

Check Sheet

Company Name: SCM Corporation
Permit Number: AC 16-057751
PSD Number: _____
Permit Engineer: _____

Application:

- | | |
|--|--------------------------|
| <input type="checkbox"/> Initial Application | Cross References: |
| <input checked="" type="checkbox"/> Incompleteness Letters | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Responses | <input type="checkbox"/> |
| <input type="checkbox"/> Waiver of Department Action | <input type="checkbox"/> |
| <input type="checkbox"/> Department Response | |
| <input type="checkbox"/> Other | |

Intent:

- Intent to Issue
 - Notice of Intent to Issue
 - Technical Evaluation
 - BACT or LAER Determination
 - Unsigned Permit
- Correspondence with:
- EPA
 - Park Services
 - Other
- Proof of Publication
 - Petitions - (Related to extensions, hearings, etc.)
 - Waiver of Department Action
 - Other

Final

Determination:

- Final Determination
- Signed Permit
- BACT or LAER Determination
- Other

Post Permit Correspondence:

- Extensions/Amendments/Modifications
- Other

PS Form 3811, Jan. 1979

① **SENDER:** Complete items 1, 2, and 3.
Add your address in the "RETURN TO" space on reverse.

1. The following service is requested: (check one.)
 Show to whom and date delivered.....¢
 Show to whom, date and address of delivery.....¢
 RESTRICTED DELIVERY
 Show to whom and date delivered.....¢
 RESTRICTED DELIVERY.
 Show to whom, date, and address of delivery.\$ _____
 (CONSULT POSTMASTER FOR FEES)

2. **ARTICLE ADDRESSED TO:**
 R. W. Harrell, SCM Corp.
 P. O. Box 389
 Jacksonville, FL 32201

3. **ARTICLE DESCRIPTION:**

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	0157776	

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE Addressee Authorized agent
R. W. Harrell

4. **DATE OF DELIVERY**
 12-10-82

5. **ADDRESS (Complete only if requested)**

6. **UNABLE TO DELIVER BECAUSE:**

CLERK'S INITIALS

POSTMARK
 1982
 DEC 10

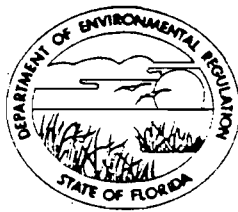
PS Form 3800, Apr. 1976

☆GPO : 1979-300-459

No. 0157776
 RECEIPT FOR CERTIFIED MAIL
 NO INSURANCE COVERAGE PROVIDED—
 NOT FOR INTERNATIONAL MAIL
 (See Reverse)

SENT TO		R. W. Harrell	
STREET AND NO.		P. O. Box 389	
P.O., STATE AND ZIP CODE		Jacksonville, FL 32201	
POSTAGE		\$	
CONSULT POSTMASTER FOR FEES	CERTIFIED FEE	¢	
	SPECIAL DELIVERY	¢	
	RESTRICTED DELIVERY	¢	
	OPTIONAL SERVICES RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED	¢
		SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
		SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY		¢	
TOTAL POSTAGE AND FEES		\$	
POSTMARK OR DATE		12-8-82	

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



BOB GRAHAM
GOVERNOR

Victoria J. Tschinkel
SECRETARY

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

December 8, 1982

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. R. W. Harrell
Manager of Engineering
SCM Corporation, Organic Chemicals Division
Post Office Box 389
Jacksonville, Florida 32201

Dear Mr. Harrell:

Enclosed is Permit Number AC 16-57751, dated December 6, 1982
to SCM Corporation, Organic Chemicals Division
issued pursuant to Section 403, Florida Statutes.

Acceptance of the permit constitutes notice and agreement that the Department will periodically review this permit for compliance, including site inspections where applicable, and may initiate enforcement actions for violation of the conditions and requirements thereof.

Sincerely,

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

CHF/pa

Enclosure

cc: James O. Sewell, P.E., SCM Corporation
John Ketteringham, DER Northeast District
Steve Pace, Duval County Dept. of Health, Welfare
and Bio-Environmental Services

Final Determination

SCM Corporation/Organic Chemicals Division
Duval County, Florida

Sixteen Fixed Roof Storage Tanks

Application Number:

AC 16-57751

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

SCM Corporation

Organic Chemicals Division

The Bureau of Air Quality Management (BAQM) has reviewed the construction permit application submitted by SCM Corporation for the construction of sixteen (16) fixed roof storage tanks at their existing facility in Jacksonville, Duval County, Florida. The notice of the Department's intent to issue was published in the Florida Times-Union on October 27, 1982. The technical package was available for public inspection at the DER Northeast District, Duval County's Bio-Environmental Services, and the BAQM office in Tallahassee.

No letters or comments were received on the proposed action as a result of the public comment period. Therefore, the construction permit will be issued as drafted.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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



BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY

APPLICANT:

SCM Corporation
Organic Chemicals Division
P. O. Box 389
Jacksonville, Florida 32201

PERMIT/CERTIFICATION
NO. AC 16-57751

COUNTY: Duval

PROJECT: Sixteen Fixed
Roof Storage Tanks

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

For the construction of sixteen (16) storage tanks and associated air pollution control equipment, to be located at the foot of West 61st Street in Jacksonville, Duval County, Florida. The UTM coordinates of the proposed source are Zone 17-743.56 km East and 3360.75 km North.

Construction shall be in accordance with the attached permit application and plans, documents and drawings except as otherwise noted on pages 3 and 4 - "Specific Conditions."

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16).
2. Letter of Incompleteness from Clair Fancy to applicant, dated July 22, 1982.
3. SCM response to the "letter of incompleteness" dated August 6, 1982-not included due to the applicant's request for confidentiality.
4. Letter of information (dikes around storage tanks) dated September 2, 1982.

PERMIT NO.: AC 16-57751
APPLICANT: SCM Corporation

GENERAL CONDITIONS:

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

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

3. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information: (a) a description of and cause of non-compliance; and (b) the period of non-compliance, including exact 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 revocation of this permit.

4. As provided in subsection 403.087(6), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.

5. This permit is required to be posted in a conspicuous location at the work site or source during the entire period of construction or operation.

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

7. In the case of an operation permit, permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or department rules.

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

9. This permit is not transferable. Upon sale or legal transfer of the property or facility covered by this permit, the permittee shall notify the department within thirty (30) days. The new owner must apply for a permit transfer within thirty (30) days. The permittee shall be liable for any non-compliance of the permitted source until the transferee applies for and receives a transfer of permit.

10. The permittee, by acceptance of this permit, specifically agrees to allow access to permitted source at reasonable times by department personnel presenting credentials for the purposes of inspection and testing to determine compliance with this permit and department rules.

11. This permit does not indicate a waiver of or approval of any other department permit that may be required for other aspects of the total project.

12. This permit conveys no title to land or water, nor constitutes state recognition or acknowledgement of title, and does not constitute authority for the reclamation 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.

13. This permit also constitutes:

- Determination of Best Available Control Technology (BACT)
- Determination of Prevention of Significant Deterioration (PSD)
- Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)

PERMIT NO.: AC 16-57751
 APPLICANT: SCM Corporation

SPECIFIC CONDITIONS:

1. Construction should reasonably conform to the plans submitted in the application and amendments.
2. The applicant should report any delays in construction and completion of the proposed sixteen (16) fixed roof storage tanks and associated air pollution control equipment to the Jacksonville Bio-Environmental Services (BES).
3. Expected throughput of the tanks and associated projected VOC emissions are:

<u>Storage Tank</u>	<u>Storage Material</u>	<u>Projected Annual Throughput</u>	<u>VOC Emissions</u>
<u>DxH-Gal.</u>		<u>Gal.</u>	<u>lbs/yr</u>
12x30-25,000	TI	715,300	51.02
12x30-25,000	TI	456,000	13.39
12x18-15,000	S	38,000	8.96
12x18-15,000	S	18,600	29.96
10.5x24-15,000	S	850,600	143.20
12x24-20,000	TI	133,300	13.71
12x24-20,000	TI	133,300	13.71
12x24-20,000	TI	119,400	13.33
12x24-20,000	TI	119,400	13.33
8.5x24-10,000	TI	67,000	7.38
8.5x24-10,000	TI	67,000	7.38
10x18-10,000	TI	97,200	9.06
10x18-10,000	TI	13,900	6.57
10x18-10,000	TI	52,800	7.73
10x18-10,000	TI	52,800	7.73
8x12-5,000	TI	2,640	3.47
Total			349.93

lbs/mth=average lbs. per month
 D=diameter
 H=height
 TI=terpene intermediate
 S=solvent

PERMIT NO.: AC 16-57751
APPLICANT: SCM Corporation

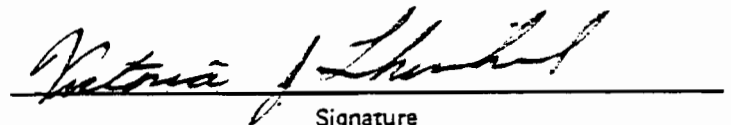
4. Annual hours of operation will be 8760 hours.
5. Concrete dikes will be erected around each storage tank and the ground area between the storage tank and its dike will be paved with concrete in order to contain potential spills and prevent excess odors that could occur from vaporization of the VOC.
6. Activated carbon drums (ACD) must be in operation and will be used to capture air pollutant emissions from the storage tank vents. If the air pollution control equipment (adsorbers) are inadequate for emissions control and/or are improperly maintained, BES must invoke measures that will ensure compliance with odor control.
7. The applicant must prevent pollutant odors from reaching off-plant property.
8. The applicant will demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit to the BES prior to 90 days of the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until the expiration date or issuance of an operating permit.

Expiration Date: September 30, 1983

Issued this 6 day of December, 1982

_____ Pages Attached.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION



Signature

PAGE 4 OF 4

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

Routing To District Offices And/Or To Other Than The Addressee		
To: _____	Loctn.: _____	
To: _____	Loctn.: _____	
To: _____	Loctn.: _____	
From: _____	Date: _____	
Reply Optional []	Reply Required []	Info. Only []
Date Due: _____	Date Due: _____	

TO: Victoria J. Tschinkel
FROM: Clair Fancy *Clair Jancy*
DATE: December 2, 1982
SUBJ: Approval and Signature of Air Construction Permit

RECEIVED
DEC 2 1982
Office of the Secretary

Attached please find one Air Construction Permit for which the applicant is SCM Corporation/Organic Chemicals Division. The proposed construction is sixteen fixed roof storage tanks at the applicant's existing facility in Jacksonville, Duval County, Florida.

Day 90, after which the permit the permit would be issued by default, is December 12, 1982.

The Bureau recommends your approval and signature.

