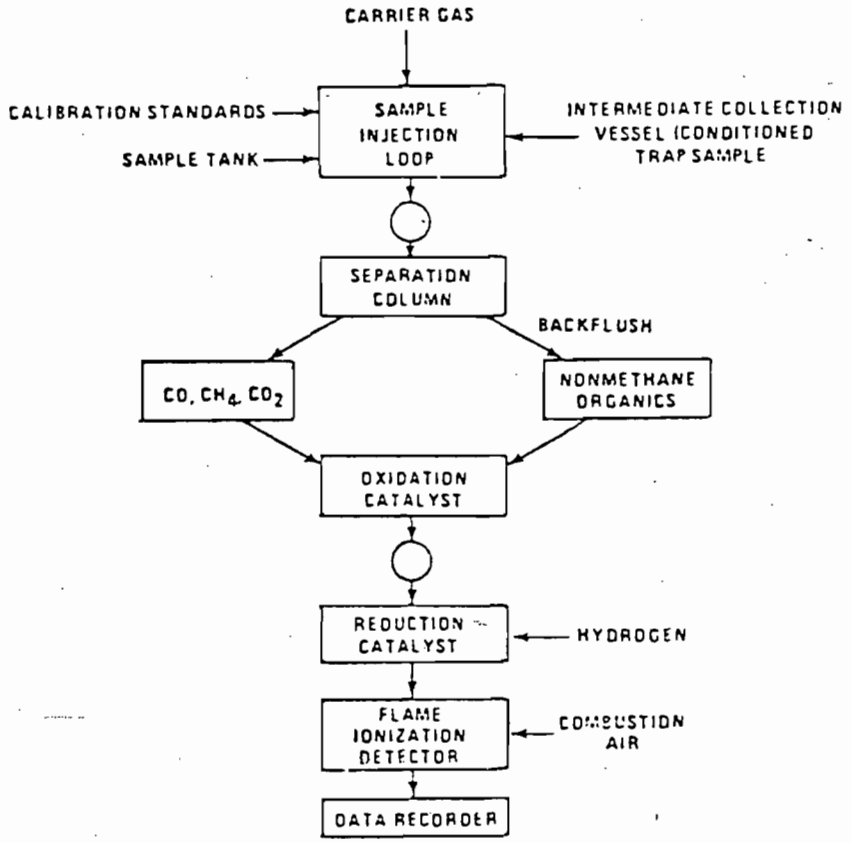

Figure 25-5. Simplified schematic of nonmethane organic (NMO) analyzer.

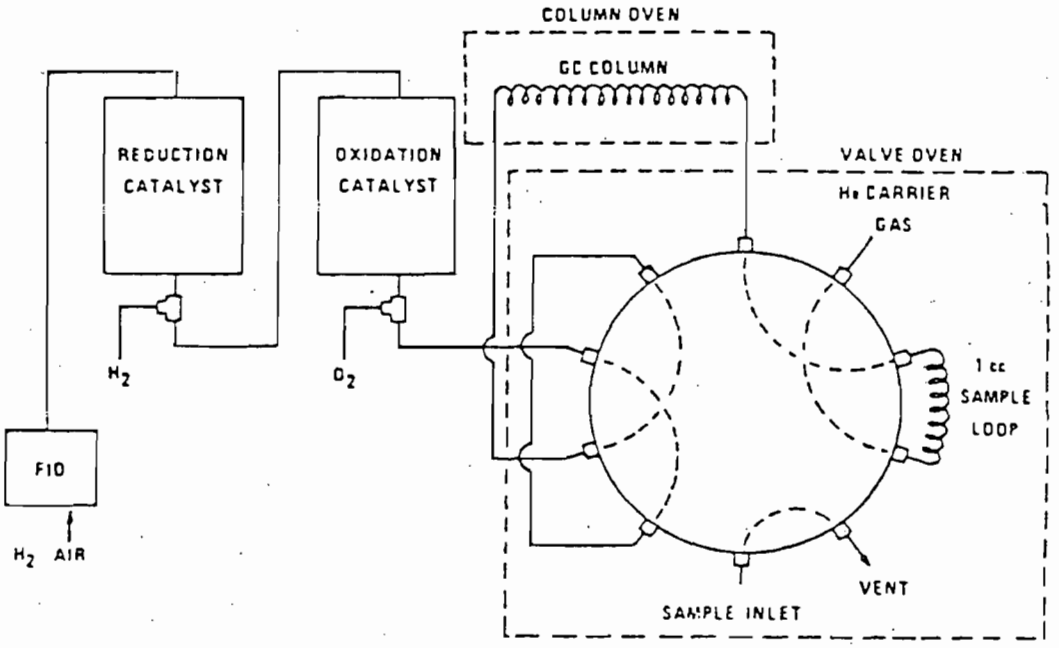

Figure 25 6. Nonmethane organic analyzer (NMO).

BILLING CODE 6560-50-C

2.3.1 Oxidation Catalyst. A suitable length of 9.5-mm (⅜-in.) OD Inconel 600 tubing packed with 5.1 cm (2 in.) of 19 percent chromia on 3.2-mm (⅛-in.) alumina pellets. The catalyst material is packed in the center of the tube supported on either side by quartz wool. The catalyst tube must be mounted vertically in a 650 °C furnace.

2.3.2 Reduction Catalyst. A 7.6-cm (3-in.) length of 6.4-mm (¼-in.) OD Inconel tubing fully packed with 100-mesh pure nickel powder. The catalyst tube must be mounted vertically in a 400 °C furnace.

2.3.3 Separation Column(s). A 30-cm (1-ft) length of 3.2-mm (⅛-in.) OD stainless steel tubing packed with 60/80 mesh Unibeads 1S followed by a 61-cm (2-ft) length of 3.2-mm (⅛-in.) OD stainless steel tubing packed with 60/80 mesh Carbosieve G. The Carbosieve and Unibeads columns must be baked separately at 200 °C with carrier gas flowing through them for 24 hours before initial use.

2.3.4 Sample Injection System. A 10-port GC sample injection valve fitted with a sample loop properly sized to interface with the NMO analyzer (1-cc loop recommended).

2.3.5 FID. An FID meeting the following specifications is required:

2.3.5.1 Linearity. A linear response (±5 percent) over the operating range as demonstrated by the procedures established in section 5.2.3.

2.3.5.2 Range. A full scale range of 10 to 50,000 ppm CH_4. Signal attenuators shall be available to produce a minimum signal response of 10 percent of full scale.

2.3.6 Data Recording System. Analog strip chart recorder or digital integration system compatible with the FID for permanently recording the analytical results.

