SERVICES DEPARTMENT

FAX COVER SHEET

AIR QUALITY DIVISION

421 West Church Street, Suite 412
Jacksonville. Florida 32202
(904)630-3484 (OFFICE)
(904)630-3638 (FAX)

DATE: 1-23-94 TIME: 10:00 AM

TO: CHARLES LOGUE FAX #: (904) 922-6979

MESSAGE:

FROM: RON BORGESON

NUMBER OF PAGES FAXED (including cover): 3

PLEASE CALL (904)630-3484 IF YOU DO NOT RECEIVE ALL THE PAGES OF THIS FAX OR IF TRANSMISSION IS UNCLEAR. OUR FAX NUMBER IS (904)630-3638.

AQD STACK TEST REVIEW

PLANT D-Graphics, Inc. IBM _____ (FAXed)

SOURCE #5 Rotogravure Press RPT. REC'D 11/11/94

PERMIT #AQ16-118645 FILE # 1120 B AQD OBSERVER Walker

AIR041 # 31/16/0213/0014 (INITIAL & DATE: _____)
CURRENT TEST DATE: 09/28/94 NEXT TEST DATE: 06/01/95
TEAM NAME: Nova Env. Serv. - Balabuszka, et al.
1TEST ACTUAL EMISSIONS: _____ (LBS/HR)
2TEST ACTUAL EMISSIONS: _____ (LBS/HR)
3TEST ACTUAL EMISSIONS: _____ (LBS/HR)
4TEST ACTUAL EMISSIONS: _____ (LBS/HR)
COMMENTS: _____

AIR043 (VE TESTS ONLY)
OBSERVER NAME: _____ TEST LENGTH: ___ (Min) TEST PASS: ___ (Y OR N)
5TEST % OPACITY: NORMAL: ___ EXCEPT: ___ TIME: ___ (Min)
6TEST % OPACITY: NORMAL: ___ EXCEPT: ___ TIME: ___ (Min)

COMPLIANCE INDICATED	[N] Y [ ] N	REPORT APPROVAL	[N] Y [ ] N	FIELD TEST APPROVAL	[N] Y [ ] N	PROCESS APPROVAL	[N] Y [ ] N

1RM: 25A/VOC ALLOW. EMIS.: 42.85 #/hr. ACTUAL EMIS.: 4.71 #/hr. (11 %)
2RM: 25A/VOC ALLOW. EMIS.: ≥ 80% C.E. ACTUAL EMIS.: 87.9% (+7.9 %)
3RM: 25A/VOC ALLOW. EMIS.: ≥ 95% D.E. ACTUAL EMIS.: 96.9% (+1.9 %)
4RM: _____ ALLOW. EMIS.: _____ ACTUAL EMIS.: _____ (___ %)
5RM: _____ ALLOW. EMIS.: _____ ACTUAL EMIS.: _____ (___ %)
6RM: _____ ALLOW. EMIS.: _____ ACTUAL EMIS.: _____ (___ %)

1ALLOW. PROC. WT.: 178.55 #/hr. ACTUAL PROC. WT.: 172.3 #/hr. (96 %)
2ALLOW. PROC. WT.: _____ ACTUAL PROC. WT.: _____ (___ %)
3ALLOW. PROC. WT.: _____ ACTUAL PROC. WT.: _____ (___ %)
4ALLOW. PROC. WT.: _____ ACTUAL PROC. WT.: _____ (___ %)
5ALLOW. PROC. WT.: _____ ACTUAL PROC. WT.: _____ (___ %)
6ALLOW. PROC. WT.: _____ ACTUAL PROC. WT.: _____ (___ %)

NOTES: Report received in 44 days.

REVIEWED BY: Walker DATE: 12/9/94 (OVER)

2.0 – RESULTS

2.1 The capture and destruction efficiency test results for the incinerator inlet and outlet at the Jacksonville facility are summarized below:

TABLE 1 – SUMMARY OF RESULTS
CAPTURE AND DESTRUCTION EFFICIENCY TESTING
September 28, 1993

INCINERATOR INLET	Run 1	Run 2	Run 3	Average
Gas Flow Rate:				
acfm	9343.23		9382.13	9362.68
scfm	8566.77		8519.15	8542.97
Total Hydrocarbons (ppmw Propane Basis)	1720.6	1686.5	1687.9	1698.33
Methane (ppm)	24	24	24	24
lb solvent/hr (measured)[1]	150.0	146.9	147.1	148.0
lb solvent/hr (process)	169.9	169.9	170.0	169.93
Capture Efficiency	88.3	86.5	86.5	87.1

INCINERATOR OUTLET	Run 1	Run 2	Run 3	Average
Gas Flow Rate:				
acfm	13681.34		13305.45	10943.13
scfm	8813.34		8580.80	8696.67
Total Hydrocarbons (ppmw Propane Basis)	54.28	51.69	49.54	51.84
Methane (ppm)	24	24	24	24
lb solvent/hr (measured)[1]	4.82	4.59	4.39	4.60
Destruction Efficiency	[illegible]5	96.93	97.07	96.95

[1] – Mass emission based on average of initial and final velocity traverses

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421 West Church Street, Suite 412
Jacksonville, Florida 32202
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DATE: 1/23/95 TIME: 3:40 PM

TO: Mr. Charles Logan, DEP FAX #: 922-6979

MESSAGE: Summary sheet - D-Graphics
#5 Press - Test of 9/28/94

FROM: Wayne Walker

NUMBER OF PAGES FAXED (including cover): 2

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2.0 – RESULTS

2.1 SUMMARY OF RESULTS

The capture and destruction efficiency test results for the incinerator inlet and outlet at the Jacksonville facility are summarized below:

