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

3. Article Addressed to:	4. Article Number
Mr. Garrett Sloan, Director Miami-Dade Water and Sewer Auth. Post Office Box 330316 Miami, FL 33233-0316	P 274 007 558
	Type of Service: ☐ Registered ☐ Insured ☒ Certified ☐ COD ☐ Express Mail ☐ Return Receipt for Merchandise
	Always obtain signature of addressee or agent and DATE DELIVERED.
5. Signature — Address X R Roenings	8. Addressee's Address *(ONLY if requested and fee paid)*
6. Signature — Agent X	
7. Date of Delivery 1 23 89	

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

P 274 007 558

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

Sent to Mr. Garrett Sloan, MDW&SA	
Street and No. P.O. Box 330316	
P.O., State and ZIP Code Miami, FL 33233-0316	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Mailed: 1-20-89 Permit: AC 13-147823 AC 13-147824	

PS Form 3800, June 1985 * U.S.G.P.O. 1985-480-794

Florida Department of Environmental Regulation

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

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

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMIT

Mr. Garrett Sloan, Director
Miami-Dade Water and Sewer Authority Dept.
Post Office Box 330316
Miami, Florida 33233-0316

January 18, 1989

Enclosed are permit Nos. AC 13-147823 and AC 13-147824 for Miami-Dade Water and Sewer Authority Department to construct 64 air stripping towers at the Hialeah and Preston Water Treatment Plants in Dade County, Florida. These permits are issued pursuant to Section 403, Florida Statutes.

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

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

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

Copy furnished to:

R. A. Cuevas, P.E.
R. Fergen
F. Echanique
S. Brooks, SE District
P. Wong, DERM
J. Gentry, DER

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on Jan. 20, 1989.

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

C. Hutchinson — Clerk

1-20-89 — Date

Final Determination

Miami-Dade Water & Sewer Authority Department
Dade County

Hialeah Water Treatment Plant Air Stripping Facility
Permit No. AC 13-147823

Preston Water Treatment Plant Air Stripping Facility
Permit No. AC 13-147824

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

January 17, 1989

Final Determination

Miami-Dade Water and Sewer Authority Department's application for a permit to construct/install air stripping facilities at their Hialeah and Preston Water Treatment Plants in Dade County, Florida, has reviewed by the Bureau of Air Quality Management.

Public Notice of the Department's Intent to Issue the construction permit was published in the Miami Herald on September 19, 1988.

Copies of the Preliminary Determination have been available for public inspection at the Department's Southeast Florida District office, the Dade County Department of Environmental Resources Management and the Department's Bureau of Air Quality Management in Tallahassee.

No comments were received during the public notice period.

The final action of the Department will be to issue the permit as noticed during the public notice period.

Florida Department of Environmental Regulation

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

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

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.
P. O. Box 330316
Miami, FL 33233-0316

Permit Number: AC 13-147823
Expiration Date: Nov. 30, 1990
County: Dade
Latitude/Longitude: 25° 49' 50" N
80° 17' 14" W
Project: Hialeah Air Stripping Towers

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

For the construction of 20 air stripping units to be located at 700 West 2nd Avenue in Hialeah, Dade County, Florida. The UTM coordinates are 71,510 M east and 56,580 M north.

Construction shall be in accordance with the permit application, plans, documents, amendments, and drawings submitted, except as noted in the General Conditions and the Specific Conditions.

Attachments:

1. Application to Operate/Construct Air Pollution Sources, DER Form 17-1.202(1) dated April 6, 1988.
2. Department's letters dated May 5 and June 29, 1988.
3. Miami-Dade Water and Sewer Authority Department's letters of June 7 and July 7, 1988.

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147823
Expiration Date: November 30, 1990

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147823
Expiration Date: November 30, 1990

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. This facility shall be allowed to operate continuously, 168 hours/week.

2. The acceptable ambient concentration levels (AAC) and the emission rates listed in the following (Table 1) for each pollutant shall not be exceeded. The actual ambient air impact shall be based on the calculated emissions and the PTPLU Model results.

PERMITTEE:
Miami-Dade Water and Sewer Authority Dept.