2.4 Other Analysis Apparatus.

2.4.1 Barometer. Mercury, aneroid, or other barometer capable of measuring atmospheric pressure to within 1 mm Hg.

2.4.2 Thermometer. Capable of measuring the laboratory temperature within 1 °C.

2.4.3 Vacuum Pump. Capable of evacuating to an absolute pressure of 10 mm Hg.

2.4.4 Syringes. 10-µl and 50-µl liquid injection syringes.

2.4.5 Liquid Sample Injection Unit. 316 SS U-tube fitted with an injection septum, see Figure 25–7.

BILLING CODE 6560-50-M

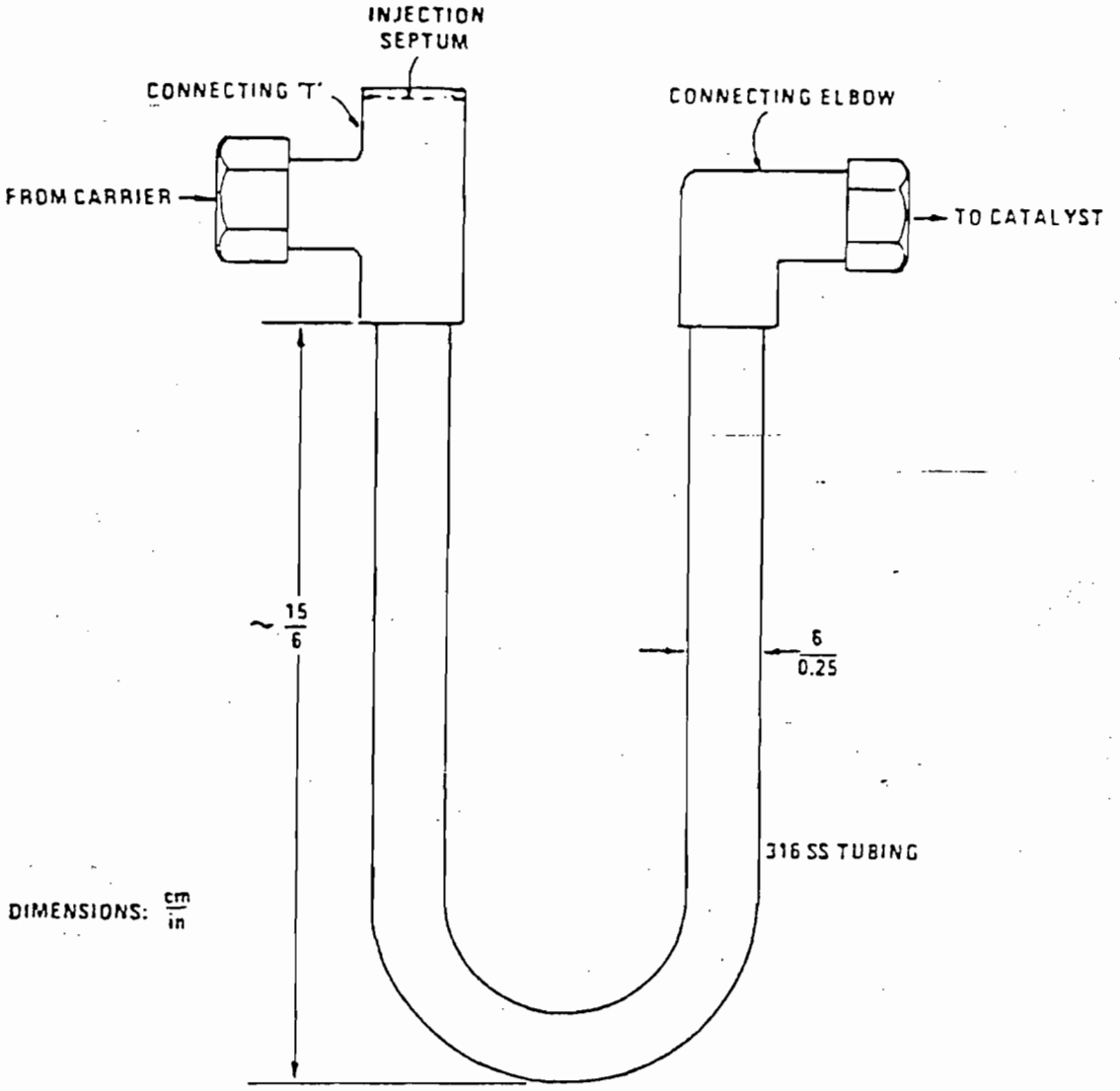

Figure 25-7. Liquid sample injection unit.

BILLING CODE 6560-50-C

Note:—If sampling has to be stopped before obtaining the minimum sampling time (specified in the applicable subpart) because a constant flow rate cannot be maintained, proceed as follows: After closing the sample tank valve, remove the used sample tank from the sampling train (without disconnecting other portions of the sampling train). Take another evacuated and leak-checked sample tank, measure and record the tank vacuum, and attach the new tank to the sampling train. After the new tank is attached to the sample train, proceed with the sampling until the required minimum sampling time has been exceeded.

4.2 Sample Recovery. After sampling is completed, close the flow control valve, and record the final tank vacuum; then record the tank temperature and barometric pressure. Close the sample tank valve, and disconnect the sample tank from the sample system. Disconnect the condensate trap at the flowmetering system, and tightly seal both ends of the condensate trap. Do not include the probe from the stack to the filter as part of the condensate sample. Keep the trap packed in dry ice until the samples are returned to the laboratory for analysis. Ensure that the test run number is properly identified on the condensate trap and the sample tank(s).

4.3 Condensate Recovery. See Figure 25–9. Set the carrier gas flow rate, and heat the catalyst to its operating temperature to condition the apparatus.