TABLE I – SUMMARY OF RESULTS
CAPTURE AND DESTRUCTION EFFICIENCY TESTING
September 28, 1994

INCINERATOR INLET	Run 1	Run 2	Run 3	Average
Gas Flow Rate:				
acfm	9343.23		9382.13	9362.68
scfm	8566.77		8519.15	8542.96
Total Hydrocarbons (ppmw Propane Basis)	1720.6	1686.5	1687.9	1698.3
Methane (ppm)	27.6	21.1	25.2	24.6
lb solvent/hr (measured)[1]	151.6	148.8	148.8	149.7
lb solvent/hr (process)	168.9	168.9	170.0	169.3
Capture Efficiency	89.7	88.1	87.5	88.4

INCINERATOR OUTLET	Run 1	Run 2	Run 3	Average
Gas Flow Rate:				
acfm	13681.34		13305.4	13493.40
scfm	8813.34		8580.80	8696.67
Total Hydrocarbons (ppmw Propane Basis)	54.28	51.69	49.54	51.84
Methane (ppm)	27.1	21.4	38.5	29.0
lb solvent/hr (measured)[1]	4.11	4.03	3.34	3.83
Destruction Efficiency	97.3	97.3	97.8	97.4
Overall Control Efficiency	87.31	85.69	85.54	86.18

[1] - Mass emission based on average of initial and final velocity traverses

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

OCT 06 1993

MEMORANDUM

SUBJECT: Draft Capture Efficiency Guidance Document

FROM: Candace B. Sorrell CBS 919/541-1064
Chemicals and Petroleum Testing Section
Emission Measurement Branch, TSD (MD-19)

TO: See Addressees

Attached is a draft document entitled "Guidelines for Determining Capture Efficiency." The purpose of the document is to provide Environmental Protection Agency (EPA) Regional Offices, and State and local agencies with guidance regarding capture efficiency (CE). This guidance includes information on the permanent and temporary total enclosure protocols and alternative CE protocols. We would like to have your impression of the guidance document. Please review and give me any comments or suggestions by October 29, 1993.

Attachment

[illegible]:
Volatile Organic Compounds Policy Work Group
Volatile Organic Compounds Compliance Work Group

GUIDELINES FOR DETERMINING CAPTURE EFFICIENCY

REVISED DRAFT

September 30, 1993

GUIDELINES FOR DETERMINING CAPTURE EFFICIENCY

REVISED DRAFT

EPA Contract No. 68-D2-0165
Work Assignment No. 13
MRI Project No. 3713

Prepared for:

Candace Sorrell
Emission Measurement Branch (MD-19)
Technical Services Division
Office of Air Quality Planning and Standards
U. S. Environmental Protection Agency
Research Triangle Park, NC 27711

Prepared by:

Michelle Ramsey
Stephen W. Edgerton
Midwest Research Institute
401 Harrison Oaks Boulevard
Cary, NC 27513

September 30, 1993

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Purpose

The primary purpose of this document is to provide guidance to U. S. Environmental Protection Agency (EPA) Regional Offices regarding capture efficiency (CE) testing. The document may also prove useful to State and local agency personnel and owners and operators of stationary sources required to determine CE.

1.2 Background

In April 1990, EPA issued new guidance on CE testing.[1] This guidance replaced conventional liquid/gas mass balance determinations, which had often resulted in very poor precision and CE values well in excess of 100 percent, with new protocols involving permanent total enclosures (PTE's), temporary total enclosures (TTE's), and building enclosures (BE's). This guidance was later codified as part of the Chicago Federal implementation plan (FIP) and included in the document "Model Volatile Organic Compound Rules for Reasonably Available Control Technology."[2,3]

From the beginning, the new protocols were met with resistance from the regulated community, primarily on grounds of safety and expense. Over time, the safety issue has largely been dispelled as it has become clear that, with proper design and operation, PTE's and TTE's pose minimal risk. However, it has also become clear that in some cases, the new CE protocols are more costly than the procedures they replaced.

To address the cost issue, EPA embarked on a 12-month study of alternatives with potential for reducing CE testing costs. This document is a result of that study. In this document, EPA presents guidance on recommended procedures and on alternative procedures that may be allowed to reduce costs.

1.3 Document Organization

In Section 2.0, EPA's recommended protocols and test methods are summarized. Section 3.0 presents the criteria by which alternative procedures can be approved, as well as the reporting

requirements for using alternative procedures. Section 4.0 sets forth the guidelines for selecting and testing representative process lines at a facility, instead of testing every line. In Section 5.0, the guidelines for testing multiple lines in combination are presented. Finally, Section 6.0 presents an alternative procedure that can be used in place of periodic CE testing.

2.0 RECOMMENDED CAPTURE EFFICIENCY (CE) PROTOCOLS AND TEST METHODS

The CE determination protocols and test methods recommended by EPA are largely unchanged from those issued in the April 1990 guidance memo and codified in the Chicago FIP.[1,2] The EPA continues to recommend the use of a PTE, TTE, or BE for determining CE. When a TTE or BE is used, either a gas/gas protocol or a liquid/gas protocol may be selected. The EPA CE test methods for carrying out the recommended protocols will be published in the Federal Register and added to 40 CFR 60, Appendix A, as Method 30 through Method 30F. (Note that the location in the Code of Federal Regulations and the actual test method numbers are not final and may change.) Some minor changes have been made to the test methods, so the latest version of the methods should be consulted when planning CE testing.

Table 2-1 lists the protocols, their associated EPA recommended CE test methods, and the formulas for calculating CE. Table 2-2 lists the EPA recommended CE test methods with the full title of each.

TABLE 2-1.

Protocols	EPA recommended CE test methods[a]				CE formula
	Enclosure verification	Liquid input (L)	Captured emissions (G)	Fugitive emissions (F) or (F_B)	
PTE	M30	NA	NA	NA	Assume 100%
TTE -- gas/gas	M30	NA	M30B or M30C	M30D	G/(G+F)
TTE -- liquid/gas	M30	M30A or M30F	NA	M30D	(L-F)/L
BE -- gas/gas	M30	NA	M30B or M30C	M30E	$G/(G+F_B)$
BE -- liquid/gas	M30	M30A or M30F	NA	M30E	$(L-F_B)/L$

[a]M = EPA Method; NA = not applicable

TABLE 2-2.