CF/pa

Attachment

In the folder labeled as follows there are documents, listed below, which were not reproduced in this electronic file. That folder can be found in one of the file drawers labeled Supplementary Documents Drawer. Folders in that drawer are arranged alphabetically, then by permit number.

Folder Name: SCM Corporation

Permit(s) Numbered:

AC	16	-	057751
----	----	---	--------

Period during
which document
was received:

Detailed Description

Period during which document was received:		Detailed Description
APPLICATION 30 JUNE 1980	1.	13"×28" BLUEPRINT: GLIDDEN-DURKEE ORGANIC CHEMICALS JACKSONVILLE PLANT LOCATION OF REACTORS & JET SYSTEMS AND BULK TANKS (DRAWING NUMBER: 5000-2) DRAWN 9/29/70, REV #7



FLORIDA PUBLISHING COMPANY

Publishers

JACKSONVILLE, DUVAL COUNTY, FLORIDA

DER

NOV 08 1982

BAQM

STATE OF FLORIDA }
COUNTY OF DUVAL }

Before the undersigned authority personally appeared _____

George A. Dan _____ who on oath says that he is

Retail Advertising Supervisor _____ of The Florida Times-Union, and

Jacksonville Journal, daily newspapers published at Jacksonville in Duval County,

Florida; that the attached copy of advertisement, being a _____

Legal Notice

in the matter of _____ Public Notice/construction of sixteen (16)

fixed roof storage tanks _____

in the _____ Court,

was published in _____ The Florida Times Union

in the issues of _____ October 27, 1982

PUBLIC NOTICE
The Department intends to issue a permit to the SCM Corporation/Organic Chemicals Division for the construction of sixteen (16) fixed roof storage tanks and associated air pollution control equipment at the applicant's existing facility in Jacksonville, Duval County, Florida. The permit will include conditions to assure compliance with Chapter 17-2, Florida Administrative Code (FAC).
Any person wishing to file comments on this proposed action may do so by submitting such comments in writing to:
Mr. C. H. Fancy, P.E.
Deputy Bureau Chief
Bureau of Air Quality Management
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301
Any comments received within thirty days after publication of this notice will be considered and noted in the Department's final determination.
Any person whose substantial interest would be affected by the Department's intended action on this permit may request an administrative hearing by filing a petition as set forth in Section 28-5.15, FAC within fourteen days of the date of this notice with:
Ms. Martha Hall
Office of General Counsel
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

Affiant further says that the said The Florida Times-Union and Jacksonville Journal are each newspapers published at Jacksonville, in said Duval County, Florida, and that the said newspapers have each heretofore been continuously published in said Duval County, Florida, The Florida Times-Union each day, and Jacksonville Journal each day except Sundays, and each has been entered as second class mail matter at the postoffice in Jacksonville, in said Duval County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in said newspaper.

Sworn to and subscribed before me
this 27th day of

October, A.D. 19 82

George A. Dan
Notary Public
State of Florida at Large.

George A. Dan

My Commission Expires _____ Notary Public, State of Florida
My Commission Expires July 9, 1986

Bonded thru Troy Trust Insurance, Inc.

PS Form 3811, Jan. 1979

RETURN RECEIPT REGISTERED, INSURED AND CERTIFIED MAIL

SENDER: Complete items 1, 2, and 3.
Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)
 Show to whom and date delivered.....¢
 Show to whom, date and address of delivery.....¢
 RESTRICTED DELIVERY
 Show to whom and date delivered.....¢
 RESTRICTED DELIVERY.
 Show to whom, date, and address of delivery \$ ____
 (CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
 R. W. Harrell
 P. O. Box 389
 Jacksonville, FL 32201

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	7682428	

 (Always obtain signature of addressee or agent)

I have received the article described above.
 SIGNATURE Addressee Authorized agent
[Signature]

4. DATE OF DELIVERY: _____ POSTMARK:

5. ADDRESS (Complete only if requested): _____

6. UNABLE TO DELIVER BECAUSE: _____ CLERK'S INITIALS: _____

☆ GPO : 1979-300-459

P16 7682428

RECEIPT FOR CERTIFIED MAIL

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

SENT TO		R. W. Harrell
STREET AND NO.		P. O. Box 389
P. O., STATE AND ZIP CODE		Jacksonville FL 32201
POSTAGE		\$
CONSULT POSTMASTER FOR FEES	CERTIFIED FEE	¢
	SPECIAL DELIVERY	¢
	RESTRICTED DELIVERY	¢
	OPTIONAL SERVICES	
	RETURN RECEIPT SERVICE	
	SHOW TO WHOM AND DATE DELIVERED	¢
	SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
TOTAL POSTAGE AND FEES		\$
POSTMARK OR DATE		
10/12/82		

PS Form 3800, Apr. 1976

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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



BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY

October 12, 1982

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. R. W. Harrell
Manager of Engineering
SCM Corporation, Organic Chemicals
Division
P. O. Box 389
Jacksonville, Florida 32201

Dear Mr. Harrell:

Pursuant to Section 403,815, Florida Statutes, and Florida Administrative Code Rule 17-1.62, you are required to publish (at your own expense) the attached notice. This notice should be published one time only in the legal ad section of the Florida Times Union as soon as possible and no later than October 30, 1982.

The Department, in accordance with Rule 17-1.62, is required to have proof that the public notice was given. Therefore, please have the newspaper prepare an affidavit of publication to submit to the Department.

Sincerely,

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

CHF/pa

Attachment

cc: Johnny Cole, DER Northeast District
Steve Pace, Jacksonville Bio-Environmental Services

PUBLIC NOTICE

The Department intends to issue a permit to the SCM Corporation/Organic Chemicals Division for the construction of sixteen (16) fixed roof storage tanks and associated air pollution control equipment at the applicant's existing facility in Jacksonville, Duval County, Florida. The permit will include conditions to assure compliance with Chapter 17-2, Florida Administrative Code (FAC).

Any person wishing to file comments on this proposed action may do so by submitting such comments in writing to:

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

Any comments received within thirty days after publication of this notice will be considered and noted in the Department's final determination.

Any person whose substantial interest would be affected by the Department's intended action on this permit may request an administrative hearing by filing a petition as set forth in Section 28-5.15, FAC within fourteen days of the date of this notice with:

Ms. Martha Hall
Office of General Counsel
Florida Department of Environmental
Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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



BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY

M E M O R A N D U M

TO: R. W. Harrell, SCM Corporation, Organic Chemicals
Division
James O. Sewell, SCM Corporation, Organic
Chemicals Division
Johnny Cole, DER Northeast District
Steve Pace, Jacksonville Bio-Environmental Services

FROM: C. H. Fancy, Deputy Chief, Bureau of Air Quality
Management *CH Fancy*

DATE: October 12, 1982

SUBJ: Preliminary Determination - SCM Corporation, Organic
Chemicals Division, AC 16-57751

Attached is one copy of the application, Technical Evaluation and Preliminary Determination and proposed permit to construct sixteen fixed roof storage tanks at SCM Corporation's existing facility in Jacksonville, Duval County.

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

CHF/pa

PUBLIC NOTICE

The Department intends to issue a permit to the SCM Corporation/Organic Chemicals Division for the construction of sixteen (16) fixed roof storage tanks and associated air pollution control equipment at the applicant's existing facility in Jacksonville, Duval County, Florida. The permit will include conditions to assure compliance with Chapter 17-2, Florida Administrative Code (FAC).

Any person wishing to file comments on this proposed action may do so by submitting such comments in writing to:

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

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Ms. Martha Hall
Office of General Counsel
Florida Department of Environmental
Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

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

28-5.15 Requests for Formal and Informal Proceedings

- (1) Requests for proceedings shall be made by petition to the agency involved. Each petition shall be printed typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double spaced and indented.
- (2) All petitions filed under these rules should contain:
 - (a) The name and address of each agency affected and each agency's file or identification number, if known;
 - (b) The name and address of the petitioner or petitioners;
 - (c) All disputed issues of material fact. If there are none, the petition must so indicate;
 - (d) A concise statement of the ultimate facts alleged, and the rules, regulations and constitutional provisions which entitle the petitioner to relief;
 - (e) A statement summarizing any informal action taken to resolve the issues, and the results of that action;
 - (f) A demand for the relief to which the petitioner deems himself entitled; and
 - (g) Such other information which the petitioner contends is material.

Technical Evaluation
and
Preliminary Determination

SCM Corporation/Organic Chemicals Division
Duval County, Florida

Sixteen Fixed Roof Storage Tanks

Application Number:

AC 16-57751

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

I. PROJECT DESCRIPTION

A. Applicant

SCM Corporation/Organic Chemicals Division
P. O. Box 389
Jacksonville, Florida 32201

B. Project and Location

The applicant proposes to construct sixteen (16) fixed roof storage tanks and associated air pollution control equipment at the applicant's existing facility on West 61st Street in Jacksonville, Duval County, Florida. Total storage volume proposed is 240,000 gallons.

UTM coordinates are Zone 17-743.56 km East and 3360.75 North.

C. Process and Controls

The tanks will be storing various solvents and terpene intermediates produced from the existing facility's processes.

Each tank will be vented to an air pollution control device, activated carbon drums. One tank will also be capable of maintaining constant temperature control, which will prevent breathing losses when storing one of the terpene intermediates (breathing losses would be expected when storing other terpene intermediates or solvents).

There will be a concrete dike placed around each storage tank to contain any spilled material. The floor space between each storage tank and its dike will be paved with concrete to prevent percolation. A valve will be fitted into each dike to allow drainage of rainwater.

II. Rule Applicability

The only criteria air pollutant to be emitted from the storage tanks' control equipment, adsorbers (activated carbon drums), will be solvents and terpene intermediates, classified as Volatile Organic Compounds or Organic Solvents (VOC) by definition in accordance with Chapter 17-2.100(175), Florida Administrative Code (FAC).

The existing facility is a major facility in accordance with Chapter 17-2.100(95), FAC, and is located in the Duval County ozone nonattainment area. VOC pollutants are precursors to ozone and are therefore controlled in accordance with Chapter 17-2.510, FAC, New Source Review (NSR) for Nonattainment Areas.

The proposed sources' VOC potential emissions are 0.175 tons per year (TPY) and would constitute a minor modification to a

major facility, subject to Chapter 17-2.510(2)(d)4.a., FAC. Since the emissions increase is not greater than the significant level of 40 TPY VOC, as set forth in Chapter 17-2.510(2)(e)2., FAC, the proposed sources shall be exempt from Chapter 17-2.510(4), FAC, Preconstruction Review Requirements. Therefore, the proposed sources will be permitted in accordance with Chapter 17-2.520, FAC.

Since there is no applicable standard in Chapter 17-2.600 or 17-2.650, FAC, the sources' VOC emissions shall be permitted in accordance with Chapter 17-2.620(1)(a) and (2), FAC, which prohibits objectionable odors and the use of organic solvents "without applying known existing vapor emission control devices or systems deemed necessary and ordered by the Department".