BILLING CODE 6560-50-M

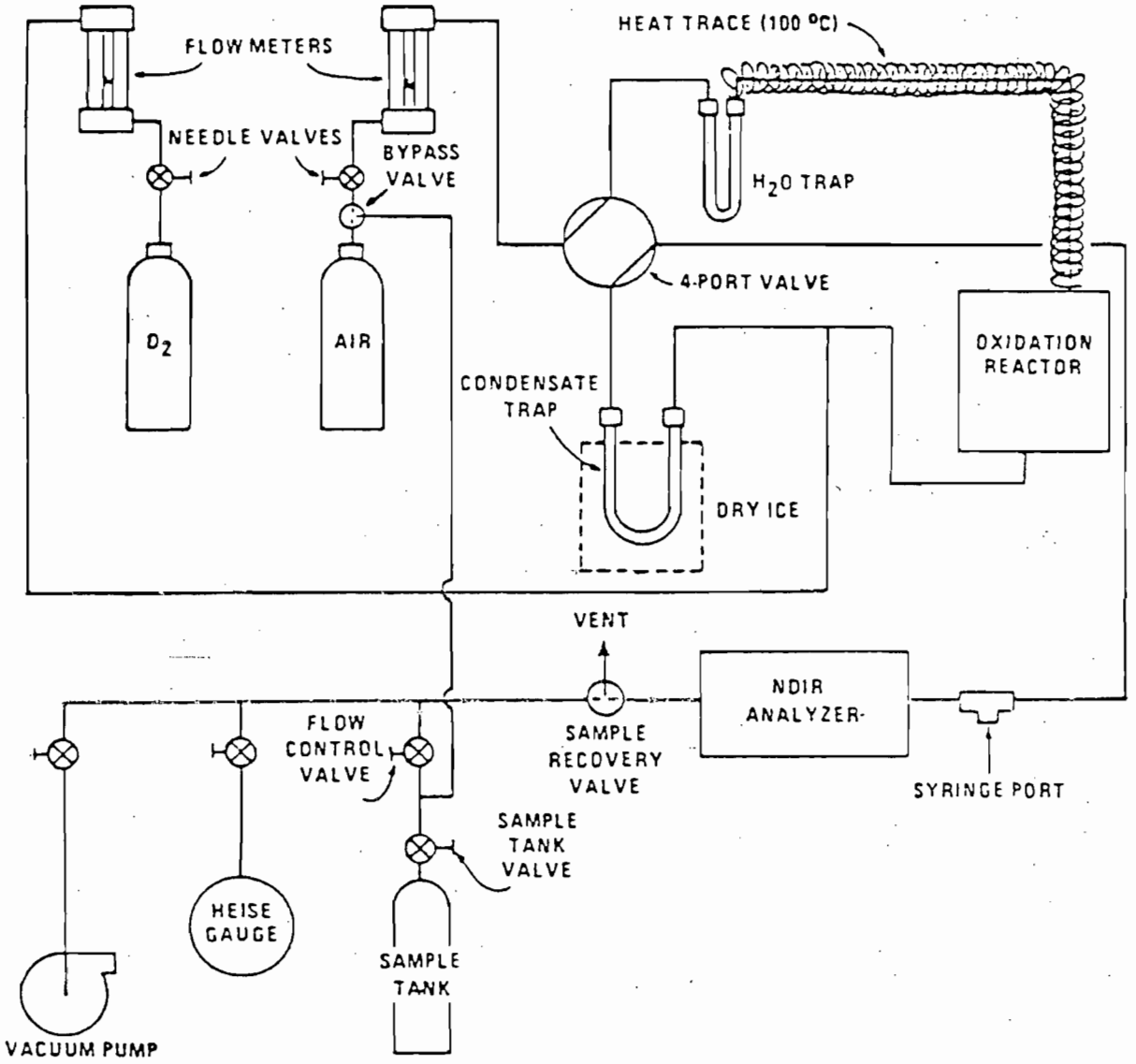

Figure 25-9. Condensate recovery system, CO_2 purge.

BILLING CODE 6560-50-C

4.3.1 Daily Performance Checks. Each day before analyzing any samples, perform the following tests:

4.3.1.1 Leak Check. With the carrier gas inlets and the flow control valve closed, install a clean condensate trap in the system, and evacuate the system to 10 mm Hg absolute pressure or less. Close the vacuum pump valve and turn off the vacuum pump. Monitor the system pressure for 10 minutes. The system is acceptable if the pressure change is less than 2 mm Hg.

4.3.1.2 System Background Test. Adjust the carrier gas and auxiliary oxygen flow rate to their normal valves of 100 cc/min and 150 cc/min, respectively, with the sample recovery valve in vent position. Using a 10-ml syringe withdraw a sample from the system effluent through the syringe port. Inject this sample into the NMO analyzer, and measure the CO_2 content. The system background is acceptable if the CO_2 concentration is less than 10 ppm.

4.3.1.3 Oxidation Catalyst Efficiency Check. Conduct a catalyst efficiency test as specified in section 5.1.2 of this method. If the criterion of this test cannot be met, make the necessary repairs to the system before proceeding.

4.3.2 Condensate Trap CO_2 Purge and Sample Tank Pressurization. After sampling is completed, the condensate trap will contain condensed water and organics and a small volume of sampled gas. This gas from the stack may contain a significant amount of CO_2 which must be removed from the condensate trap before the sample is recovered. This is accomplished by purging the condensate trap with zero air and collecting the purged gas in the original sample tank.

Begin with the sample tank and condensate trap from the test run to be analyzed. Set the four-port valve of the condensate recovery system in the CO_2 purge position as shown in Figure 25–9. With the sample tank valve closed, attach the sample tank to the sample recovery system. With the sample recovery valve in the vent position and the flow control valve fully open, evacuate the manometer or pressure gauge to the vacuum of the sample tank. Next, close the vacuum pump valve, open the sample tank valve, and record the tank pressure.

Attach the dry-ice-cooled condensate trap to the recovery system, and initiate the purge by switching the sample recovery valve from vent to collect position. Adjust the flow control valve to maintain atmospheric pressure in the recovery system. Continue the purge until the CO_2 concentration of the trap effluent is less than 5 ppm. CO_2 concentration in the trap effluent should be measured by extracting syringe samples from the recovery system and analyzing the samples with the NMO analyzer. This procedure should be used only after the NDIR response has reached a minimum level. Using a 10-ml syringe, extract a sample from the syringe port prior to the NDIR, and inject this sample into the NMO analyzer.

After the completion of the CO_2 purge, use the carrier gas bypass valve to pressurize the sample tank to approximately 1,060 mm Hg absolute pressure with zero air.

4.3.3 Recovery of the Condensate Trap Sample. See Figure 25–10. Attach the ICV to the sample recovery system. With the sample recovery valve in a closed position, between vent and collect, and the flow control and ICV valves fully open, evacuate the manometer or gauge, the connecting tubing, and the ICV to 10 mm Hg absolute pressure. Close the flow-control and vacuum pump valves.