Method 30	Criteria for and Verification of a Permanent or Temporary Total Enclosure
Method 30A	Volatile Organic Compounds Content in Liquid Input Stream
Method 30B	Volatile Organic Compounds Emissions in Captured Stream
Method 30C	Volatile Organic Compounds Emissions in Captured Stream (Dilution Technique)
Method 30D	Volatile Organic Compounds Emissions in Fugitive Stream from Temporary Total Enclosure
Method 30E	Volatile Organic Compounds Emissions in Fugitive Stream from Building Enclosure
Method 30F	Volatile Organic Compounds Content in Liquid Input Stream (Distillation Approach)

The PTE, TTE, and BE are discussed further in Sections 2.1 through 2.3, respectively.

2.1 Permanent Total Enclosure

Method 30 lists the PTE requirements and the procedures for verifying that an enclosure qualifies as a PTE. A PTE is an enclosure that completely surrounds a source of emissions such that all volatile organic compound (VOC) emissions are contained and directed to a control device. If a PTE meets the criteria listed below and all the exhaust gases from the enclosure are ducted to a control device, the CE may be assumed to be 100 percent and need not be measured. The PTE criteria are as follows:

1. Any natural draft opening (NDO) shall be at least 4 equivalent opening diameters from each VOC-emitting point. An "equivalent diameter" is the diameter of a circle that has the same area as the opening. The equation for an equivalent diameter (ED) is:

$$ED = [(4 \times \text{area})/\pi]^{0.5}$$

For a circular NDO, this equation simply reduces to the diameter of the opening.

2. The total area of all NDO's shall not exceed 5 percent of the surface area of the enclosure's walls, floor, and ceiling.

3. The average face velocity (FV) of air through all NDO's shall be at least 200 ft/min. The direction of air through all NDO's shall be into the enclosure.

4. All access doors and windows whose areas are not included as NDO's and are not included in the calculation of FV shall be closed during routine operation of the process.[4]

If the PTE criteria are not met, the CE must be measured.

2.2 Temporary Total Enclosure

Method 30 lists the TTE requirements and the test procedures for verifying that an enclosure qualifies as a TTE. A TTE is an enclosure temporarily installed specifically for the CE test.[4] For an enclosure to qualify as a TTE, the criteria listed in

Section 2.1 for PTE's must be met. In addition, any exhaust point from the TTE shall be at least 4 equivalent duct or hood diameters from each NDO. These five criteria ensure that all VOC's are captured for measurement while minimizing disruption of the capture normally achieved by the existing capture device(s) in the absence of a TTE.[4]

Two protocols may be used to measure the CE, a gas/gas protocol or a liquid/gas protocol. The associated test methods and CE formula for each protocol are listed in Table 2-1.

2.3 Building Enclosure

Building enclosure protocols involve using the building that houses the process as the enclosure. First, one must verify that the BE meets the requirements for a TTE that are presented in Method 30. Then, using the procedures specified in Method 30E, one must identify all the emission points from the building enclosure (e.g., roof exhausts, windows, etc.) and determine which emission points must be tested. Test procedures are given for determining the flow rate and VOC concentration in the exhaust from each of the various emission test points.

As with a TTE, two BE protocols may be used to measure the CE, a gas/gas protocol or a liquid/gas protocol. The associated test methods and CE formula for each protocol are listed in Table 2-1.

3.0 REQUIREMENTS FOR ALTERNATIVE CE PROTOCOLS

The EPA recognizes that the recommended CE protocols may not be feasible at all sites. To provide flexibility, EPA has developed approval criteria which, when met, allow the use of alternative protocols and test methods. Alternative CE protocols and test methods must meet the data quality objective (DQO) and additional criteria presented below. The DQO and additional criteria are described in Sections 3.1 and 3.2, respectively. The reporting requirements necessary for using alternative CE protocols and test methods are discussed in Section 3.3.

3.1 Data Quality Objective

The purpose of the DQO is to allow sources to use alternative CE test procedures while ensuring reasonable precision. The DQO calculation is as follows:

$$a = \frac{t_{0.95}\, s}{\sqrt{n}}$$

$$DQO = \frac{a}{x_{avg}}\, 100$$

where n = number of test runs

$$s = \text{standard deviation} = \left[\frac{\sum_{i=1}^{n} (x_i - x_{avg})^2}{n-1}\right]^{0.5}$$

where x_i = the CE value calculated from the ith test run

$$x_{avg} = \frac{\sum_{i=1}^{n} x_i}{n}$$

$t_{0.95}$ = t-value at the 95 percent confidence limit (the t-value can be found in a statistical table correlating t_α to υ, where $\alpha = 0.025$ (one-tailed test) and $\upsilon = n-1$)

NOTE: The final document will include a table of t-values.

x_{avg} = average CE result, calculated as shown above in the definition of s

The DQO is achieved when the following condition is met:

DQO $\leq$ 5 percent.

This requirement provides for a 95 percent confidence interval of ±5 percent about the average CE value. (In other words, assuming that the test protocol is unbiased and that the CE is constant from run to run, the actual CE will be within ±5 percent of the

CE determined by the test 95 percent of the time.) In order to meet this objective, facilities may have to conduct more than three test runs. Examples of calculating the DQO, given a finite number of test runs, are shown below.

Facility A conducted a CE test using a traditional liquid/gas mass balance and submitted the following results:

Run	CE
1	96.1
2	105.1
3	101.2

therefore:

$n = 3$

$t_{0.95} = 4.30$

$x_{avg} = 100.8$

$s = 4.51$

$$a = \frac{(4.30)\ (4.51)}{\sqrt{3}} = 11.20$$

$$DQO = \frac{11.2}{100.8}\ 100 = 11.11$$

Since the facility did not meet the DQO objective, they ran three more test runs.