Permit Number: AC 13-147823
Expiration Date: November 30, 1990

SPECIFIC CONDITIONS:

Table 1
Contamination, Acceptable Ambient Concentrations, and Emissions

	Max. Concentration in Raw Water (ppb)		Acceptable Ambient Concentration (mg/m^3)	Hialeah & Preston Combined @ 194 MGD (tons/year)
1,1,2,2, Tetrachloroethane	20	24hr	0.017 ✓	0.0384
1,1, Dichloroethane	22.3	1944µg	0.019 1.9	0.7676
Vinyl Chloride	28	31.2	0.024 ✓	0.9506
Vinylidene Chloride	56	417.6	0.048 ✓	
1,1 Dichloroethylene				0.1270
Methylene Chloride	294		0.25 .42	0.0768
1,2 Dichloroethene 1,2 Dichloroethylene	2,214	1903	1.88 ✓	5.2260
Trichloroethylene	756		0.64	0.7382
Chlorobenzene	980	828	0.83 ✓	0.2480
o-chlorotoluene	700	621.6	0.59 ✓	0.2805
p-Dichlorobenzene	1,260	1082.4	1.07 ✓	0.2480
o-Dichlorobenzene	840	~~1082.4~~ 722.4	0.71 ✓	0.1920
Trichloromethane (chloroform)	140	117.6	0.12 ✓	8.6668
Dichlorobromomethane	144	?	0.1223	1.7045
Chlorodibromomethane	255	?	0.2174	0.7598
Tribromomethane	14	?	0.012	0.5491
Total VOCs and Trihalomethane (THM)				20.5731

3. The concentration in the raw water feeding the stripping tower shall not exceed the value listed in Table 1.

4. This facility is allowed to perform the chloramine process continuously. The breakpoint chlorination process shall not be performed for more than 2 weeks in a calendar year.

5. In accordance with FAC Rule 17-2.620(2), no person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor.

6. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, the Department must be notified in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit, (Rule 17-2, FAC).

7. To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with compliance test results and Certificate of Completion, to the Department's Southeast Florida District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate (Rules 17-2 and 17-4, FAC).

8. If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application (Rule 17-4, FAC).

9. Upon obtaining an operating permit, the permittee will be required to submit quarterly reports on the actual operation of these air stripping towers. These reports shall include but are not limited to the following: influent concentration (ppb), effluent concentration (ppb), stripping factor, maximum influent flowrate (GPM), maximum air flow rate (CFM), calculated ambient air impact concentrations, etc. These reports shall be sent to the Department's Southeast Florida Distict office.

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147823
Expiration Date: November 30, 1990

SPECIFIC CONDITIONS:

10. This facility shall comply with all applicable provisions under Florida Statutes Chapter 403 and Department Rules Chapter 17-2 and 17-4, Florida Administrative Code.

Issued this 17 day of Jan, 1989

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

Dale Twachtmann, Secretary

Florida Department of Environmental Regulation

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

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

PERMITTEE:
Miami-Dade Water and Sewer Authority Dept.
P. O. Box 330316
Miami, FL 33233-0316

Permit Number: AC 13-147824
Expiration Date: Nov. 30, 1990
County: Dade
Latitude/Longitude: 25° 49' 50" N
80° 17' 14" W
Project: Preston Water Treatment Plant

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

For the construction of 44 air stripping units to be located at 1100 West 2nd Avenue Preston Water Treatment Plant in Hialeah, Dade County, Florida. The UTM coordinates are 71,510 M east and 56,580 M north.

Construction shall be in accordance with the permit application and plan, documents, amendments, and drawings submitted, except as noted in the General Conditions and the Specific Conditions.

Attachments:

1. Application to Operate/Construct Air Pollution Sources, DER Form 17-1.202(1) dated April 6, 1988.
2. Department's letters dated May 5 and June 29, 1988.
3. Miami-Dade Water and Sewer Authority Department's letters of June 7 and July 7, 1988.

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147824
Expiration Date: November 30, 1990

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147824
Expiration Date: November 30, 1990

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. This facility shall be allowed to operate continuously, 168 hours/week.

2. The acceptable ambient concentration levels (AAC) and the emission rates listed in the following (Table 1) for each pollutant shall not be exceeded. The actual ambient air impact shall be based on the calculated emissions and the PTPLU Model results.