BILLING CODE 6560-50-M

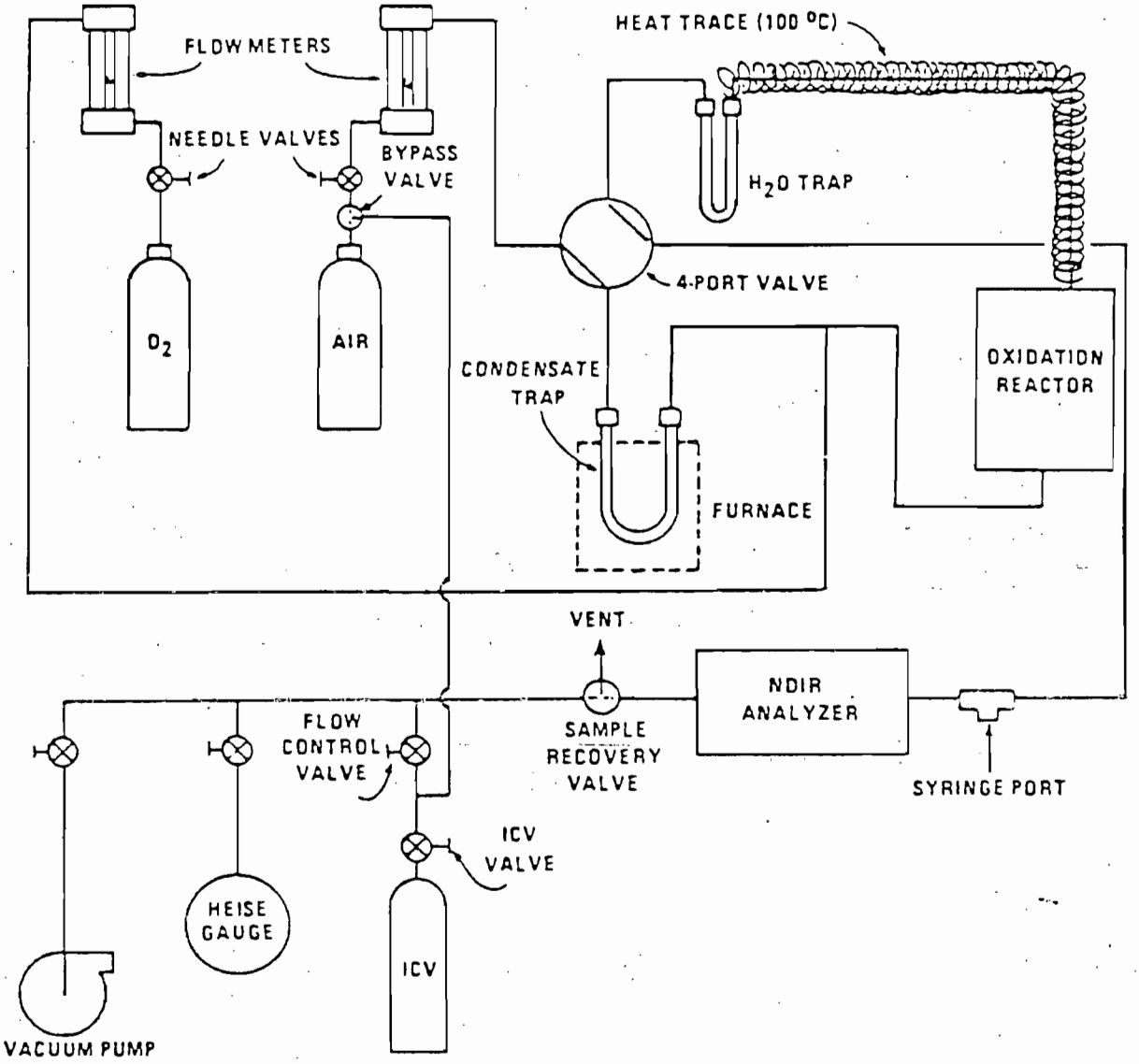

Figure 25-10. Condensate recovery system, collection of trap organics.

BILLING CODE 6560-50-C

Begin auxiliary oxygen flow to the oxidation catalyst at a rate of 150 cc/min, then switch the four-way valve to the trap recovery position and the sample recovery valve to collect position. The system should now be set up to operate as indicated in Figure 25–10. After the manometer or pressure gauge begins to register a slight positive pressure, open the flow control valve. Adjust the flow-control valve to maintain atmospheric pressure in the system within 10 percent.

Now, remove the condensate trap from the dry ice, and allow it to warm to ambient temperature while monitoring the NDIR response. If after 5 minutes, the CO_2 concentration of the catalyst effluent is below 10,000 ppm, discontinue the auxiliary oxygen flow to the oxidation catalyst. Begin heating the trap by placing it in a furnace preheated to 200°C. Once heating has begun, carefully monitor the NDIR response to ensure that the catalyst effluent concentration does not exceed 50,000 ppm. Whenever the CO_2 concentration exceeds 50,000 ppm, supply auxiliary oxygen to the catalyst at the rate of 150 cc/min. Begin heating the tubing that connected the heated sample box to the condensate trap only after the CO_2 concentrate falls below 10,000 ppm. This tubing may be heated in the same oven as the condensate trap or with an auxiliary heat source such as a heat gun. Heating temperature must not exceed 200°C. If a heat gun is used, heat the tubing slowly along its entire length from the upstream end to the downstream end, and repeat the pattern for a total of three times. Continue the recovery until the CO_2 concentration drops to less than 10 ppm as determined by syringe injection as described under the condensate trap CO_2 purge procedure, section 4.3.2.

After the sample recovery is completed, use the carrier gas bypass valve to pressurize the ICV to approximately 1060 mm Hg absolute pressure with zero air.

4.4 Analysis. Before putting the NMO analyzer into routine operation, conduct an initial performance test. Start the analyzer, and perform all the necessary functions in order to put the analyzer into proper working order; then conduct the performance test according to the procedures established in section 5.2. Once the performance test has been successfully completed and the CO_2 and NMO calibration response factors have been determined, proceed with sample analysis as follows:

4.4.1 Daily Operations and Calibration Checks. Before and immediately after the analysis of each set of samples or on a daily basis (whichever occurs first), conduct a calibration test according to the procedures established in section 5.3. If the criteria of the daily calibration test cannot be met, repeat the NMO analyzer performance test (Section 5.2) before proceeding.

4.4.2 Operating Conditions. The carrier gas flow rate is 29.5 cc/min He and 2.2 cc/min O_2. The column oven is heated to 85°C. The order of elution for the sample from the column is CO, CH_4, CO_2, and NMO.

4.4.3 Analysis of Recovered Condensate Sample. Purge the sample loop with sample, and then inject the sample. Under the specified operating conditions, the CO_2 in the sample will elute in approximately 100 seconds. As soon as the detector response returns to baseline following the CO_2 peak, switch the carrier gas flow to backflush, and raise the column oven temperature to 195°C as rapidly as possible. A rate of 30°C/min has been shown to be adequate. Record the value obtained for the condensible organic material (C_{mo}) measured as CO_2 and any measured NMO. Return the column oven temperature to 85°C in preparation for the next analysis. Analyze each sample in triplicate, and report the average C_{mo}.

4.4.4 Analysis of Sample Tank. Perform the analysis as described in section 4.4.3, but record only the value measured for NMO (C_{tm}).

4.5 Audit Samples. Analyze a set of two audit samples concurrently with any compliance samples and in exactly the same manner to evaluate the analyst's technique and the instrument calibration. The same analysts, analytical reagents, and analytical system shall be used for the compliance samples and the EPA audit samples; if this condition is met, auditing of subsequent compliance analyses for the same enforcement agency within 30 days is not required. An audit sample set may not be used to validate different sets of compliance samples under the jurisdiction of different enforcement agencies, unless prior arrangements are made with both enforcement agencies.

Calculate the concentrations of the audit samples in ppm using the specified sample volume in the audit instructions. (Note.—Indication of acceptable results may be obtained immediately by reporting the audit results in ppm and compliance results in ppm by telephone to the responsible enforcement agency.) Include the results of both audit samples, their identification numbers, and the analyst's name with the results of the compliance determination samples in appropriate reports to the EPA regional office or the appropriate enforcement agency during the 30-day period.