Run	CE
4	93.2
5	96.2
6	87.6

The DQO calculations for Runs 1-6 are as follows:

$n = 6$

$t_{0.95} = 2.57$

$x_{avg} = 96.6$

$s = 6.11$

$$a = \frac{(2.57)\ (6.11)}{\sqrt{6}} = 6.41$$

$$DQO = \frac{6.41}{96.6}\ 100 = 6.64$$

The facility still did not meet the DQO objective. They ran three more test runs with the following results:

Run	CE
7	92.9
8	98.3
9	91.0

The DQO calculations for Runs 1-9 are as follows:

$n = 9$

$t_{0.95} = 2.31$

$x_{avg} = 95.7$

$s = 5.33$

$$a = \frac{(2.31)\ (5.33)}{\sqrt{9}} = 4.10$$

$$DQO = \frac{4.10}{95.7}\ 100 = 4.28$$

Based on the DQO results, the average CE result from the nine test runs, using the alternative method, can be used to determine compliance.

3.2 Additional Criteria

The Office of Air Quality Planning and Standards (OAQPS) has developed an additional set of criteria that must be met for alternative CE protocols and test methods to be approved. The following criteria apply:

1. A minimum of three valid test runs are required. A valid test run must last for at least 1 hour.

2. All the test runs must be separate and independent. For example, liquid VOC input and output must be determined independently for each run. The final liquid VOC sample from one run cannot be the initial sample for another run. In addition, liquid input for an entire day cannot be apportioned among test runs based on production.

3. Composite liquid samples will not be permitted to obtain an "average composition" for a test run. For example, separate initial and final coating samples must be taken and analyzed for

each run; initial and final samples cannot be combined prior to analysis to derive an "average composition" for the test run.

4. All test runs that are conducted must be included in the CE determination.

5. The average CE for the test program can not be greater than 105 percent.

6. Alternative test methods for measuring VOC concentration must include a three-point calibration of the gas analysis instrument in the expected concentration range.

7. If a temporary enclosure is to be used to measure fugitives, the enclosure must meet EPA's TTE criteria (i.e., Method 30).

8. If a BE is to be used to measure fugitives, EPA's TTE criteria (Method 30) and BE procedures (Method 30E) must be used.

9. If a facility elects to use measurement procedures different from the EPA recommended CE test methods (Methods 30 through 30F), the alternative procedures must be approved by the appropriate authority. The requirements are presented below. Additional guidance on approval of alternative methods can be found in a guideline document entitled "Handling Requests for Minor/Major Modifications/Alternative Testing and Monitoring Methods or Procedures Approvals and Disapprovals," which is included in an appendix to this document.

a. If a facility uses an EPA reference method, such as Method 24 or 25, in accordance with the current guidance, the individual methods can be approved by State or local agencies. Note that the test protocol still must meet the DQO and other acceptability criteria for the CE test to be acceptable.

b. If a facility wishes to make minor changes to an EPA reference method, the alternative method's acceptability can be determined by State or Regional authority, depending on the delegation status.

c. If a facility wishes to make major changes to an EPA reference method, the alternative method must be approved by the EPA Administrator.

3.3 Reporting Requirements for Alternative CE Protocols

A copy of all alternative test methods, including any major or minor changes to EPA reference methods, validation data when applicable, QA/QC information, and calibration procedures (this information should be submitted in advance so that approval can be obtained prior to testing).

If a facility chooses to use alternative CE protocols and test methods, the following information should be submitted with each test report to the appropriate regulatory agency:

1. A table with information on each liquid sample, including the sample identification, where and when the sample was taken, and the VOC content of the sample;

2. The coating usage for each test run (for protocols in which the liquid VOC input is to be determined);

3. The quantity of captured VOC measured;

4. The CE calculations and results;

5. The DQO calculations and results; and

6. The QA/QC results, including information on calibrations (e.g., how often the instruments were calibrated, the calibration results, and information on calibration gases, if applicable).

4.0 DETERMINING CE BASED ON TESTING REPRESENTATIVE LINES

Determining the CE by testing representative process lines instead of all the process lines at a facility can be approved by EPA if certain conditions are met. The guidelines for measuring the CE using representative line sampling are as follows:

1. The CE may be measured using representative line sampling only if one uses EPA's recommended CE protocols and test methods.

2. At least 50 percent of the lines in a facility should be randomly selected for CE testing.

3. Blind random selection should be used to select the lines to be tested. This blind selection of lines to be tested should be performed by the regulatory agency.

4. After the lines are selected, the facility owner/operator may perform only normal and routine maintenance on

the selected lines. No special modifications or overhauls should be permitted to enhance CE performance above normal operating conditions. Certification that the facility did not perform any nonroutine maintenance on the lines selected for testing must be submitted with the test report.

5. The number of lines not in compliance with the applicable emission limit for the facility is determined by multiplying the total number of lines in the facility by the fraction of the representative lines tested that were not in compliance.

6. If the owner/operator of a facility using the representative line testing approach believes the results are not indicative of the full facility, then the owner/operator may elect to test additional randomly selected lines in the facility. The results of these additional tests are combined with the results from the first group of representative lines to determine the new fraction of non-complying lines. This new fraction is used as specified in guideline No. 5, above, to determine the number of lines in the entire facility that are out of compliance.[5]

5.0 DETERMINING CE BASED ON COMBINED TESTING OF MULTIPLE LINES

Under some circumstances, multiple lines may be tested in combination. For example, a TTE could be constructed around several lines for a combined CE test. The guidelines are as follows:

1. The multiple lines must share a common control device.

2. Multiple line testing may be performed using recommended EPA protocols and test methods or alternative CE protocols and test methods, provided the alternative meets the requirements of Section 3.0.

3. The lines that are tested in combination are considered to be in compliance only if the CE determined for the combination of lines meets the most stringent CE required for any individual line.

EPA review question: Will all the lines that share a common control device have to be tested together? Could lines be tested in subsets? For example, could a facility choose to test lines subject to RACT together and test lines subject to an NSPS separately when all share a common control device? Testing lines in subsets could cause problems when the applicable emission standards are in terms of overall efficiency and the testing provisions require that CE and destruction efficiency be tested simultaneously.