III. SUMMARY OF EMISSIONS AND AIR QUALITY ANALYSIS

A. Emission Limitations

The regulated pollutant emissions from the proposed storage tanks (16) are VOC. The following table evaluates the maximum total annual projected VOC emissions (350 lbs/yr) through data presentations for each storage tank (emissions are the applicant's calculated emissions and are acceptable by the Bureau):

<u>Storage Tank</u>	<u>Storage Material</u>	<u>Projected Annual Throughput</u>	<u>VOC Emissions</u>
<u>DxH-Gal.</u>		<u>Gal.</u>	<u>lbs/yr</u>
12x30-25,000	TI	715,300	51.02
12x30-25,000	TI	456,000	13.39
12x18-15,000	S	38,000	8.96
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10.5x24-15,000	S	850,600	143.20
12x24-20,000	TI	133,300	13.71
12x24-20,000	TI	133,300	13.71
12x24-20,000	TI	119,400	13.33
12x24-20,000	TI	119,400	13.33
8.5x24-10,000	TI	67,000	7.38
8.5x24-10,000	TI	67,000	7.38
10x18-10,000	TI	97,200	9.06
10x18-10,000	TI	13,900	6.57
10x18-10,000	TI	52,800	7.73
10x18-10,000	TI	52,800	7.73
8x12-5,000	TI	2,640	3.47
Total			349.93

lbs/mth=average lbs. per month
D=diameter
H=height
TI=terpene intermediate
S=solvent

The permitted emissions are in compliance with all applicable requirements of Chapter 17-2, FAC.

All unexpected VOC emissions that will occur by handling, transferring, and storage of the materials shall be properly attended to, i.e. from correcting the problem and removal of contaminated material to final disposal. Also, BES shall be promptly notified.

B. Air Quality Analysis

An air quality analysis is not necessary under the applicable regulations for this source.

IV. CONCLUSIONS

The emissions limits proposed by the applicant have been determined to be in compliance with all applicable requirements of Chapter 17-2, FAC.

Because the projected total VOC emissions from the proposed storage tanks are very low and from several emission points, the Bureau feels that mass VOC emissions test would be impractical. Due to the nature of the compounds stored, odors would be a more sensitive test. Therefore, the permittee must prevent pollutant odors from reaching off-plant property.

The applicant has requested that the information contained in their response to the Bureau's Letter of Incompleteness remain confidential. Therefore, a copy of this letter is not attached to the Preliminary Determination for public review.

The General and Specific Conditions are listed in the Proposed Permit.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2500 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301



BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY

APPLICANT:

SCM Corporation
Organic Chemicals Division
P. O. Box 389
Jacksonville, Florida 32201

PERMIT/CERTIFICATION
NO. AC 16-57751

COUNTY: Duval

PROJECT: Sixteen Fixed
Roof Storage Tanks

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

For the construction of sixteen (16) storage tanks and associated air pollution control equipment, to be located at the foot of West 61st Street in Jacksonville, Duval County, Florida. The UTM coordinates of the proposed source are Zone 17-743.56 km East and 3360.75 km North.

Construction shall be in accordance with the attached permit application and plans, documents and drawings except as otherwise noted on pages 3 and 4 - "Specific Conditions."

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16).
2. Letter of Incompleteness from Clair Fancy to applicant, dated July 22, 1982.
3. SCM response to the "letter of incompleteness" dated August 6, 1982-not included due to the applicant's request for confidentiality.
4. Letter of information (dikes around storage tanks) dated September 2, 1982.

PERMIT NO.: AC 16-57751
APPLICANT: SCM Corporation

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions", and as such are binding upon the permittee and enforceable pursuant to the authority of Section 403.161(1), Florida Statutes. Permittee is hereby placed on notice that the department will review this permit periodically and may initiate court action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.
2. This permit is valid only for the specific processes and operations indicated in the attached drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit shall constitute grounds for revocation and enforcement action by the department.
3. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the department with the following information: (a) a description of and cause of non-compliance; and (b) the period of non-compliance, including exact 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 revocation of this permit.
4. As provided in subsection 403.087(6), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations.
5. This permit is required to be posted in a conspicuous location at the work site or source during the entire period of construction or operation.
6. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the department, may be used by the department as evidence in any enforcement case arising under the Florida Statutes or department rules, except where such use is proscribed by Section 403.111, F.S.
7. In the case of an operation permit, permittee agrees to comply with changes in department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or department rules.
8. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant, or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and department rules, except where specifically authorized by an order from the department granting a variance or exception from department rules or state statutes.
9. This permit is not transferable. Upon sale or legal transfer of the property or facility covered by this permit, the permittee shall notify the department within thirty (30) days. The new owner must apply for a permit transfer within thirty (30) days. The permittee shall be liable for any non-compliance of the permitted source until the transferee applies for and receives a transfer of permit.
10. The permittee, by acceptance of this permit, specifically agrees to allow access to permitted source at reasonable times by department personnel presenting credentials for the purposes of inspection and testing to determine compliance with this permit and department rules.
11. This permit does not indicate a waiver of or approval of any other department permit that may be required for other aspects of the total project.
12. This permit conveys no title to land or water, nor constitutes state recognition or acknowledgement of title, and does not constitute authority for the reclamation 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.
13. This permit also constitutes:
 - Determination of Best Available Control Technology (BACT)
 - Determination of Prevention of Significant Deterioration (PSD)
 - Certification of Compliance with State Water Quality Standards (Section 401, PL 92-500)

PERMIT NO.: AC 16-57751
 APPLICANT: SCM Corporation

SPECIFIC CONDITIONS:

1. Construction should reasonably conform to the plans submitted in the application and amendments.
2. The applicant should report any delays in construction and completion of the proposed sixteen (16) fixed roof storage tanks and associated air pollution control equipment to the Jacksonville Bio-Environmental Services (BES).
3. Expected throughput of the tanks and associated projected VOC emissions are:

<u>Storage Tank</u>	<u>Storage Material</u>	<u>Projected Annual Throughput</u>	<u>VOC Emissions</u>
<u>DxH-Gal.</u>		<u>Gal.</u>	<u>lbs/yr</u>
12x30-25,000	TI	715,300	51.02
12x30-25,000	TI	456,000	13.39
12x18-15,000	S	38,000	8.96
12x18-15,000	S	18,600	29.96
10.5x24-15,000	S	850,600	143.20
12x24-20,000	TI	133,300	13.71
12x24-20,000	TI	133,300	13.71
12x24-20,000	TI	119,400	13.33
12x24-20,000	TI	119,400	13.33
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8.5x24-10,000	TI	67,000	7.38
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10x18-10,000	TI	13,900	6.57
10x18-10,000	TI	52,800	7.73
10x18-10,000	TI	52,800	7.73
8x12-5,000	TI	2,640	3.47
Total			349.93

lbs/mth=average lbs. per month
 D=diameter
 H=height
 TI=terpene intermediate
 S=solvent

PERMIT NO.: AC 16-57751
APPLICANT: SCM Corporation

4. Annual hours of operation will be 8760 hours.
5. Concrete dikes will be erected around each storage tank and the ground area between the storage tank and its dike will be paved with concrete in order to contain potential spills and prevent excess odors that could occur from vaporization of the VOC.
6. Activated carbon drums (ACD) must be in operation and will be used to capture air pollutant emissions from the storage tank vents. If the air pollution control equipment (adsorbers) are inadequate for emissions control and/or are improperly maintained, BES must invoke measures that will ensure compliance with odor control.
7. The applicant must prevent pollutant odors from reaching off-plant property.
8. The applicant will demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit to the BES prior to 90 days of the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until the expiration date or issuance of an operating permit.

Expiration Date: September 30, 1983

Issued this _____ day of _____, 19_____.

_____ Pages Attached.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Signature

SCM **ORGANIC CHEMICALS**
DIVISION OF SCM CORPORATION

P. O. BOX 389, JACKSONVILLE, FLA. 32201 (904) 764-1711

September 2, 1982

DER
SEP 07 1982
BAQM

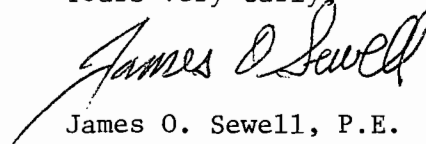
Mr. Bruce Mitchel
Department of Environmental Regulations
Bureau of Air Quality Management
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301-8241

Re: AC 16-57751

Dear Mr. Mitchel:

This letter is to confirm that all tanks being considered in the above construction permit will be enclosed by dikes. In addition the floor of the diked area will be paved with concrete. One valve will be provided to drain the diked area of storm water. This valve will be closed at all times other than while draining in order to comply with our insurance and to prevent any spill from leaving the plant as required in our SPCC plan.

Yours very turly,


James O. Sewell, P.E.
Project Engineer

JOS:mcb

cc: Mr. R. W. Harrell

PS Form 3811, Jan. 1976

SENDER: Complete items 1, 2, and 3. Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)

Show to whom and date delivered.....¢

Show to whom, date and address of delivery.....¢

RESTRICTED DELIVERY

Show to whom and date delivered.....¢

RESTRICTED DELIVERY.

Show to whom, date, and address of delivery.\$ _____

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
R. W. Harrell
P. O. Box 389
Jacksonville, Florida 32201

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	7682409	

(Always obtain signature of addressee or agent)

I have received the article described above.

SIGNATURE Addressee Authorized agent

4. DATE OF DELIVERY

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE:

CLERK'S INITIALS

POSTMARK: JACKSONVILLE FLA 32201 JUL 23 1982

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

☆GPO : 1979-300-459

P16 7682409

RECEIPT FOR CERTIFIED MAIL

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

SENT TO
R. W. Harrell
STREET AND NO.
P. O. Box 389
P.O., STATE AND ZIP CODE
Jacksonville, FL

POSTAGE	\$
CERTIFIED FEE	¢
SPECIAL DELIVERY	¢
RESTRICTED DELIVERY	¢
SHOW TO WHOM AND DATE DELIVERED	¢
SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
TOTAL POSTAGE AND FEES	\$
POSTMARK OR DATE	7/23/82

CONSULT POSTMASTER FOR FEES

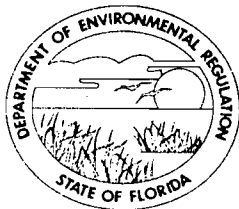
OPTIONAL SERVICES

RETURN RECEIPT SERVICE

PS Form 3800, Apr. 1976

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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



BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY

July 22, 1982

Mr. R. W. Harrell
Manager of Engineering
P.O. Box 389
Jacksonville, Florida 32201

RE: Construction Permit Application for Air Pollution
Sources - 16 Fixed Roof Storage Tanks

Dear Mr. Harrell:

The referenced application (Permit No. AC 16-57751) has been transferred from Jacksonville Bio-Environmental Services to the Central Air Permitting Section (CAPS), in Tallahassee, for processing. CAPS is responsible for review and issuance of all construction permits at major air pollution facilities (e.g., SCM Corporation) in the State.