The concentration of the audit samples obtained by the analyst shall agree within 20 percent of the actual concentrations. Failure to meet the 20-percent specification may require retests until the audit problems are resolved. However, if the audit results do not affect the compliance or noncompliance status of the affected facility, the Administrator may waive the reanalysis requirement, further audits, or retests and accept the results of the compliance test. While steps are being taken to resolve audit anslysis problems, the Administrator may also choose to use the data to determine compliance or noncompliance of the affected facility.

5. Calibration and Operational Checks

Maintain a record of performance of each item.

5.1 Initial Performance Check of Condensate Recovery Apparatus. Perform these tests before the system is first placed in operation, after any shutdown of 6 months or more, and after any major modification of the system, or at the specified frequency.

5.1.1 Carrier Gas and Auxiliary O_2 Blank Check. Analyze each new tank of carrier gas or auxiliary O_2 with the NMO analyzer to check for contamination. Treat the gas cylinders as noncondensible gas samples, and analyze according to the procedure in section 4.4.3. Add together any measured CH_4, CO, CO_2, or NMO. The total concentration must be less than 5 ppm.

5.1.2 Catalyst Efficiency Check. With a clean condensate trap installed in the recovery system, replace the carrier gas cylinder with the high level methane standard gas cylinder (section 3.4.1). Set the four-port valve to the recovery position, and attach an ICV to the recovery system. With the sample recovery valve in vent position and the flow-control and ICV valves fully open, evacuate the manometer or gauge, the connecting tubing, and the ICV to 10 mm Hg absolute pressure. Close the flow-control and vacuum pump valves.

After the NDIR response has stabilized, switch the sample recovery valve from vent to collect. When the manometer or pressure gauge begins to register a slight positive pressure, open the flow-control valve. Keep the flow adjusted so that atmospheric pressure is maintained in the system within 10 percent. Continue collecting the sample in a normal manner until the ICV is filled to a nominal gauge pressure of 300 mm Hg. Close the ICV valve, and remove the ICV from the system. Place the sample recovery valve in the vent position, and return the recovery system to its normal carrier gas and normal operating conditions. Analyze the ICV for CO_2 using the NMO analyzer; the catalyst efficiency is acceptable if the CO_2 concentration is within 2 percent of the methane standard concentration.

5.1.3 System Performance Check. Construct a liquid sample injection unit similar to design to the unit shown in Figure 25–7. Insert this unit into the condensate recovery and conditioning system in place of a condensate trap, and set the carrier gas and auxiliary O_2 flow rates to normal operating levels. Attach an evacuated ICV to the system, and switch from system vent to collect. With the carrier gas routed through the injection unit and the oxidation catalyst, inject a liquid sample (see sections 5.1.3.1 to 5.1.3.4) into the injection port. Operate the trap recovery system as described in section 4.3.3. Measure the final ICV pressure, and then analyze the vessel to determine the CO_2 concentration. For each injection, calculate the percent recovery using the equation in section 6.6.

The performance test is acceptable if the average percent recovery is 100 ± 5 percent with a relative standard deviation (section 6.9) of less than 2 percent for each set of triplicate injections as follows:

5.1.3.1 50 µl Hexane.

5.1.3.2 50 µl Hexane.

5.1.3.3 50 µl Decane.

5.1.3.4 50 µl Decane.

5.2 Initial NMO Analyzer Performance Test. Perform these tests before the system is first placed in operation, after any shutdown longer than 6 months, and after any major modification of the system.

5.2.1 Oxidation Catalyst Efficiency Check. Turn off or bypass the NMO analyzer reduction catalyst. Make triplicate injections of the high level methane standard (section

3.4.1.). The oxidation catalyst operation is acceptable if the FID response is less than 1 percent of the injected methane concentration.

5.2.2 Reduction Catalyst Efficienty Check. With the oxidation catalyst unheated or bypassed and the heated reduction catalyst bypassed, make triplicate injections of the high level methane standard (section 3.4.1). Repeat this procedure with both catalysts operative. The reduction catalyst operation is acceptable if the response under both conditions agree within 5 percent.

5.2.3 Analyzer Linearity Check and NMO Calibration. While operating both the oxidation and reduction catalysts, conduct a linearity check of the analyzer using the propane standards specified in section 3.4.2. Make triplicate injections of each calibration gas, and then calculate the average response factor (area/ppm C) for each gas, as well as the overall mean of the response factor values. The instrument linearity is acceptable if the average response factor of each calibration gas is within 2.5 percent of the overall mean value and if the relative standard deviation (section 6.9) for each set of triplicate injections is less than 2 percent. Record the overall mean of the propane response factor values as the NMO calibration response factor (RF_{NMO}).

Repeat the linearity check using the CO_2 standards specified in section 3.4.3. Make triplicate injections of each gas, and then calculate the average response factor (area/ppm C) for each gas, as well as the overall mean of the response factor values. Record the overall mean of the response factor values as the CO_2 calibration response factor (RF_{CO2}). The RF_{CO2} must be within 10 percent of the RF_{NMO}.

5.2.4 System Performance Check. Check the column separation and overall performance of the analyzer by making triplicate injections of the calibration gases listed in section 3.4.4. The analyzer performance is acceptable if the measured NMO value for each gas (average of triplicate injections) is within 5 percent of the expected value.

5.3 NMO Analyzer Daily Calibration.

5.3.1 CO_2 Response Factor. Inject triplicate samples of the high level CO_2 calibration gas (section 3.4.3), and calculate the average response factor. The system operation is adequate if the calculated response factor is within 5 percent of the RF_{CO2} calculated during the initial performance test (section 5.2.3). Use the daily response factor (DRF_{CO2}) for analyzer calibration and the calculation of measured CO_2 concentrations in the ICV samples.

5.3.2 NMO Response Factors. Inject triplicate samples of the mixed propane calibration cylinder (section 3.4.4.1), and calculate the average NMO response factor. The system operation is adequate if the calculated response factor is within 5 percent of the RF_{NMO} calculated during the initial performance test (section 5.2.4). Use the daily response factor (DRF_{NMO}) for analyzer calibration and calculation of NMO concentrations in the sample.

5.4 Sample Tank and ICV Volume. The volume, of the gas sampling tanks used must be determined. Determine the tank and ICV volumes by weighing them empty and then filled with deionized distilled water: weigh to the nearest 5 g, and record the results. Alternatively, measure the volume of water used to fill them to the nearest 5 ml.

6. *Calculations*

All equations are written using absolute pressure; absolute pressures are determined by adding the measured barometric pressure to the measured gauge or manometer pressure.

6.1 Nomenclature.

C = TGMMO concentration of the effluent, ppm C equivalent.

C_c = Calculated condensible organic (condensate trap) concentration of the effluent, ppm C equivalent.

C_{cm} = Measured concentration (NMO analyzer) for the condensate trap ICV, ppm CO_2.

C_t = Calculated noncondensible organic concentration (sample tank) of the effluent, ppm C equivalent.