6.0 ALTERNATIVE COMPLIANCE TECHNIQUE

After an initial CE determination, a source may use the alternative compliance technique described below in lieu of subsequent multiple-run CE determinations. The alternative compliance technique consists of two elements: (1) continuous monitoring of the VOC concentration in the duct leading to the control device and (2) a 3-hour liquid/gas material balance each month (i.e., measurement of the liquid VOC input to the process and the gaseous VOC ducted to the control device). The monitoring and material balances provide an ongoing indication of how the capture system is performing.

Although a single month's material balance is not sufficient to determine compliance or noncompliance, a series of monthly material balances can be treated as the multiple test runs of a CE determination, provided that the test procedures and results meet the requirements for an alternative test protocol that are presented in Sections 3.1 and 3.2. For this purpose, the number of months over which to determine compliance should be determined based on the requirements to which the source is subject. For example, if the source is required to demonstrate compliance annually, the 12 monthly material balances for the year could be averaged to determine the CE for the year, provided that the alternative CE protocol requirements were met. Note that the source runs the risk of conducting the continuous monitoring and

monthly material balances only to fail to achieve the DQO (see Section 3.1) and be required to conduct a CE test.

Specific guidelines for the alternative compliance technique are presented below:

1. The continuous emission monitoring system (CEMS) shall monitor total hydrocarbons as a surrogate for VOC. The CEMS shall conform to section XX.3086, "Performance Specifications for Continuous Emissions Monitoring of Total Hydrocarbons," presented in Reference 3.

2. The facility shall implement CEMS quality control procedures that meet the requirements of section XX.3087, "Quality Control Procedures for Continuous Emission Monitoring Systems," presented in Reference 3.

3. Facilities with multiple process lines need not operate a CEMS dedicated to each line. Instead, a single CEMS can be used to monitor emissions from multiple lines on a time-sharing basis, provided that the requirements of Method 30B, section 4.2.7 are met. (Although this section refers to sampling during a test run, the requirements provide guidance for time sharing for continuous monitoring.)

4. Facilities with multiple process lines that are served by a common control device may monitor the common duct at the entrance to the control device. However, if the facility elects to monitor this single point, the monthly liquid/gas material balance will have to be carried out on all process lines simultaneously.

5. Facilities that use the alternative compliance technique must maintain records of the VOC concentration results and records of production for the affected lines. The records must be reduced so that production conditions can be correlated to VOC concentration records. In addition, records of monthly liquid/gas mass balances must be maintained.

6. Facilities that use the alternative compliance technique must provide advance notice to EPA and the State prior to conducting the monthly liquid/gas material balance testing.

7. Facilities that use the alternative compliance technique must submit reports detailing the VOC concentration monitoring results and monthly liquid/gas material balances. The frequency of reports should be determined based on State implementation plan reporting requirements, other existing reporting requirements for the facility, and any other relevant factors.

7.0 REFERENCES

1. Memorandum and attachments from Seitz, J.S., EPA/SSCD, to Regional Office air division directors. April 16, 1990. Guidelines for developing a State protocol for the measurement of capture efficiency.

2. Office of the Federal Register. Control strategy: Ozone control measures for Cook, DuPage, Kane, Lake, McHenry and Will Counties. 40 CFR 52.741. Washington, DC. U. S. Government Printing Office. 1992.

3. OAQPS. Model Volatile Organic Compound Rules for Reasonably Available Control Technology. U. S. Environmental Protection Agency. Research Triangle Park, NC. June 1992. pp. 340-349.

4. The Measurement Solution: Using a Temporary Total Enclosure for Capture Efficiency Testing. EPA-450/4-91-020. August 1991. Research Triangle Park, NC.

5. Facsimile received August 31, 1993 from Ms. Candace Sorrell, TSD/EMB, to Mr. Stephen Edgerton, MRI. Contains Mr. Robert Stallings, AQMD/OAQPS, recommendations for representative line sampling.

APPENDIX

EMISSION MEASUREMENT TECHNICAL INFORMATION CENTER
GUIDELINE DOCUMENT

Handling Requests for Minor/Major Modifications/Alternative Testing and Monitoring Methods or Procedures Approvals and Disapprovals

The purposes of this guideline are to discuss the Environmental Protection Agency (EPA) alternative testing and monitoring method approval/disapproval procedures and describe EPA procedures for responding to requests to conduct such evaluations. The procedures describe both external and internal procedures and responsibilities associated with EPA's technical assistance and review authority roles.

Background

Sections 111 and 112 of the Clean Air Act, as amended, specify that the Administrator of the EPA has the authority to establish and approve changes to testing and monitoring methods promulgated for determining or assessing compliance of stationary sources with Federally enforceable emission limitations or standards. Many of the Subparts reiterate this authority. The Assistant Administrator for the Office of Air and Radiation has traditionally exercised this authority and delegated some specific technical and implementation issues to the Regional Offices, as appropriate. A 1990 memorandum from the Assistant Administrator for the Office of Administration and Resources Management, approved by the EPA Administrator, clarified the formal delegation authority for NSPS, NESHAP, and Federally-enforceable regulations in State implementation plans (SIP's).

The 1990 memorandum and the delegation document 7-14 of the Delegations Manual (attached) formally clarified that approval of minor changes to testing and monitoring methods and procedures could and would be delegated to the Regional Administrators and the Assistant Administrator for Air and Radiation. Approval of equivalent methods, alternative methods, shorter sampling times and smaller volumes, and waiver of emissions and performance test requirements would be delegated only to the Assistant Administrator for Air and Radiation or a designee. A subsequent memorandum from the Assistant Administrator for Air and Radiation delegated this authority to the Director of the Office of Air Quality Planning and Standards (OAQPS).

There were limitations placed on the delegations:

- The Assistant Administrator for Air and Radiation or a designee must notify the affected Regional Administrators or designees when exercising the authority for approving major changes;

- The Regional Administrators or designees must notify the Assistant Administrator for Air and Radiation or designee when exercising the authority for approval of minor changes;

- The Regional Administrators or designees must request the Assistant Administrator for Air and Radiation or designee to exercise the authority to rule on multi-source cases or cases of national significance. To accomplish this, the Regional Administrators or designees must provide notice by letter to the Assistant Administrator for Air and Radiation or designee of requests for review and disposition of any modification or alternative that is not minor.