The application has been determined incomplete and processing of the application has been discontinued until the following information regarding emissions calculations is received.

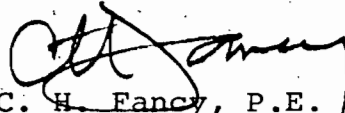
1. Section V, Part 2 requires attachment of the basis of emission estimates to the application. The "sample calculation" which was submitted is insufficient, in that it uses only one tank size and one specific storage product. Please provide calculations which address the individual tank parameters and identify the proposed liquids to be stored in each tank. This is the only manner in which we can verify emission estimates. I should also mention that the AP-42 emission equations have been revised. Enclosed is a copy of the new AP-42 Section 4.3., Storage of Organic Liquids, containing the new equations which should be used in your calculations.
2. Please attach a copy of the referenced technical paper which is used as a basis for the efficiency

Mr. R. W. Harrell
July 22, 1982
Page Two

of the control device. Test data verifying control efficiency of the carbon drums for the appropriate type of liquid stored would be sufficient, if available.

Processing of the application will be expedited upon receipt of this information. Please call Tim Powell at (904) 488-1344 if you have any questions.

Sincerely,



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

CHF:TP:ras

Enclosure

cc: Steve Pace, Jacksonville BES
Johnny Cole, FDER, SJRS
James Sewell, SCM Corp.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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



BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY

July 9, 1982

R. W. Harrell
Manager of Engineering
SCM Corporation, Organic
Chemicals Division
P.O. Box 389
Jacksonville, Florida 32201

Dear Mr. Harrell:

This is to acknowledge receipt and transaction of your "Application to Construct an Air Pollution Source" fee check. The permit processing number assigned to this application is AC 16-57751.

If we may be of further assistance, please feel free to call me at (904) 488-1344.

Sincerely,

Patty Adams

Patty Adams
Bureau of Air Quality
Management

PA:ras

Attachment

DEPARTMENT OF HEALTH, WELFARE
& BIO-ENVIRONMENTAL SERVICES
Bio-Environmental Services Division
Air and Water Pollution Control



June 29, 1982

DER
JUL 02 1982
BAQM

Mr. Clair Fancy, Director
Central Air Permitting Section
Department of Environmental Regulation
Twin Towers Office Building
2600 Blairstone Road
Tallahassee, Florida 32301

Dear Mr. Fancy:

Enclosed is a Construction Permit application and processing fee from SCM Corporation. These items are being forwarded to your office pursuant to the guidelines available to this agency.

If I may be of further assistance, please advise.

Very truly yours,

Jerry E. Woosley
Assistant Engineer

JEW/am

Enc.



ATLANTIC NATIONAL BANK
OF JACKSONVILLE, FLORIDA

SCM ORGANIC CHEMICALS
DIVISION OF SCM CORPORATION
JACKSONVILLE, FLA. 32201

63-2
630

No. 56253

CHECK DATE		
MONTH	DAY	YEAR
6	22	82

VOID AFTER
90 DAYS

\$20.00

PAY

The sum of **20** Dollars **00** Cts.

TWO MANUAL SIGNATURES REQUIRED, OR ONE FACSIMILE
SIGNATURE FOR AMOUNTS LESS THAN \$5000.00

TO THE ORDER OF Department of Environmental Regulations
515 West 6th Street
Jacksonville, FL 32206

W.F. Dean
AUTHORIZED SIGNATURE
L. L. Aleno
AUTHORIZED SIGNATURE



MO.	DAY	DESCRIPTION	INVOICE	GROSS	DISCOUNT	NET
6	22	Application fee for Pollution Control Construction Permit				\$20.00
DETACH BEFORE DEPOSITING			SCM CORPORATION	TOTALS		

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

No 33618

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from SCM Organic Chemicals Date July 2 1982
 Address P.O. Box 289 Jacksonville FL 32201 Dollars \$ 20.00
 Applicant Name & Address Same as above
 Source of Revenue _____
 Revenue Code 0101 Application Number AC 10-57751
 By Patricia G. Adams

Ac 116 57751



DER

JUL 2 1982

BAQM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT
AIR POLLUTION SOURCES

SOURCE TYPE: Storage Tanks New¹ Existing¹

APPLICATION TYPE: Construction Operation Modification

COMPANY NAME: SCM Corporation, Organic Chemicals Division COUNTY: Duval

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

SOURCE LOCATION: Street Foot of West 61st Street City Jacksonville

UTM: East 7435600 North 3360750

Latitude ° ' "N Longitude ° ' "W

APPLICANT NAME AND TITLE: R. W. Harrell, Manager of Engineering

APPLICANT ADDRESS: P. O. Box 389, Jacksonville, Florida 32201

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of SCM Corporation, Organic Chemicals Division

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

*Attach letter of authorization

Signed: R. W. Harrell
R. W. Harrell, Manager of Engineering
Name and Title (Please Type)

Date: June 16, 1982 Telephone No. (904) 754-1711

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

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed: James O. Sewell
James O. Sewell
Name (Please Type)

SCM Corporation, Organic Chemicals Division
Company Name (Please Type)
P. O. Box 389, Jacksonville, Florida 32201
Mailing Address (Please Type)

Date: June 16, 1982 Telephone No. (904) 764-1711

(Affix Seal)

Florida Registration No. 16068

¹See Section 17-2.02(15) and (22) Florida Administrative Code, (F.A.C.)

SECTION II: GENERAL PROJECT INFORMATION

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

Sixteen fixed roof tanks with maximum volume per tank 25,000 gallons - total volume 240,000 gallons.

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

Start of Construction August, 1982 Completion of Construction September, 1983

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

Total \$20,000

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

None

E. Is this application associated with or part of a Development of Regional Impact (DRI) pursuant to Chapter 380, Florida Statutes, and Chapter 22F-2, Florida Administrative Code? Yes No

F. Normal equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr _____ ; if seasonal, describe: _____

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

- | | |
|---|------------|
| 1. Is this source in a non-attainment area for a particular pollutant? | <u>Yes</u> |
| a. If yes, has "offset" been applied? | <u>No</u> |
| b. If yes, has "Lowest Achievable Emission Rate" been applied? | <u>No</u> |
| c. If yes, list non-attainment pollutants. | |
| <u>Hydrocarbons</u> | |
| 2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. | <u>No</u> |
| 3. Does the State "Prevention of Significant Deterioration" (PSD) requirements apply to this source? If yes, see Sections VI and VII. | <u>No</u> |
| 4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? | <u>No</u> |
| 5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? | <u>No</u> |

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

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

A. Raw Materials and Chemicals Used in your Process, if applicable: N/A

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		

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

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

2. Product Weight (lbs/hr): _____

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission ¹		Allowed Emission ² Rate per Ch. 17-2, F.A.C.	Allowable ³ Emission lbs/hr	Potential Emission ⁴		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
Hydrocarbons	0.0577	0.253	50 tons/year	N/A	0.5769	2.527	

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles ⁵ Size Collected (in microns)	Basis for Efficiency (Sec. V, It ⁵)
Activated Carbon Drums	Hydrocarbons	90%	Unknown	Technical Paper*
	"			

¹See Section V, Item 2. *Engineering Control of Odors - Duffee, from 74th Annual Meeting AIChE, 11/8:

²Reference applicable emission standards and units (e.g., Section 17-2.05(6) Table II, E. (1), F.A.C. - 0.1 pounds per million BTU heat input)

³Calculated from operating rate and applicable standard

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

⁵If Applicable

E. Fuels None

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

*Units Natural Gas, MMCF/hr; Fuel Oils, barrels/hr; Coal, lbs/hr

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

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

F. If applicable, indicate the percent of fuel used for space heating. Annual Average N/A Maximum _____

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

None

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

Stack Height: 3' ft. Stack Diameter: 0.17 ft.

Gas Flow Rate: Tank breathing rate ACFM Gas Exit Temperature: Ambient °F.

Water Vapor Content: Ambient Relative Humidity % Velocity: Tank breathing rate/0.17 FPS

SECTION IV: INCINERATOR INFORMATION N/A

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq & Gas By-prod.)	Type VI (Solid By-prod.)
Lbs/hr Incinerated							

Description of Waste _____

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

Approximate Number of Hours of Operation per day _____ days/week _____

Manufacturer _____

Date Constructed _____ Model No. _____

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

Stack Height: _____ ft. Stack Diameter _____ Stack Temp. _____

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

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

Type of pollution control device: Cyclone Wet Scrubber Afterburner Other (specify) _____

Brief description of operating characteristics of control devices: _____

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

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight – show derivation.
2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.
3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).
4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, etc.).
5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3, and 5 should be consistent: actual emissions = potential (1-efficiency).
6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.
7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).
8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

- 9. An application fee of \$20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.
- 10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY N/A

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?
 Yes No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy) Yes No

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

- | | |
|---------------------------|----------------------|
| 1. Control Device/System: | 4. Capital Costs: |
| 2. Operating Principles: | 6. Operating Costs: |
| 3. Efficiency:* | 8. Maintenance Cost: |
| 5. Useful Life: | |
| 7. Energy: | |
| 9. Emissions: | |

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

- a. Height: _____ ft. b. Diameter: _____ ft.
- c. Flow Rate: _____ ACFM d. Temperature: _____ °F
- e. Velocity: _____ FPS

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

1.

- a. Control Device:
- b. Operating Principles:
- c. Efficiency*:
- d. Capital Cost:
- e. Useful Life:
- f. Operating Cost:
- g. Energy*:
- h. Maintenance Cost:
- i. Availability of construction materials and process chemicals:
- j. Applicability to manufacturing processes:
- k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

- a. Control Device:
- b. Operating Principles:
- c. Efficiency*:
- d. Capital Cost:
- e. Useful Life:
- f. Operating Cost:
- g. Energy**:
- h. Maintenance Costs:
- i. Availability of construction materials and process chemicals:
- j. Applicability to manufacturing processes:
- k. Ability to construct with control device, install in available space, and operate within proposed levels:

*Explain method of determining efficiency.

**Energy to be reported in units of electrical power – KWH design rate.

3.

- a. Control Device:
- b. Operating Principles:
- c. Efficiency*:
- d. Capital Cost:
- e. Life:
- f. Operating Cost:
- g. Energy:
- h. Maintenance Cost:

*Explain method of determining efficiency above.

- i. Availability of construction materials and process chemicals:
- j. Applicability to manufacturing processes:
- k. Ability to construct with control device, install in available space and operate within proposed levels:

4.