C_{tm} = Measured concentration (NMO analyzer) for the sample tank, ppm NMO.

F = Sampling flow rate, cc/min.

L = Volume of liquid injected, µl.

M = Molecular weight of the liquid injected, g/g-mole.

M_c = TGNMO mass concentration of the effluent, mg C/dsm^3.

N = Carbon number of the liquid compound injected (N = 12 for decane, N = 6 for hexane).

P_f = Final pressure of the intermediate collection vessel, mm Hg absolute.

P_b = Barometric pressure, cm Hg.

P_{ti} = Gas sample tank pressure before sampling, mm Hg absolute.

P_t = Gas sample tank pressure after sampling, but before pressurizing, mm Hg absolute.

P_{tf} = Final gas sample tank pressure after pressurizing, mm Hg absolute.

T_f = Final temperature of intermediate collection vessel, °K.

T_{ti} = Sample tank temperature before sampling, °K.

T_t = Sample tank temperature at completion of sampling, °K.

T_{tf} = Sample tank temperature after pressurizing, °K.

V = Sample tank volume, m^3.

V_t = Sample train volume, cc.

V_v = Intermediate collection vessel volume, m^3.

V_s = Gas volume sampled, dsm^3.

n = Number of data points.

q = Total number of analyzer injections of intermediate collection vessel during analysis (where k = injection number, 1 . . . q).

r = Total number of analyzer injections of sample tank during analysis (where j = injection number, 1 . . . r).

xi = Individual measurements.

$\bar{x}$ = mean value.

ρ = Density of liquid injected, g/cc.

θ = Leak check period, min.

ΔP = Allowable pressure change, cm Hg.

6.2 Allowable Pressure Change. For the pretest leak check, calculate the allowable pressure change:

Eq. 25-1

$$\Delta P = 0.01 \frac{FP_b\theta}{V_t}$$

6.3 Sample Volume. For each test run, calculate the gas volume sampled:

Eq. 25-2

$$V_s = 0.3857\ V \left[\frac{\bar{P}_t}{\bar{T}_t} - \frac{\bar{P}_{ti}}{\bar{T}_{ti}} \right]$$

6.4 Noncondensible Organics. For each sample tank, determine the concentration of nonmethane organics (ppm C):

Eq. 25-3

$$C_t = \left[\frac{P_{tf}}{\frac{T_{tf}}{\frac{\bar{P}_t}{T_t} - \frac{\bar{P}_{ti}}{T_{ti}}}} \right] \left[\frac{1}{r} \sum_{j=1}^{r} C_{tm_j} \right]$$

6.5 Condensible organics. For each condensate trap determine the concentration of organics (ppm C):

Eq. 25-4

$$C_c = 0.3857 \frac{V_v P_f}{V_s T_f} \left[\frac{1}{q} \sum_{k=1}^{q} C_{cm_k} \right]$$

6.6 TGNMO. To determine the TGNMO concentration for each test run, use the following equation:

Eq. 25-5

$$C = C_t + C_c$$

6.7 TGNMO Mass Concentration. To determine the TGNMO mass concentration as carbon for each test run, use the following equation:

Eq. 25-6

$$M_c = 0.4993\ C$$

6.8 Percent Recovery. To calculate the percent recovery for the liquid injections to the condensate recovery and conditioning system use the following equation:

$$\text{Percent recovery} = 1.604 \frac{M}{L} \frac{V_v}{\rho} \frac{P_f}{T_f} \frac{C_{cm}}{N}$$

Eq. 25-7

6.9 Relative Standard Deviation.

$$RSD = \frac{100}{\bar{x}} \frac{\Sigma (x_i - \bar{x})^2}{n - 1}$$

Eq. 25-8

7. Bibliography

1. Salo, Albert E., Samuel Witz, and Robert D. MacPhee. Determination of Solvent Vapor Concentrations by Total Combustion Analysis: A Comparison of Infrared with Flame Ionization Detectors. Paper No. 75-33.2. (Presented at the 68th Annual Meeting of the Air Pollution Control Association, Boston, Massachusetts, June 15-20, 1975.) 14 p.

2. Salo, Albert E., William L. Oaks, and Robert D. MacPhee. Measuring the Organic Carbon Content of Source Emissions for Air Pollution Control. Paper No. 74-190. (Presented at the 67th Annual Meeting of the Air Pollution Control Association, Denver, Colorado June 9-13, 1974.) 25 p.

* * * * *

[FR Doc. 86-25192 Filed 11-6-86; 8:45 am]

BILLING CODE 6560-50-M

ATTACHMENT 3

ENVIRONMENTAL SCIENCE & ENGINEERING,

NOTES OF TELEPHONE CONVERSATION

ESE employee making/~~receiving~~ call: Lloyd Stebbins

TO/~~FROM~~: Gary McAlister,

of: Emission Measurement Branch, USEPA RTP, North Carolina

TELEPHONE NO: (919) 541-2237 TIME & DATE 12/15/86

SUBJECT OF CONVERSATION EPA Method 25

PROJECT NO: 86023-0000

COMMENTS:

PROPOSED RULE CHANGE

On Friday, November 7, 1986, the USEPA published in the Federal Register, proposed rules for changing the procedures for conducting the Method 25 evaluation of VOC emissions. The revised procedures are intended to improve the precision and reliability of the test.

Gary acknowledged that there had been many problems with this test procedure throughout the country since it was first established in October 1980. He added that some consultants simply refused to use the procedure. He continued to explain that the problems were sufficiently widespread that the USEPA had no difficulty justifying the time and expense related to preparation of the recently proposed rules. However, many of the issues raised by consultants were communicated to the Agency in informal meetings during the first year after promulgation of the rule. Gary added that tests sponsored by the USEPA revealed the same difficulties as reported by others in privately run tests. Documentation of these problems is apparently slim, but the difficulties were obviously sufficiently widespread to justify the effort of developing the proposed rules.

Attachment 3

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

June 8, 1987

Mr. W. Fred Smith
President
Austill Packaging Company, Inc.
3389 Powers Avenue
Jacksonville, Florida 32231

Dear Mr. Smith:

Re: Construction Permits
AC 16-115518, AC 16-093347, AC 16-089528
Rotogravure Presses 2, 4, and 5

The Department received your letter, dated May 21, 1987, which requested approval of USEPA Reference Method 25A in lieu of USEPA Method 25 for the determination of VOC emissions from Rotogravure Presses 2, 4, and 5.

This request is acceptable and the specific conditions are changed as follows:

Specific Condition No. 5

From:
Destruction efficiency of the catalytic incinerator shall be demonstrated by determining the inlet and outlet VOC concentrations using EPA Method 25. Dividing the outlet concentration by the inlet concentration will provide the penetration. Destruction efficiency = 1- Penetration

To:
Destruction efficiency of the catalytic incinerator shall be demonstrated by determining the inlet and outlet VOC concentrations using EPA Method 25A. Dividing the outlet concentration by the inlet concentration will provide the penetration. Destruction efficiency = 1- Penetration

Specific Condition No. 7

From:
The Department, BES, and EPA shall be notified, in writing, 15 days in advance of the EPA Method 25 compliance test.