In most cases, the Regional Administrators have delegated the authority to approve minor test method changes to the State or local agencies responsible for implementing the NSPS, NESHAP, and federally enforceable SIP's. In October of 1990, John Seitz, Director of the Office of Air Quality Planning and Standards (OAQPS), further delegated responsibility for the authority specified in 7-14 for both minor and major changes to the Directors of the Stationary Source Compliance Division (SSCD) and the Technical Support Division (TSD). In addition, informal legal opinion provided by Regional Counsels and the Office of Enforcement (OE) indicates that disapprovals of "major" modifications to testing and monitoring methods and procedures, or testing waivers must follow the same delegated authority track as approvals.

As further clarification, our understanding is that this delegation should not be applied to programs operated under the Air Quality Management Division (AQMD) Director's discretion (i.e., those completely delegated to State or local agencies with little or no EPA oversight) nor to initial State implementation plan reviews for the permit program or the enhanced monitoring and compliance certification program. For these latter programs, the agency will provide specific guidance on what constitutes acceptable test methods through the regulation or associated guidance material (e.g., the Title IV background documentation and the Enhanced Monitoring Reference Document). Only after an approved program is in place and an alternative method or other method change is proposed should the delegation process be implemented.

Historically, requests for review of alternative testing and monitoring methods or major changes sent to SSCD and TSD and reviewed and either approved or disapproved by the SSCD or TSD Director have generally met the 7-14 criterion above; however, the practice of notifying the SSCD and TSD Directors about minor changes or even major alternative methods or test waiver disapprovals at the Regional, State, or local agency level is not well established or practiced.

Acceptance Criteria

A request for a major change in a testing and monitoring method or procedure and testing waivers will receive rigorous review. Basic principles of these reviews should be:

(a) The change in the testing or monitoring method or procedure will provide a determination of compliance status at the same or higher stringency as the method or procedure specified in the applicable regulation; or

(b) The compliance or conformance with an applicable emission limitation or standard has been sufficiently demonstrated by other means to justify the testing waiver.

In addition, the requester shall include the compelling reasons which prompted the request; that is, a request for any change should address significant deficiencies in applying the prescribed procedure or provide the meaningful improvements achieved over existing procedures or methods. Examples of supporting reasons are as follows:

(a) Overcoming significant interferences or biases (e.g., addition of an HCl-filled impinger to remove NH_3 from an SO_2 gas sample);

(b) Allowing for new technology for improved accuracy, lower cost procedures, or increased applicability (e.g., use of dynamic calibration gas cells for in situ cross-stack continuous emission monitoring systems in lieu of a relative accuracy audit);

(c) Allowing alternative measurement locations for hybrid processes subject to multiple regulations (e.g., alternative measurements and emission calculation procedures for combined cycle, gas turbine/fossil fuel-fired boiler units).

Most importantly, acceptance of an alternative method shall be based on substantive technical support information. While chemistry, engineering, and economic evaluations will be important to the TSD reviews, requests must also include support data of the type described in Method 301 of Appendix A, Title 40

Part 63. The promulgation of Method 301 included the requirement that any non-validated method proposed for demonstrating conformance with a federal emission limitation or standard be subject to the requirements in Method 301. Supporting information includes:

(a) direct comparisons with existing reference or compliance test methods;

(b) precision and bias determinations (e.g., duplicate test trains and multiple test runs under a range of test conditions); and

(c) detailed and documented test procedures (e.g., similar to published EPA reference methods).

Questions regarding these procedures should be directed to and reviewed with Peter Westlin (919/541-1058), Anthony Wayne (919/541-3576), or Robin Segall (919/541-0893).

May 3, 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:

RE: Alternate Sampling Procedure

Subject: Comments from Regulatory and Environmental Services Department
City of Jacksonville, Florida

After reviewing the comments from the City of Jacksonville's Regulatory and Environmental Services Department (RESD) in their letter to you dated April 6, 1994, we wish to clarify an important point. When Press #4 is refurbished, it will be moved into the same building where Press #5 is currently located before being reactivated. In fact, it will be parallel and adjacent to Press #5.

In addition to being located in the same building, Press #4 will be configured identically to Press #5 with solid walls on the top and one side, and the 200%-coverage, plastic strips on the other side. As we indicated in our request letter dated March 21, 1994, this configuration is functionally equivalent to a permanent total enclosure, and is adequate for demonstrating compliance with the capture efficiency requirements.

Also, in their comments, RESD referred to EPA's draft Capture Efficiency Guidance Document and recommended that its requirements be applied to the final test protocol approved by your office. While we understand RESD's concern for complying with published guidance, we are apprehensive about being subjected to this document, which was originally published in April 1990, has only recently been republished in draft form, is under severe scrutiny by the regulated community, and is based on test methods that have only been released in draft form at this time.

In summary, we believe that the test protocol D-Graphics proposed in our request letter is adequate and approvable because it:

- Stipulates the use of Procedure L, which is stricter than the method previously approved by your office and RESD to determine VOC content in the inks,

- Utilizes a liquid/gas methodology involving actual measurement of VOC concentrations for determining capture efficiency in a functionally-equivalent permanent total enclosure, even though the draft guidance would allow a presumption of 100% capture in this configuration; and,

- Stipulates only federally-approved test methods.

Thank you for your attention to this critical issue. If you need further information, please don't hesitate to contact me at 904-733-4020.

Very truly yours,

Douglas Turner
Plant Manager

cc: Mr. Steve Pace, P.E., RESD
Mr. James L. Manning, P.E.