- a. Control Device
- b. Operating Principles:
- c. Efficiency*:
- d. Capital Cost:
- e. Life:
- f. Operating Cost:
- g. Energy:
- h. Maintenance Cost:
- i. Availability of construction materials and process chemicals:
- j. Applicability to manufacturing processes:
- k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

- 1. Control Device:
- 2. Efficiency*:
- 3. Capital Cost:
- 4. Life:
- 5. Operating Cost:
- 6. Energy:
- 7. Maintenance Cost:
- 8. Manufacturer:
- 9. Other locations where employed on similar processes:

a.

- (1) Company:
- (2) Mailing Address:
- (3) City:
- (4) State:
- (5) Environmental Manager:
- (6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

- (1) Company:
- (2) Mailing Address:
- (3) City:
- (4) State:

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

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration
<hr/>	<hr/>
<hr/>	<hr/>
<hr/>	<hr/>

(8) Process Rate*:

10. Reason for selection and description of systems:

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

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. _____ no sites _____ TSP _____ () SO²* _____ Wind spd/dir

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

Other data recorded _____

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

a) Was instrumentation EPA referenced or its equivalent? _____ Yes _____ No

b) Was instrumentation calibrated in accordance with Department procedures? _____ Yes _____ No _____ Unknown

B. Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location) _____

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

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

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

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

E. Emission Data Used in Modeling

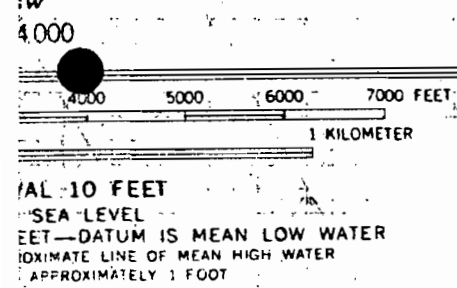
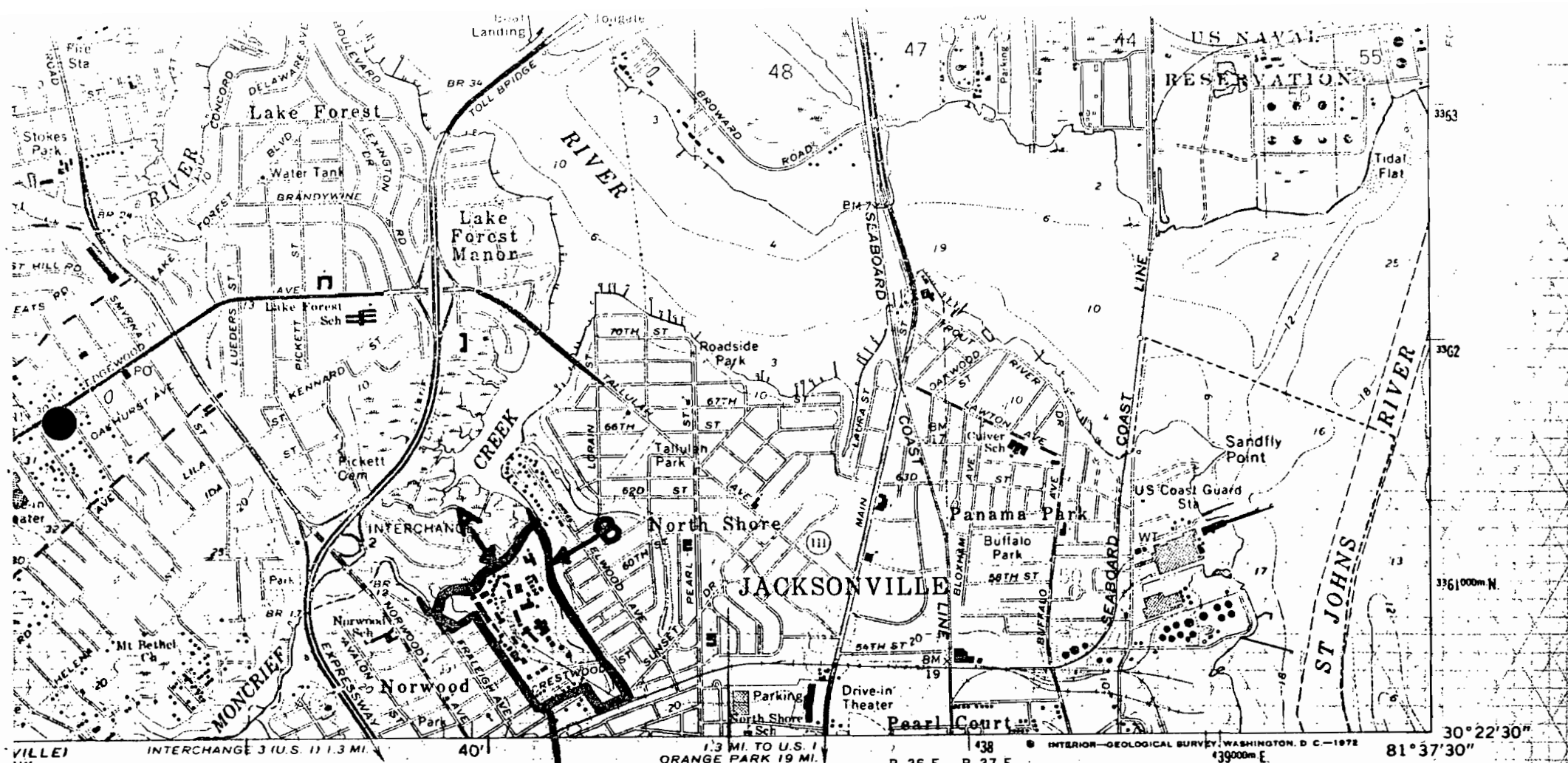
Attach list of emission sources. Emission data required is source name, description on point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

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

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

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



A-D002
B-D003
SCM PLANT
ENCLOSED AREA



QUADRANGLE LOCATION
SCM CORPORATION
ORGANIC CHEMICALS DIVISION
PLANT LOCATION
 DATE *12-21-78*
 APPROVED *ACS*
 DWG. NO. S-5000-26

ROAD CLASSIFICATION

Heavy-duty ————— Light-duty —————
 Medium-duty ————— Unimproved dirt - - - - -

Ⓜ Interstate Route Ⓜ U.S. Route ○ State Route

TROUT RIVER, FLA.