To:
The Department, BES, and EPA shall be notified, in writing, 15 days in advance of the EPA Method 25A compliance test.

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

Attachment to be Incorporated

Mr. Lloyd H. Stebbins' letter of May 21, 1987.

Sincerely,

Dale Twachtmann
Secretary

DT/ks

cc: K. Mehta, BES
L. Stebbins, ESE

Attachment 4

Department of Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

November 7, 1994

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Douglas V. Turner, Plant Manager
D-Graphics
Division of Jefferson Smurfit Corporation
3389 Powers Avenue
Jacksonville, Florida 32231

Dear Mr. Turner:

The Department reviewed your application of October 26 for a construction permit to extend the annual hours of operation for Press #5. Please provide a response to the following questions.

1) Has the air handling system for Press #5 been properly balanced since Press #4 was disassembled?

2) There have been recent allegations that the source has been bypassing the incinerator. What action has been taken to correct this, if the allegations are in fact correct?

Upon receipt of the above information, the Department will proceed with review of your application.

Sincerely,

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

CHF/JB/pm

cc: S. Pace, DCR&ESD
C. Kirts, NED
J. Manning, P.E.
J. Braswell, Esq., DEP
T. Cole, Esq., OHF&C

Attachment 5

JEFFERSON SMURFIT CORPORATION
D-GRAPHICS DIVISION

3389 POWERS AVENUE
JACKSONVILLE, FL 32207
TELEPHONE: 904/733-4020
FAX: 904/733-4361

November 7, 1994

Mr.Clair Fancy, P.E.
Chief, Bureau of Air Regulations
Division of Air Resources Management
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Fancy:

Regarding the questions in your memo dated November 7, 1994, to the best of my knowledge the answers are as follows:

Question #1 - Press #5 was properly balanced after Press #4 was shutdown.

Question #2 - Is answered in the first full paragraph on page 3 of Current Practices Review Air Sources prepared by Ed Barber And Associates dated November 4, 1994.

I trust that the above is fully responsive to your questions.

Sincerely,

Douglas Turner
Plant Manager

Enclosures

cc: Mr. Terry L. Cole, Attorney at Law

CURRENT PRACTICES REVIEW
AIR SOURCES

Prepared for:

D-Graphics
A Division of Jefferson Smurfit Corporation
3389 Powers Avenue
Jacksonville, FL 32207

Submitted to:

D-Graphics
City of Jacksonville
Florida Department of Environmental Protection

Prepared by:

Ed Barber And Associates
P.O. Box 838
Macclenny, FL 32063

November 4, 1994

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CURRENT PRACTICES REVIEW
AIR SOURCES

Pursuant to Emergency Order Case Number 94-3395 issued by The State of Florida Department of Environmental Protection (FDEP) paragraph 17, Ed Barber and Associates was retained by D-Graphics, an affiliate of Jefferson Smurfit Corporation, 3389 Powers Avenue, Jacksonville, Florida as an independent consultant to review current practices at the facility. Further this order provided that the results of this review would be provided to the FDEP and City of Jacksonville (City). This report constitutes that review.

As stated in The Emergency Order, D-Graphics operates a catalytic incinerator with an associative air capture and transport system that provides treatment for volatile organic carbon compounds (VOC) being emitted from a rotogravure printing press. The press, designated as Press 5, and its pollution control system are operated as authorized under permit AC 16-089528 issued February 12, 1985.

In the review process, interviews were conducted with D-Graphics personnel, Jefferson Smurfit representatives, the company attorney, representatives of The City and FDEP. The review is divided into four sections: (1) operating conditions, (2) control systems, (3) monitoring and (4) record keeping, testing, maintenance and inspection. Additionally, this report contains conclusions and recommendations.

Operating Conditions

This facility operates under FDEP permit AC 16-089528 and the Emergency Order referenced above. There is currently no operating permit for this facility. The operating permit is presently the subject of an administrative proceeding. D-Graphics emissions and operations data have been summarized in an October 27, 1994 letter from Mr. Michael Farrar to Mr. Ernest Frey and Mr. Alton Yates.

The permit limit for maximum VOCs applied to the substrate in pounds per hour (specific condition 2) were exceeded for 1991. The pounds per hour were not exceeded for 1990, 1992, 1993. The test results for 1994 have not as yet been received. Run hours (specific condition 1) have exceeded permit limits for 1990, 1991, 1992, 1993 and 1994. The 1994 run hours exceedence was in part the basis for the issuance of the Emergency Order.

The company has also disclosed that the VOC capture requirements were compromised when the containment curtains, located on the operators side of the press, were removed or in some cases not maintained in the proper position. Otherwise, the conditions of the permits in terms of meeting limits of discharges should have been met when equipment was operated and maintained properly.

Systems upsets can be caused by unit overheating (pressure) or power failures. No records of such occurrences (if any have occurred) have been made. In the permit it was anticipated that an automatic system shut down process would be used, a lower explosive level (LEL) system, to safeguard against accidents. However, D-Graphics utilizes a different system as described in a letter from Mr. Michael Farrar to Mr. Ernest Frey and Mr. Alton Yates dated November 2, 1994. Instead of the LEL, the operators utilize panel alarm lights that are activated when the temperature across the catalytic bed in the incinerator exceeds safe limits. The press operator then can safely manually shut down the press and the incinerator. If temperatures get even higher, because the operator fails to appropriately shut down the system, then the incinerator burner is automatically extinguished. In any case, the gases are intended to be vented to atmosphere during an upset occurrence.

Fugitive sources at the site may be generated from several areas. There are noncovered spaces around the edges of the curtains and above the press, open drums of solvent and ink (when material is briefly being handled or removed), building roof vents, doors and vents from four 3,000 gallon storage tanks, all of which may generate or transfer fugitive emissions to atmosphere. Those fugitive emissions from the press line are accounted for in the calculations of material mass balance and would be detected during testing if they by design exceed 20%.

Control Systems

There are two elements of emission control, the capture and conveyance and the destruction of the VOCs through use of a catalytic incinerator. Compliance is measured by calculation of capture efficiency and VOC destruction efficiency. A LEAR determination was used in the permit process to evaluate overall capture and transport efficiency. Capture efficiency is, according to the LEAR, 80% and overall destruction efficiency in the incineration process is 95%. Test results are compiled in the Mr. Michael Farrar to Mr. Ernest Frey, Mr. Alton Yates letter of October 27 and reports as submitted to FDEP. These results indicate general compliance (based on test results that equal or exceed the LEAR efficiencies) except for the destruction efficiency in 1990. In that case the level was 94.5% which might be argued to be, for purposes of compliance, at 95%. All testing appears to be in order and the system appears to be physically capable of operating within acceptable capture and destruction limits when operated properly.