REGULATORY & ENVIRONMENTAL SERVICES DEPARTMENT
Air Quality Division

April 6, 1994

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

RE: **D-GRAPHICS; REQUEST FOR ALTERNATE SAMPLING PROCEDURE DATED MARCH 21, 1994**

Dear Mr. Fancy:

Air Quality Division (AQD) has reviewed a copy of the above referenced request, and offers the following comments. Because of the physical configuration of sources at D-Graphics, with two large, multi-station presses located in separate buildings, and connected to a common control device, building a temporary total enclosure, or using the buildings as total enclosures would be very difficult. The best solution to the capture efficiency question would be to convert the existing enclosures around the two presses to total enclosures which satisfy the requirements of U.S. EPA procedure T. Although this would involve a capital expenditure, and may include some operational constraints, it would eliminate any need for future capture efficiency testing.

If the applicant cannot operate within the constraints of a total enclosure, then a liquid/gas mass balance is the most feasible alternative. As you know, EPA has now produced a draft Capture Efficiency Guidance Document, dated October 6, 1993, which establishes requirements for alternative CE protocols. It is recommended that these requirements, including the data quality objective (DQO) and additional criteria be applied. Because the proposed measurement procedures, i.e., procedure L and methods 1-4, 18, and 25A, are EPA approved methods, these individual methods can be approved by State or local agencies. The applicant should, however, be aware that procedure L for measuring VOC content in Liquid Input Streams differs from what D-Graphics has done in the past.

421 West Church Street - Suite 412
Jacksonville, Florida 32202-4111

Area Code 904/630-3484

If you have any questions or wish to discuss this matter, please call AQD at SUNCOM 986-3420.

Very truly yours,

Robert S. Pace, P.E.
Chief

RSP/ea

c: AQD File 1120B
Wayne Tutt, AQD
Douglas Turner, D-Graphics
James L. Manning, P.E.

S:\Pace/Fancy

D-GRAPHICS

A DIVISION OF JEFFERSON SMURFIT CORPORATION

Consumer Packaging Division
3389 POWERS AVENUE
JACKSONVILLE, FL 32207
TELEPHONE 904/733-4020

March 21, 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:

RE: Alternate Sampling Procedure

Please accept this letter as an official request for an alternate sampling procedure (ASP) for the measurement of VOC emissions at our facility in Jacksonville, Florida.

As you know, D-Graphics is a rotogravure printing operation currently utilizing one 8-unit press (Press #5) for the production of printed labels. We also have one inactive 8-unit press (Press #4) on the premises that we intend to refurbish and reactivate in the future as the market allows.

This facility is currently operating under construction permits issued by your office in 1985 and subsequently challanged by the owner at that time, Austill Packaging. This request is part of D-Graphics' effort to resolve all outstanding issues so we can proceed to obtain final operating permits under Florida law. Therefore, as a first step, we want to resolve the issue of the sampling and analytical procedures that will be required to demonstrate compliance with the emission standards.

Pursuant to Rule 17-297.620, F.A.C., we request continuation of an ASP from the procedure stipulated in Rule 17-297.450, F.A.C. The enclosed proposed protocol, Appendix A, consists of two main procedures, determination of capture efficiency and determination of destruction efficiency, each of which contain procedures or methods that differ from the rules. This proposed protocol has been followed by D-Graphics and accepted by Jacksonville's Regulatory and Environmental Services Department (RESD) and the Florida Department of Environmental Protection (FDEP) since 1987.

To determine the efficiency of the capture system, D-Graphics proposes to use a liquid/gas method based on Rule 17-297.450(2)(d), F.A.C., but without measuring the mass of fugitive VOC emissions that escapes from the building. Instead, the capture efficiency will be determined by comparing the VOC measured at the inlet to the control equipment with the total VOC introduced into the process by the ink. The fugitive emissions will not be measured, but will conservatively be assumed to be all VOC not accounted for otherwise.

We believe this is justified because, currently, Press #5 is the only source of VOC in the building and, therefore, all VOC captured and introduced to the control equipment can only come from Press #5. In essence, the building acts as a total enclosure for the operations.

In addition to the building acting as a total enclosure for the operations, there is also an enclosure around Press #5 (and Press #4 when operational) that serves as a barrier to prevent fugitive emissions from escaping by creating negative pressure within the enclosure. This pressure differential draws ambient air in and the resulting air velocity carries solvent vapor to the control equipment. Specifically, one side of the press is totally closed in by sheet metal. The other side of the press is enclosed by heavy plastic strips that extend to just above the floor, are overlapping, and create 200% coverage where they are located. The plastic strips were installed in 1985 in an effort to affect a total enclosure to keep fugitive emissions within the negative pressure air stream, while at the same time, allowing necessary access to the press by the operators while the press is running. With the 200% coverage, even when an operator does enter the enclosed press area, the entry is quick and the plastic strips are quickly and automatically repositioned to their original coverage. In addition, the press is covered on top by a catwalk with a sheet metal floor. This design serves to function as total enclosure to keep fugitive emissions in while allowing necessary access to the press during operations.

Previous tests have demonstrated that this system is highly effective in capturing VOC emissions from the operation. To totally enclose each printing station or the entire press in a more rigid manner would restrict the operators from their required duties, increase downtime, and increase set-up time, all of which would prevent the operation from being cost competitive.

When Press #4 becomes operational, we propose to continue this method because both presses will continue to be served by the single control system. The same reasoning will apply for the two presses regarding VOC input into the process, because Press #4 will be configured the same as Press #5.

No direct measurement has been made in the past for possible VOC destruction in the ovens or exhaust gas recirculation system, even though it is recognized that under certain conditions, some pre-incinerator destruction of VOC does occur. If and when credit for this destruction is requested in the future, it will be determined by measuring by-products of combustion at the inlet to the incinerator using methodology defined in part B of Appendix A as prepared by RESD in their draft operating permit for our operation.

EPA Reference Method 18 will be used to determine methane concentrations in the exhaust gas stream, and that amount deducted from the total VOC concentration measured at the inlet and outlet. This procedure accounts for all regulated VOC resulting from the plant operation and is adequate for determining the capture efficiency of the system.

To determine the destruction efficiency of the control equipment, D-Graphics proposes to continue to use EPA Reference Method 25A for the measurement of VOC at the inlet and outlet of the VOC control system. Method 25A has been used and accepted by RESD and FDEP since 1987. Approval of Method 25A was granted by RESD by letter dated December 4, 1987, a copy of

which is enclosed. Permission was based on comparative testing of Methods 25 and 25A conducted July 26, 1986, which demonstrated excellent agreement between the two methods for this source. A summary of the comparative data is enclosed.