N3022.5—W8137.5/7.5

1954
 PHOTOREVISED 1970
 AMS 4644 ; NW—SERIES V847

MAP ACCURACY STANDARDS
 SURVEY, WASHINGTON, D. C. 20242
 ADDITIONAL SYMBOLS IS AVAILABLE ON REQUEST

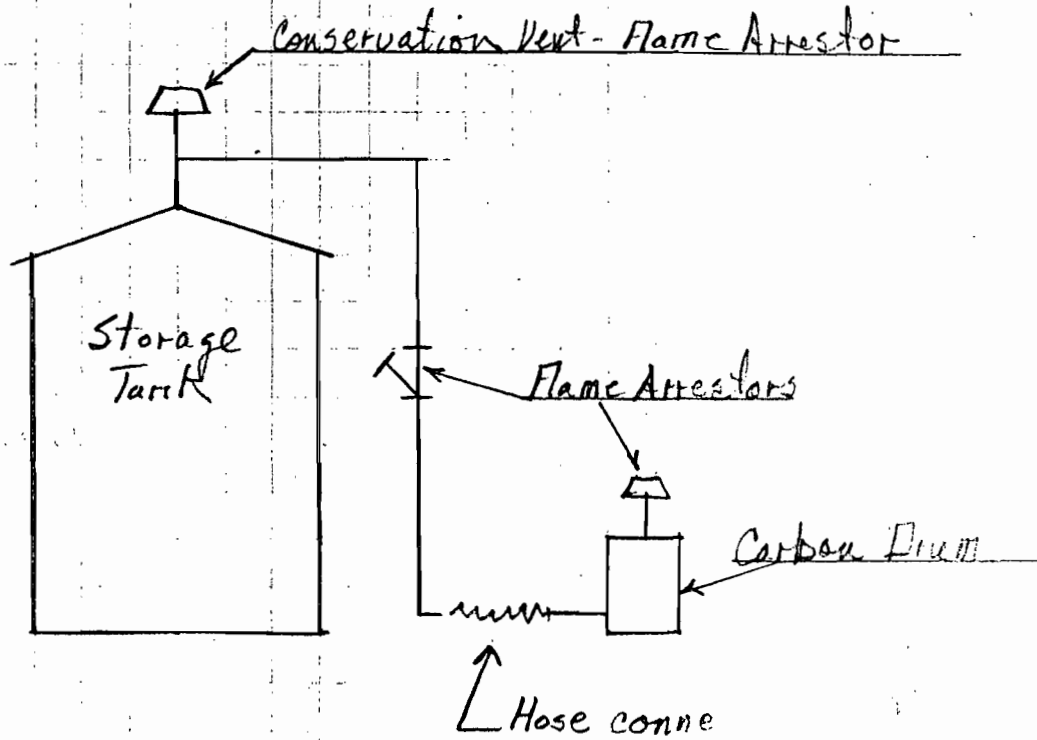
BY L.O. Sewell

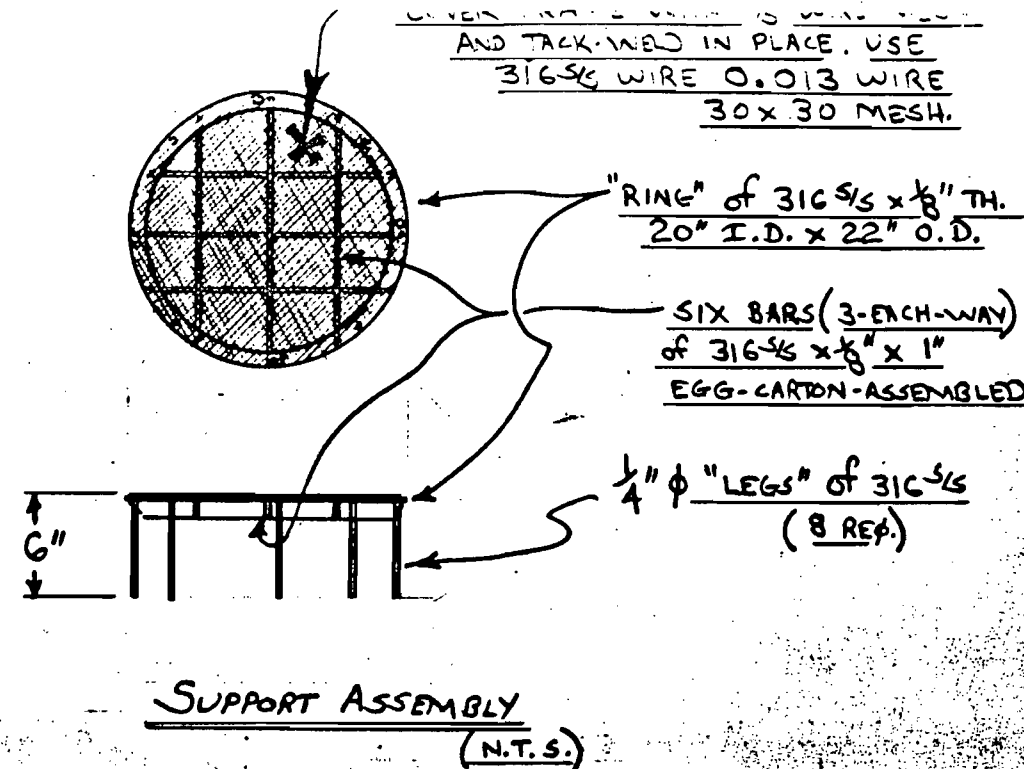
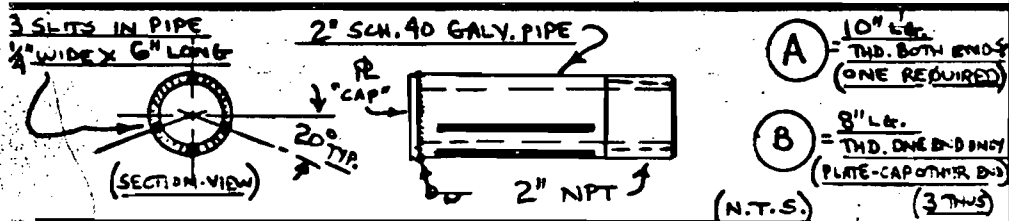
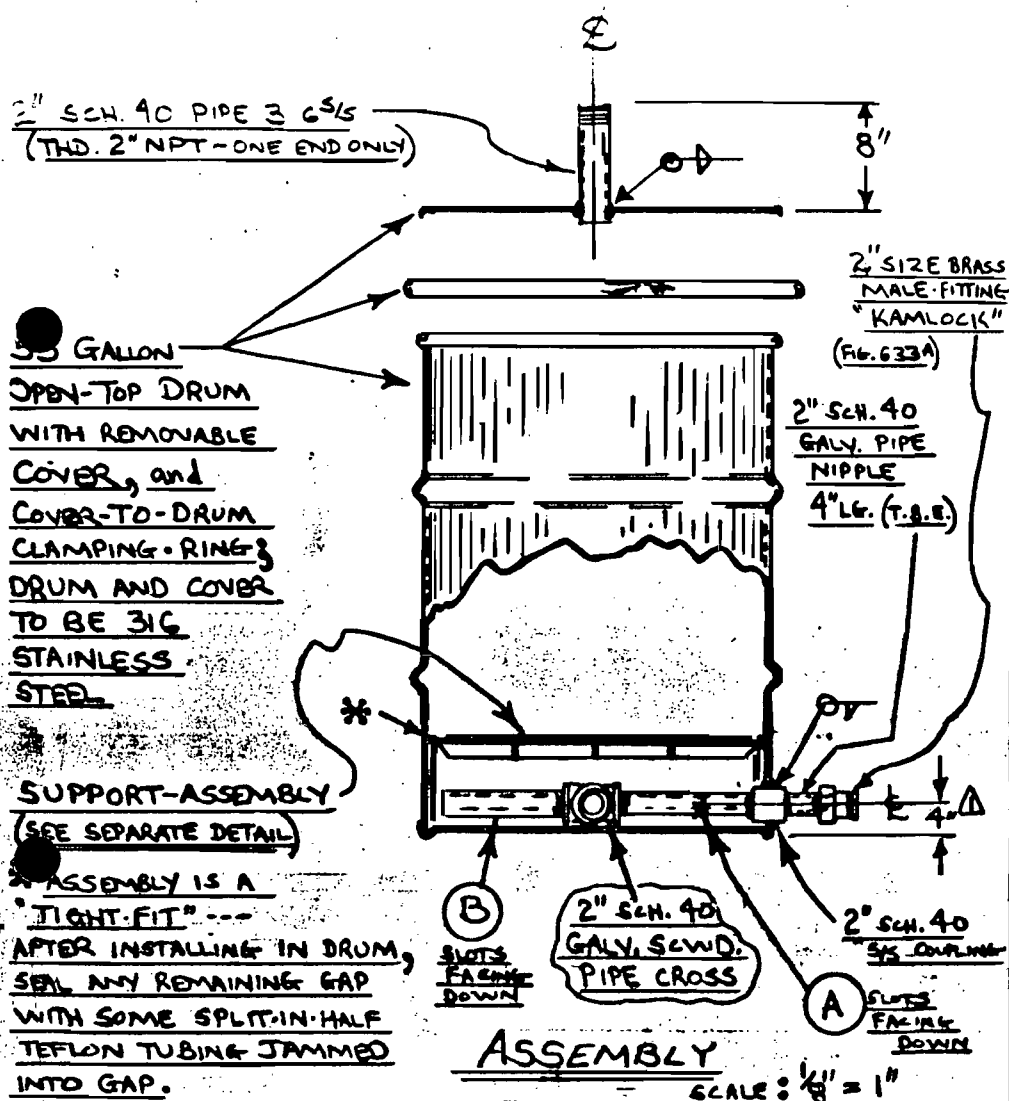
DATE 6-14-82

SUBJECT Flow Sheet - Carbon Adsorption

CHECKED BY

DATE





NOTES:

1. FABRICATOR IS TO SUPPLY UNIT FULLY-ASSEMBLED.

UNIT WILL BE HYDROSTATIC TESTED TO 3 PSIG, AND DRIED OUT BEFORE DELIVERY.

NO.	REVISION	DATE	BY

ORGANIC CHEMICALS
DIVISION OF SCM CORPORATION
P.O. BOX 288 JACKSONVILLE, FLORIDA 32201

TITLE: PORTABLE CHARCOAL-BED (STE. TX. VENT DEODORIZER)	DRAWN: RWN	DATE: 6-7-78
	CHECKED: RDH	DATE: 6-16-78
	APPROVED: [Signature]	DATE: 6/19/78
C.E.R. NO. - 562	(ITEM NO.)	REV. 1
W.O. NO.	DWG. NO. 2-6503-201	

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#5612

120C

MANUSCRIPT CONTR.

J. O. S.

FEB 05 1982

ENGINEERING CONTROL OF ODORS

BY

RICHARD A. DUFFEE
MANAGER, ODOR SERVICES
TRC-ENVIRONMENTAL CONSULTANTS, INC.

FOR PRESENTATION AT

THE 74TH ANNUAL MEETING
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

NOVEMBER, 1981

INTRODUCTION

Odor control may be the most challenging area to the environmental pollution control engineer. There are several reasons for this. Most significant, perhaps, is the lack of any - not merely uniform - standards as to what constitutes an acceptable odor. As a result, each odor control problem becomes - or should - an exercise in applied research to determine what sources of odorous emissions to control and to what extent to eliminate community odor complaints. One can neglect this only at the risk of greatly exacerbating the problem, as well as wasting considerable amounts of time and money.

The second underlying reason for the challenge of odor control is the extremely small amount of odorant that triggers odor perception in humans. Some odorants can be detected in vapor concentrations as low as 0.001 part per billion. As a result of our olfactory acuity, ordinarily minor sources for most pollutants - e.g., evaporation from waste treatment ponds or impoundments, spills, leaks from valves and flanges, vents from tanks or filling operations - may be the primary source. Also, the concentration of odorants in typical emission sources is usually in the part per million (ppm) range. To minimize or to eliminate odor detection frequently requires reducing odorant concentrations to the part per billion (ppb) range, i.e., overall control efficiencies upwards of 99 percent.

The final basis for the challenge of odor control is that we are dealing with an effect, i.e., our conscious reaction to a stimulus of our olfactory system by odorants in the gaseous or vapor state. While we can quantify several odor properties such as intensity or detectability, as

well as odorant concentration, we have only a limited understanding of the relation of these measures to the resulting level of annoyance. (Remember, the objective of odor control is to eliminate objectionable odors not all odor.) Ability to detect odor increases in parts of the populāce with increased frequency of exposure to certain odorants with an associated increase in their level of annoyance. Consequently, designing to so-called threshold concentrations frequently will not eliminate odor complaints where the population is sensitized.

Because we are dealing with an effect, odor control can be directed either at reducing the concentration of odorants at the receptor (the human nose) or at interfering with the receptor's olfaction process.¹ Approaches to odor control aimed at reducing odorant concentration at the receptor are:

- Process modification
- Atmospheric dispersion
- Absorption and gas phase reactions
- Adsorption
- High temperature oxidation

The techniques that interfere with the olfaction process are commonly grouped under the term "odor modification." These include:

- Counteraction - denotes reduction in intensity of the malodorant.
- Cancellation - means reduction to zero intensity, never convincingly documented.
- Masking - refers to a change in odor quality that makes the malodorant unrecognizable; implies concealment.

These will not be discussed since they do not represent engineering controls of odor.

In the following sections, each of the odorant control techniques is reviewed briefly with respect to principles of design and operation. Comparative costs are also included as a guide to method selection.

For a fuller discussion of these topics the reader is referred to the section on odor control in the report by the National Research Council Committee on Odors From Stationary and Mobile Sources, published by the National Academy of Sciences in 1979.²

PROCESS MODIFICATION

The simplest way to solve odor problems is to prevent them - not by applying sophisticated and costly technology but merely by being aware of potential odor problems. For example, many odor problems can be eliminated simply by using less odorous materials, e.g., substitute glycols or refined mineral oil for aromatic solvents. Odorous emissions can be reduced substantially by operating drying systems at lower temperatures. Chilling the water in condensers can increase their effectiveness. Conversely, raising the temperature in combustion equipment used for waste treatment can prevent formation of partially oxidized intermediates more odorous than the original waste.

Pressure should also be carefully considered. Simply maintaining a slight negative pressure in process equipment or in production facilities minimizes fugitive emissions and makes the odor control job easier.

Volume is one of the most important considerations. A large dilution ventilation volume may be desirable to maintain worker comfort and safety. However, this can increase the discharge to the atmosphere of volatile odorants and negate the efficiency of certain odor control alternatives such as scrubbers. Careful exhausting of process emissions, including such things as drain junction boxes and sewer vents, can greatly reduce ventilation volumes. The resulting energy savings, in fact, can offset the cost of the odor control system.

Two of the major contributors to odor problems are poor maintenance and poor housekeeping. In many odorous processes, the greatest amount of odorant released is from leaks (from flanges, pumps, seals, open vessels, etc.). Continued maintenance can prevent this type of problem. Similarly, processes involving odor producing materials such as putrescible foods or food by-products or volatile materials must be kept scrupulously clean to prevent odor problems.