Negative pressure is placed on the system to assist in VOC capture within the press enclosure. This negative pressure is achieved by the dryer fans. The air supply fans deliver less air than the exhaust fans. The difference creates a negative pressure across the system.

Temperatures and system negative pressure are continuously monitored from a central control box near the press. The system consists of temperature gauges, lights and a chart recorder. These instruments are used by the press operator to determine how well the

system is working. Temperatures at various points in the system and the pressure sensor (for negative pressure pulling air to the exhaust system) are displayed. There are three switches for Press 5, Station 1, Station 2-7 and Station 8, that are used to direct exhaust either to the incinerator or vent to atmosphere. These switches are not switched to atmosphere unless there is an emergency or unless there is a Station 8 water base application.

There is no specified treatment system to be used when water base product is being applied at Station 8. The emissions (non VOC) are vented to atmosphere. A review of the recirculation system does not indicate any cross connections that would allow VOCs to be emitted from Station 1 or Station 2-7 through the Station 8 vent during this time period. The water base product contains ammonia. The effect that the ammonia could have on the catalytic bed, should the discharge be directed to the incinerator, is unknown. The permit does not appear to address this issue.

Sweeps were recently installed within the press enclosure to facilitate capture. These sweeps are located at press and floor levels. These sweeps should improve capture and reduce fugitive emissions from the press area.

In general the destruction portion of the system, appears to be relatively new and in good working order. Recent inspections indicate no problems with this system and unless testing indicates otherwise there is no reason to believe that this incinerator can not or will not continue to adequately perform its intended function at the appropriate, permitted level. The system is also such that it probably consistently does well and is not subject to efficiency variations.

The capture/conveyance system is, as permitted, not extremely efficient. When operating, as indicated by testing and mass balance calculations, this system achieves approximately 80% to 85% efficiency. Residual fugitive emissions during shut downs escape due to loss of negative pressure through the unenclosed areas. These emissions may not be great in number and the impact on the resource is no doubt immeasurable, however this system, as presently permitted, is not efficient in terms of VOC capture even when operating properly (80%-85% capture). Further both the gas buildup in the press area, no doubt uncomfortable to workers, and the inconvenience of the curtains tend to lead to circumvention of that element of the capture system. In essence, removal or misplacement of curtain sections by workers, as evidenced by the problems noted in the Emergency Order, is always a possibility. From a practical standpoint these real and potential operational problems are inherent in the design.

In the files there is reference in both drawings and verbage to a particulate air filter in the exhaust system prior to air conveyance to the recirculation system. There is a place on the duct on the roof marked filter. Employees know nothing about this filter. It is not clear from the file if this filter exists, if it is required or if it is even necessary.

Monitoring

The system operation is monitored at the control box. Lights and gauges reflect the poliution control system temperatures and pressure. A daily chart records incinerator and catalytic bed temperatures only. Pressure which is a critical component of capture is watched constantly but not recorded. The chart readings do however give a sense of operational efficiency. The temperature across the bed indicates the operational state of the press and nature of the solvent being sent to the incinerator. Charts are set on a clock and manually dated. The plant manager can review these charts daily for the period of time that press operators are not directly supervised (during parts of the 24 hour daily operation).

There are no other monitoring devices maintained at this facility. Monitoring during testing is performed in accordance with the permit or standard engineering protocol.

VOC content of ink and solvents are obtained from manufacturers specifications. Independent checks are not performed by D-Graphics. These manufacturers specifications are assumed to be accurate.

Record Keeping, Testing, Maintenance and Inspection

In general records are kept as required by the permit. Names and quantities of all solvents and inks are maintained and a compilation is submitted as a quarterly report in accordance with the permit. No additional information has been routinely requested by the FDEP or City regarding the solvent and ink content or usage. D-Graphics maintains more detailed information than is submitted.

Testing is performed according to methods as directed by the permit. D-Graphics has not reported that these tests have not been accepted by FDEP or the City. Yearly stack tests, for example, are up to date with the most resent one (1994) to be submitted as soon as the results are received from testing consultants. Testing procedures do not appear to be a problem.

Maintenance of capture and conveyance equipment may be adequate but relies on memory and is not documented. Generally there is no use of logs for items replaced or repaired and no schedule for repair. The conveyance system relies on flow balance with both fixed dampers and with vent dampers that are controlled by switches at the control panel. These dampers may be subject to some degree of failure particularly the vent dampers.

The incinerator is new and probably presently needs very little maintenance. However no long term maintenance plans have been developed so that as the equipment ages, the current high degree of performance may not be guaranteed.

Inspections by government and in-house inspectors have been infrequent. Recently Jefferson Smurfit has instituted self inspections and as a result of the Emergency Order, daily inspections by Ed Barber & Associates are being performed. Irregularities are to be reported to the plant manager and a written report made to the City and FDEP.

Routine equipment inspections are not made. When maintenance is performed on the incinerator no written report by the contractors is sent to the company and no calibrations of equipment and sensors are reported. There is a presumption of accuracy and precision on the part of D-Graphics.

In general training has been informal and on-the-job. The level of understanding of the press operators may need improving.

Conclusions and Recommendations

Based on our review we have recommendations concerning the operation.

1) The Capture and conveyance system is limited and inefficient. While testing indicates that it meets or exceeds permit limits it allows considerable incidental emissions which could be captured and treated. We recommend evaluation of total enclosure.

2) The capture system is not reliable when you consider the human factor. Human error is likely in dealing with the curtains, on the operator side, and while they achieve 80% to 85% efficiency they could be improved upon. Total enclosure would remedy this concern.

3) The active drum storage area near the press may not emit large quantities of VOCs. Although the permit does not require it, ideally this area should be included in the containment area. This area should be included in the total enclosure plan.

4) There are no good as-built drawings of the system available. These drawings should be made. It is difficult to trace the inflows and outflows. Ductwork should be labelled.

5) Routine system efficiency evaluations at the time of the stack tests would ensure maintenance of appropriate flows, recirculation and detect leaks or maintenance problems.

6) Maintenance and inspection logs would assist in periodic management review.

7) The pressure sensor is a critical component to VOC capture, I would evaluate methods to record its readings. Some type of a data logger might be appropriate.

8) All permits should be updated to reflect practices or changes. Reporting requirements for upsets should be included.

9) Press operators and/or shift supervisors should receive annual training by in-house experts. This effort would both update the employees on new regulations and reinforce the importance of following procedures.

10) The permit requirements (application and AC permit) as defined in various components of the file are difficult to follow. While this is not surprising, I would have one document specify all requirements and agreements. Since the application, LEAR, completeness summary responses and permit are all part of the program, a summary would assist the plant manager in maintaining compliance.

The facility itself is presently in good condition. I believe improved enclosure and formal routine maintenance and inspection will bring the facility up-to-date in terms of air emissions. Considering the size of the operation (small) the plant could be developed into an extremely low VOC discharger.