As you know, the original Method 25 proved to be so cumbersome and unreliable the EPA proposed to revise the method on November 7, 1986. The method is intended to measure the VOC emissions from sources that cannot accurately characterize the constituents of the gas stream, i.e., it measures any and all VOC. Because Method 25 has this capability, it is very complex and expensive to conduct. Method 25A, however, uses a simpler analytical technique that can be calibrated to a few known constituents, and is less expensive and cumbersome to perform. The VOC emissions from D-Graphics' operation are characterized and quantified very accurately because the type and amount of ink used at any time are well documented, and, thus, is well suited to Method 25A.

Considering the excellent demonstrated correlation between the methods, the historical unreliability of Method 25, the expense of conducting Method 25, and the historical reliability of Method 25A at this facility, we believe Method 25A is appropriate for demonstrating the destruction efficiency of D-Graphics' VOC control system.

In summary, the main points of this request are:

- the current system functions effectively as a total enclosure;
- the proposed procedure accounts for all VOC emissions;
- Method 25A is appropriate for this operation; and,
- this procedure has been accepted by RESD and FDEP since 1987.

We appreciate your patience and cooperation as we proceed to resolve these issues and demonstrate our desire to fully comply with our regulatory obligations. If you need further information, please don't hesitate to contact me at 904-733-4020.

Very truly yours,

Douglas Turner
Plant Manager

Enclosures

cc: Mr. Steve Pace, P.E., RESD
Mr. James L. Manning, P.E.

APPENDIX A

PROCEDURES FOR DETERMINING THE EFFICIENCY OF VOC CAPTURE AND DESTRUCTION AT D-GRAPHICS, INC., JACKSONVILLE, FLORIDA

A. The capture efficiency of the VOC collection system and the destruction efficiency of the incinerator shall be determined by simultaneously measuring the amount of VOC introduced to the process, the amount of VOC captured as measured at the incinerator inlet, and the amount of VOC leaving the incinerator as measured at the incinerator outlet. Specific test procedures shall be as follows:

CAPTURE EFFICIENCY (%CE) $= G_i/L \times 100$

DESTRUCTION EFFICIENCY (%DE) $= [1-(G_o/G_i)] \times 100$

OVERALL CONTROL EFFICIENCY $= [(G_i-G_o)/L] \times 100$

where:

L = mass of liquid VOC input into the process determined using DEP Procedure L.
G_i = mass of VOC captured and delivered to the control device, less methane, as determined by EPA Methods 1-4, 18, and 25A.
G_o = mass of VOC leaving the control device, less methane, as determined by EPA Methods 1-4, 18, and 25A.

All VOC audit gases required for compliance testing purposes will be provided by the City of Jacksonville's Air Quality Division.

B. If the permittee believes that a significant amount of the captured VOC are oxidized in the ovens or in the exhaust recirculation system, the permittee may elect to conduct additional testing to determine the amount of captured VOC being oxidized as follows:

Nomenclature

L = Liquid phase VOC input.

G = Gaseous phase captured VOC emissions measured by procedures G_i and G_o.

G_M = Captured VOC emissions adjusted to as-methane basis.

AF = Adjustment factor, determined as the ratio of $G_{(TOT)/GM}$.

$CO_{2(NG)}$ = CO_2 concentration at the incinerator inlet attributable to the natural gas burned as fuel in

the drying ovens.

$CO_{2(AMB)}$ = CO_2 concentration at the incinerator inlet attributable to the CO_2 concentration in ambient air.

$CO_{2(VOC)}$ = CO_2 concentration at the incinerator inlet attributable to gaseous phase captured VOC emissions oxidized in the ovens prior to reaching the incinerator.

$G_{(TOT)}$ = Total captured VOC emissions at the incinerator inlet, determined as the sum of G_M and $CO_{2(VOC)}$.

$CO_{(TOT)}$, $CO_{2(TOT)}$ = Total CO or CO_2 measured at the incinerator inlet using EPA Method 25A.

(1) Using the procedures for single-point, integrated sampling from EPA Reference Method 3, obtain an integrated captured gas sample during each captured VOC pollutant determination. The sampling runs should be simultaneous with, and for the same total length of time as, the captured VOC determination. These bags will be analyzed for $CO_{2(TOT)}$, $CO_{(TOT)}$ by EPA Reference Method 25A. This analysis is necessary to determine concentrations in the part per million range.

(2) Following the sampling described above, bag standards of the solvents used during the testing will be prepared, based upon the solvent composition used during the test. Standards will be prepared according to the standards preparation procedure of EPA Reference Method 18 at a concentration level of 10,000 parts per million, to match the expected source concentration. Using the same FIA used in paragraph A above, the FIA will then be calibrated with methane standards, and the solvent bag standards will be analyzed. A relative response factor for solvent-to-methane basis conversion will thus be determined. Using this response factor, VOC concentrations determined at the incinerator inlet (G_1) will be adjusted to an as-methane basis (G_M).

(3) Meter the amount of natural gas (CH_4) burned in the dryer ovens during the period of the capture efficiency testing, paragraph A above. Based upon the volumetric flow rate at the incinerator inlet, calculate the concentration of carbon dioxide (CO_2) expected in the captured gas stream as a result of the oxidation of the methane in the natural gas fuel (CO_{2NG}).

(4) Determine the CO_2 concentration in the ambient air (CO_{2AMB}) using sampling and analytical procedures required in paragraph A above. An air-cooled or water-cooled condenser to remove

SUMMARY OF RESULTS

COMPARISON OF METHODS 25 AND 25A FOR VOC AT D-GRAPHICS (FORMERLY AUSTILL PACKAGING COMPANY)

Date	Press No.	Capture Efficiency		Destruction Efficiency	
		Method 25	Method 25A	Method 25	Method 25A
7/26/86	2	105.1	104.1	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