ATMOSPHERIC DISPERSION AND LAND USE PLANNING

Many odor problems result from exhausting odorous emissions through ventilating fans or through stub vents or ducts on the roof in such a manner that they are immediately entrained in the building wake and become, in effect, ground level sources. Solving these problems frequently involves discharging these exhausts through a stack tall enough to prevent capture of the odorous exhaust in the building wake. But beware - this does not necessarily mean a good engineering practice (GEP) stack height of 2-1/2 times the height of the building roof, which is frequently woefully inadequate.

The requisite stack height can only be determined by either (1) a puff dispersion model that incorporates building wake effects; (2) a physical model/wind tunnel simulation; or (3) tracer experiments on the actual facility.

Odor control by atmospheric dispersion is predicated on the assumption that dilution of odorants to below a sensory target value - e.g., the detection threshold - can be achieved and maintained by atmospheric dispersion. This assumption relies heavily both on the validity of reported odorant thresholds and on the accuracy of measurements of odorous emission. Published odorant thresholds are more a function of the measurement method used than an absolute indicator. The same observation may be made with respect to measurement of odorant emission rates; in this case, however, with careful selection of method and adaptation to the source, accurate and reliable measurement can be made.

Since there are no federal EPA odor regulations neither is there an EPA ban on using atmospheric dispersion for odor control. Atmospheric dilution of odorous emission can be achieved in two main ways:

- Collection of all process and plant emission and discharge through a tall stack: Contaminants emitted into the atmosphere are diluted by turbulence and diffusion. The dilution of a contaminant depends directly on the wind speed: the mass emitted in unit time is spread over the distance traveled in unit time by air blowing over the discharge point. In addition to this thinning of material in the direction of the mean wind, there is mixing along and across the mean wind horizontally and vertical mixing because of the natural turbulence resulting from the wind.
- Relocation of the source at a greater distance from any receptor: Moving an odorous discharge farther from any receptor obviously results in a reduced odorant concentration at the receptor. Such a drastic step is currently limited to situations where the source may be relocated within the confines of property to take advantage of favorable atmospheric dispersion provided by local climate

and topography. These situations arise most often during siting studies. Careful assessment by use of physical or dispersion models of industrial-plant odor sources before the location of a plant is fixed can avoid odor problems.

Several factors must be carefully considered before reliance is placed on atmospheric dispersion for odor control. These include the characteristics of the odorants and their sources and local meteorologic characteristics. Point sources - such as ducts, ports, and vents - are suitable for dispersion. Fugitive emission - such as that from open doors, windows, or leaking flanges - should be prevented or captured and ducted to the stack. Terrain must also be considered. If the odor source is in a valley in rugged, complex terrain, odor control by dispersion is either impractical or impossible; in such cases, discharging odorants through a tall stack only transfers the location of complaints of malodors. The following steps should be followed when discharge through a tall stack is selected as the means of controlling odors:

- Measure the odor emission per source. Dilution ratio and standard flow rate are measured at each potentially odorous emission source.
- Perform modeling calculations from the present or design source configuration with a puff model, such as the TRC Odor Model³ which includes plume rise, building wake entrainment, and mixing-volume correction techniques designed to increase accuracy.
- Conduct an odor survey in the community. This involves the mapping of perceived odor qualities (or characteristic smell) and odor dilution ratios and/or intensities under different meteorologic conditions, usually on the basis of tests with expert odor judges.
- Correlate the model results with the survey results (i.e., calibrate the model). This will relate the odor intensities, dilution ratios, and types found in the community with those determined by modeling suspected sources. If there is no correlation, this could mean that the odor source configuration is more complex than anticipated or that a significant contribution to the odor problem has been neglected or incorrectly represented in the model. The model should be adjusted accordingly.

- Determine required stack height. The adjusted model should be used for the determination of the stack height required to reduce the odor impact at receptors to less than the selected target value.

ABSORPTION AND GAS PHASE REACTIONS

Scrubbing of odorous emissions is a widely used means of odor control. Non-chemical absorption, i.e., involving only solution of the odorants in an appropriate solvent (usually water) is widely used for removal of soluble inorganic gases such as HCl and NH₃. Most odorants, however, are organic compounds with limited solubility in water. Accordingly, most odorant scrubbing applications involve use of solvents which not only dissolve the odorants - a fundamental requirement for scrubbing - but also react with the odorants to prevent their re-volatilization from the scrubbing liquid. Since most odorous emissions involve mixtures of numerous odorants, multiple stage scrubbing is becoming more common, using different scrubbing liquors in each stage. Frequently, injection of an oxidant (usually Cl₂) into the odorous exhaust upstream of the scrubber is used to react with the odorants in the gas phase to make them either less odorous or more soluble or both. Since these oxidants are soluble in the scrubbing liquid, they become powerful oxidants for the absorbed odorants.

For applications involving very low odorant concentrations and requiring maximum mass transfer rates, countercurrent packed towers are used. Maximum odor control efficiencies for single stage towers are approximately 95 percent because of mass transfer limitations. For somewhat higher concentrations or multistage scrubber operations, cross-flow packed beds are

most often used with dilute, recycled sulfuric acid and dilute, recycled caustic as the primary scrubbing liquids. Such systems can achieve odor control efficiencies of 97 percent or better. Other commonly used scrubbing liquors are sodium hypochlorite for aldehydes, organic acids, amines and sulfides, sodium or calcium bisulfite for aldehyde control, and mineral oil or glycol for miscellaneous volatile organics.⁴

Careful design is needed for scrubbing applications to prevent plugging of the packing by particulate matter, to maintain adequate liquid/gas ratios usually in the range of 5-10 gpm/1000 cfm, and to control chemical feed rates. For example, careful control of chemical feed is vital when using Cl₂ or hypochlorite to prevent discharging strong chlorine-like odors.

ADSORPTION

Any gas or vapor will adhere to some degree to any solid surface. This phenomenon is called "adsorption." Practical adsorbents have extensive areas of inner surface, by reason of extensive honeycombing. When adsorbed matter condenses in the submicroscopic pores of an adsorbent, the phenomenon is called "capillary condensation." Adsorption is useful in odor control, because it is a means of concentrating gaseous odorants from an airstream, thus facilitating their disposal, their recovery, or their conversion to innocuous or valuable products. When an odorous airstream is passed through a fresh adsorbent bed, almost all the odorant molecules that reach the surface are adsorbed, and desorption is very slow. Furthermore, if the bed consists of closely packed granules, the distance the molecules must travel

to reach some point on the surface is small, and the transfer rate is therefore high. In practice, the half-life of airborne molecules streaming through a packed adsorbent bed is around 0.01 s, and a 95% removal occurs in about 4 half-lives, or around 0.04 s.⁵ Thus, the very high efficiencies required to deodorize a highly odorous airstream may be achieved with a bed of moderate depth at reasonable airflow rates.

The quantity of material that can be adsorbed by a given weight of adsorbent depends on the following factors: the concentration of the material in the space around the adsorbent, the total surface area of the adsorbent, the total volume of pores in the adsorbent with diameters small enough to facilitate condensation of adsorbed gases, the temperature, the presence of other gases in the environment that may compete for a place on the adsorbent, the characteristics of the molecules to be adsorbed (especially their weight, electric polarity, size, and shape), and the electric polarity of the adsorbent surface. Maximal capacity for adsorption of a given substance is favored by a high concentration of the substance in the space adjoining the adsorbent, a large adsorbing surface, freedom from competing substances, low temperature, and aggregation of the substance in large molecules that fit and are strongly attracted to the receiving shapes of the adsorbent.⁶

Adsorbed odorants may be disposed of in any of the following ways: the adsorbent with its adsorbate may be discarded; the adsorbate may be desorbed and recovered, if it is valuable, or discarded (the adsorbent is recovered in either case), or the adsorbate may be chemically converted to a more easily disposed product.

There are basically two adsorbents widely used for industrial odor control, activated carbon, often impregnated for specialized applications, and activated alumina impregnated with potassium permanganate (which has the trade name of Purafil). Activated carbon will absorb most organic odorants, especially non-polar. For typical industrial applications, thick bed adsorbers are used with on-site regeneration of the carbon by superheated steam. This system involves two carbon beds. One carbon bed is adsorbing while the other is being regenerated. Bed depths are in the range of 1 to 6 feet and airflow capacities up to 40,000 cfm. The carbon in this system can last for years with odor control efficiencies in excess of 95 percent. The period between regeneration is usually in the range of 2 to 10 hours, but this is highly variable and must be determined for each application.

Thin bed adsorbers are used for light odorant loads (ppb to low ppm range) and consist of carbon beds of approximately 1" depth in flat, cylindrical or pleated shapes. Single cells handle 750-1000 cfm, while aggregates of flat bed components handle 2000 cfm. Thin bed adsorbers are expected to have service lives of several months. They are usually replaced when exhausted.

Impregnated activated alumina is used in similar configurations as thin bed carbon adsorbers. It is used primarily to control easily oxidizable odorants including formaldehyde and hydrogen sulfide. Typical applications of impregnated adsorbents are shown in Table 1.⁸

TABLE 1
 ADSORBENT IMPREGNATIONS^(a)

<u>Adsorbent</u>	<u>Impregnant</u>	<u>Pollutant</u>	<u>Action</u>
Activated carbon	Bromine	Ethylene; other alkenes	Conversion to dibromide, which remains on carbon
	Lead acetate	H ₂ S	Conversion to PbS
	Phosphoric acid	NH ₃ ; amines	Neutralization
	Sodium silicate	HF	Conversion to fluorosilicates
	Iodine	Mercury	Conversion to HgI ₂
	Sulfur	Mercury	Conversion to HgS
	Sodium sulfite	Formaldehyde	Conversion to addition product
	Sodium carbonate or bicarbonate	Acidic vapors	Neutralization
	Oxides of Cu, Cr, V, etc.; noble metals (Pd, Pt)	Oxidizable gases, including reduced sulfur compounds such as H ₂ S, COS, and mercaptans	Catalysis of air oxidation
Activated alumina	Potassium permanganate	Easily oxidizable gases, especially formaldehyde	Oxidation
	Sodium carbonate or bicarbonate	Acidic gases	Neutralization

^(a) Reprinted with permission from Turk.

HIGH TEMPERATURE OXIDATION⁷

High temperature oxidation is an air pollution control process in which odorous waste organic gases or organic particles are converted to odorless gaseous products, such as carbon dioxide and water vapor. The odors are destroyed by exposure of the waste gases to the proper conditions of temperature, time, and turbulence in the presence of air in a combustion chamber. The temperature required depends on the specific contaminants involved and the design configuration of the equipment used. This method will completely destroy the odors in the waste gases at some temperature if the control equipment has been properly designed.

Oxidation temperatures range mainly from about 600 to 1,500°F (about 315 to 815°C). Residence times can range from less than a second to about 2 s. Turbulence (on the basis of a calculated average velocity at the outlet from the combustion chamber) can be as high as about 30 ft/s (9.1 m/s) at oxidation temperature.

Some odorous inorganic combustibles - such as hydrogen sulfide, ammonia, and cyanides - can be destroyed by high temperature oxidation, but there is a limit on the concentration of inorganic combustibles in the waste gas stream that can be satisfactorily controlled, because these substances are converted by oxidation to their oxides, which can be objectionable themselves at high concentrations.

Odor problems that ordinarily cannot be satisfactorily controlled by high temperature oxidation alone are those in which the waste gases contain halogen compounds or compounds (such as phosphates) that form objectionable oxides or acids. When odorous waste gases containing halogens are oxidized,

the reaction products include free halogens (fluorine, chlorine, bromine, or iodine), halogen acids, phosgene, etc., all of which are toxic or corrosive and must be removed by chemical scrubbing before discharge to the atmosphere. In the case of phosphates, the treated gases contain phosphorus oxides or acids, which are toxic and also have to be removed.

Several methods of high temperature oxidation are applicable to controlling odorous waste gases in which contaminants are present in concentrations below the LEL: direct-flame oxidation, catalytic oxidation, and use as the combustion air supply for any plant combustion equipment, such as boilers and air heaters. The maximal concentration of odorous waste gases processed in high temperature oxidation equipment is usually limited, by insurance underwriters, to 25% of the LEL, to eliminate fire hazards. This limitation ensures that the vapor-air mixture being oxidized will not ignite when exposed to a spark or flame. In some cases with continuous monitoring equipment, concentrations as high as 40 or 50% of the LEL are permitted. In most instances of odor nuisance, the concentration of the contaminating vapors is well below 25% of the LEL - and in many cases, as low as a few parts per million by volume.

In direct-flame oxidation, the odorous emission in concentrations well below the LEL is completely oxidized to nonodorous gases, such as carbon dioxide and water vapor, by exposure to temperatures of 900-1,600°F (480-815°C) in the presence of a flame. The temperature required to do an effective job depends on the specific pollutants involved and the design of the combustion chamber. It has been shown that temperatures of 900-1600°F, velocities of 15-30 ft/s (4.6-9.1 m/s), and residence times (including flame contact time) of 0.25-0.60 s give satisfactory cleanup.

In catalytic oxidation, the presence of a catalyst allows high temperature oxidation to take place at a lower temperature and in the absence of a flame. However, a burner is usually required to heat the odorous waste gases to the required temperatures, and the gases are partially oxidized before they reach the catalyst. In catalyst systems, the type of catalyst, the oxidation temperature, the velocity through the bed, and the amount of catalyst are important variables that affect efficiency. Platinum and mixed noble-metal catalysts have been used predominantly in catalytic oxidation equipment for the control of industrial air pollutants. The catalyst does not participate in the reaction. Although the precise mechanism of heterogeneous catalytic oxidation is not well understood, there is general agreement that it proceeds through three necessary steps (and in this order): adsorption on the active surface, chemical reaction (oxidation on surface), and desorption of the reaction products.

The oxidation temperature for a catalyst system is the average temperature of the gases leaving the catalyst bed and ranges from about 600°F to 1,200°F (about 315°C to 650°C). There is a temperature rise across the bed that depends on the amount of the contaminant that is oxidized.

The major problems with catalyst systems are the difficulty in obtaining uniform flow and uniform temperature distribution and the susceptibility of catalysts to deterioration due to poisoning, suppression, and fouling (Table 2), or due to attrition. Another concern is that catalytic condition is difficult to monitor, compared with the ease of monitoring temperature only in a direct-flame oxidation system. Any high temperature

TABLE 2⁷

TYPICAL POISONS, SUPPRESSANTS, AND FOULING AGENTS THAT AFFECT
CATALYSTS OF THE PLATINUM-GROUP METALS

Type of Agent

Poison

Heavy metals

Phosphates

Arsenic

Suppressant

Halogens (both as elements
and in compounds)

Sulfur compounds

Fouling Agent

Inorganic particles

Alumina and silica dust

Iron oxides

Silicones

oxidation system that operates inefficiently for any reason will yield intermediate oxidation products, such as pungent aldehydes and acrylates and burnt odors. With direct-flame oxidation, once the temperature for proper oxidation has been determined in a field test, maintenance of that temperature should ensure proper operation of the system. That is not true for a catalyst system, because higher operating temperatures are required as the catalyst deteriorates.

COSTS

The costs of odor control systems vary with application and depend on a number of factors such as, volume of gas, size of equipment, odorant composition and concentration, and degree of control required. Consequently, the comparative costs of the various control techniques presented in Table 3 are to be taken only as broad guidelines not definitive estimates.

Operating costs are highly variable and are very much site specific. Scrubbers handling 20,000 cfm will have energy costs for fans, etc. of approximately \$4,000 per year based on a rate of \$0.015 per kw hour. A stack of 100 feet in height will have similar energy operating costs.

Chemical costs for a two stage scrubber using dilute sulfuric and dilute caustic with chlorine injection upstream would be approximately equal to another \$4,000 per year for a 20,000 cfm system.

Operating costs for carbon systems are highly variable as shown in Table 4.

TABLE 3

COMPARATIVE CAPITAL COSTS OF ENGINEERING ODOR CONTROL METHODS

Method	Type of System	Approximate Capital Cost
Stack Dispersion	50 foot guyed stack Small diameter	\$7,000
	100 foot guyed stack	\$13,000
	200 foot self-supporting	\$250,000
	300 foot self-supporting	\$400,000
Absorption	FRP scrubber only fans, pumps, piping, etc.	\$1.3 to 3.0 \$/cfm
		\$2.5 to 3.5 \$/cfm
Adsorption	Dual bed regenerable Thin bed adsorber	\$10-15/cfm
		\$4-7/cfm
High Temperature Oxidation	Direct Flame - with heat recovery	\$10-25/cfm
	Catalytic - with heat recovery	\$10-30/cfm

TABLE 4⁶

**COMPONENTS OF ANNUALIZED COSTS (SAVINGS) FOR ADSORPTION
AND ADSORPTION-INCINERATION SYSTEMS(a)**

Configuration:	1. Dual fixed-bed absorber operating at 100°F (38°C) 2. Solvent recovery with condenser and decanter	1. Dual fixed-bed adsorber operating at 100°F (38°C) 2. Thermal incineration with primary heat recovery
Gas-stream characteristics:		
Flow	20,000 scfm	20,000 scfm
Concentration	25% LEL	25% LEL
Process-gas temperature	170°F (77°C)	375°F (191°C)
Direct operating costs:		
Utilities	\$48,700 ^(b)	70,200 ^(b)
Direct labor	3,000 ^(c)	3,000 ^(c)
Maintenance	15,400 ^(d)	18,400 ^(d)
Carbon replacement	11,500 ^(e)	11,500 ^(e)
Capital charges:	80,850 ^(f)	96,500 ^(f)
Recovery (credits):	(333,400) ^(g)	--
Total net annualized costs (credits):	(173,950) ^(h)	199,600

(a) Derived from Radian Corporation.

(b) Cooling water at \$0.045/1,000 gal., steam at \$2/1,000 lb., electricity at

(c) Labor at \$8.25/h.

(d) Maintenance as 4% of the capital cost.

(e) Carbon at \$0.72/lb., with 20% of carbon replenished each year.

(f) Capital charges included as percent of capital cost: depreciation, 12%; taxes, insurance, and overhead, 4%; interest, 5%.

(g) Benzene credited at \$0.90/gal., hexane at \$0.50 gal.

(h) Net costs calculated as capital charges + direct operating costs - recovery credits.

Annualized costs for catalytic oxidizers are shown in Table 5. For low pollutant concentrations of 100 ppm or less, operating costs for a 20,000 cfm direct-flame system with heat recovery is approximately \$180,000/yr. This means that controlling odor sources by high temperature oxidation can become prohibitively expensive.

In summation, the most cost-effective way to solve odor problems is to prevent them by proper siting and process design, and by good maintenance and housekeeping practices. Atmospheric dispersion may be used as a means of odor control, especially to prevent entrainment of exhaust in building wake. When required stack height exceeds approximately 150 feet, other control methods become comparably cost-effective.

In choosing between absorption (scrubbing), adsorption or thermal oxidation, consideration must be given to degree of control required, type and concentration of odorants. In all cases volume of air to be treated should be minimized. Scrubbing will usually involve lower capital costs than either adsorption or thermal oxidation, but may require higher operating or maintenance costs.

TABLE 5⁷TYPICAL COMPONENTS OF ANNUALIZED COSTS OF CATALYTIC AFTERBURNERS^(a)

Gas-stream characteristics:

Flow	15,000 scfm (7 m ³ /s)
Concentration	15% LEL
Inlet temperature	300°F (150°C)

Direct operating costs:

Utilities	\$20,000 ^(b)
Direct labor	3,000 ^(c)
Maintenance	7,800 ^(d)
Annualized catalyst replacement	19,800 ^(e)

Capital charges:

41,000^(f)

Total:

\$91,600

(a) Reprinted with permission from Hirt Combustion Engineers.

(b) Fuel at \$1.56/GJ (\$1.65/10⁶ Btu), electricity at \$9.17/GJ (\$0.033/kWh).

(c) Labor at \$8.25/man-hour.

(d) Maintenance as percentage of capital cost: 4%.

(e) Catalyst life of 3 yrs.

(f) Capital charges include as percentages of capital cost: depreciation, 13%; and taxes, insurance, and administrative overhead, 4%.

REFERENCES

1. J. E. Yocom and R. A. Duffee, "Controlling Industrial Odors," *Chemical Engineering*, 77:160-168, 1970.
2. National Research Council Committee on Odors From Stationary and Mobile Sources, "Odors From Stationary and Mobile Sources," pp. 179-242, 1979.
3. D. R. Murray, S. S. Cha and N. E. Bowne, "Use of a Fluctuating Plume Puff Model for Prediction of the Impact of Odorous Emissions," Preprint No. 78-68:8, 71st Annual Meeting, Air Pollution Control Association, Houston, Texas, June, 1978.
4. M. W. First, "Odors From Stationary and Mobile Sources," pg. 211, 1979.
5. A. Turk, "Adsorption", pp. 329-363. In. A. C. Stern, Ed. *Air Pollution*, 3rd Ed. Vol. IV, Engineering Control of Air Pollution, N.Y. Academic Press, 1977.
6. A. Turk, "Odors From Stationary and Mobile Sources," pp. 217-235, 1979.
7. D. Benforado, "Odors From Stationary and Mobile Sources," pp. 181-201.