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147824
Expiration Date: November 30, 1990

SPECIFIC CONDITIONS:

Table 1
Contamination, Acceptable Ambient Concentrations, and Emissions

	Max. Concentration in Raw Water (ppb)	Acceptable Ambient Concentration (mg/m^3)	Hialeah & Preston Combined @ 194 MGD (tons/year)
1,1,2,2, Tetrachloroethane	20	0.017	0.0384
1,1, Dichloroethane	22.3	0.019	0.7676
Vinyl Chloride	28	0.024	0.9506
Vinylidene Chloride	56	0.048	
1,1 Dichloroethylene			0.1270
Methylene Chloride	294	0.25	0.0768
1,2 Dichloroethene 1,2 Dichloroethylene	2,214	1.88	5.2260
Trichloroethylene	756	0.64	0.7382
Chlorobenzene	980	0.83	0.2480
o-chlorotoluene	700	0.59	0.2805
p-Dichlorobenzene	1,260	1.07	0.2480
o-Dichlorobenzene	840	0.71	0.1920
Trichloromethane (chloroform)	140	0.12	8.6668
Dichlorobromomethane	144	0.1223	1.7045
Chlorodibromomethane	255	0.2174	0.7598
Tribromomethane	14	0.012	0.5491
Total VOCs and Trihalomethane (THM)			20.5731

3. The concentration in the raw water feeding the stripping tower shall not exceed the value listed in Table 1.

4. This facility is allowed to perform the chloramine process continuously. The breakpoint chlorination process shall not be performed for more than 2 weeks in a calendar year.

5. In accordance with FAC Rule 17-2.620(2), no person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor.

6. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, the Department must be notified in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit, (Rule 17-2, FAC).

7. To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with compliance test results and Certificate of Completion, to the Department's Southeast Florida District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate (Rules 17-2 and 17-4, FAC).

8. If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application (Rule 17-4, FAC).

9. Upon obtaining an operating permit, the permittee will be required to submit quarterly reports on the actual operation of these air stripping towers. These reports shall include but are not limited to the following: influent concentration (ppb), effluent concentration (ppb), stripping factor, maximum influent flowrate (GPM), maximum air flow rate (CFM), calculated ambient air impact concentrations, etc. These reports shall be sent to the Department's Southeast Florida Distict office.

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147824
Expiration Date: November 30, 1990

SPECIFIC CONDITIONS:

10. This facility shall comply with all applicable provisions under Florida Statutes Chapter 403 and Department Rules Chapter 17-2 and 17-4, Florida Administrative Code.

Issued this 17 day of July, 1989

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

Dale Twachtmann, Secretary

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

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

Interoffice Memorandum

TO: Dale Twachtmann

FROM: Steve Smallwood

SUBJ: Approval of Construction Permits
Miami-Dade Water & Sewer Authority Department
AC 13-147823 and AC 13-147824

DATE: January 18, 1989

Attached for your approval and signature are two permits prepared by Central Air Permitting for Miami-Dade Water and Sewer Authority to install air stripping facilities at their Hialeah and Preston Water Treatment Plants in Dade County.

No comments were received during the public notice period.

Day 90, after which these permits will be issued by default, is February 26, 1989

I recommend your approval and signature.

SS/TH/s

attachments

24H/ASP/memo

TO: Clair Fancy

THRU: Bill Thomas

FROM: Teresa Heron

DATE: September 1, 1988

SUBJ: Air Stripping Project
Miami Dade Water & Sewer Authority

From: Files

what is the averaging time for the "AAC"?
24 hrs

The attached preliminary determination was written on the basis that the acceptable ambient concentrations (AAC) for all volatile organic compound (VOC) including trihalomethanes (THMs) will not be exceeded. However, there exists the possibility that the applicable AAC for THMs specified in the draft permit will be exceeded during a two week period because a breakpoint chlorination process will be performed during this time period. The breakpoint chlorination process forms approximately 16 times the concentration of THMs that is formed by the common practiced method for chloramine desinfection.

(the 8 hr and 24 hr averaging time)

Background Information

Natural and synthetic organic chemicals are present in the Hialeah and Preston Wellfields. The Biscayne aquifer is very permeable. It has a very limited capacity to atenuate or degrade to harmless substances many of these chemicals if they are discharged to ~~the~~ ground water. The natural organics present in the water supplies are presumed to have no human health significance except for their potential to form THMs during water treatment. THMs are formed in all water supplies in the county

as a result of reactions between naturally occuring organic substances in the groundwater and the chlorine that is added in the treatment process. Because natural organics are present in the ground water at much higher concentrations than the synthetic chemicals in the affected wellfields, the carbon filters lose their effectiveness very quickly, thereby greatly escalating maintenance costs.

why? or the sqw theim?

Saturated with natural organic

Cost

The attached tables show a cost comparison between the different control technologies available. EPA's document No. 450/3-87-017, August, 1987, "Air Stripping of Contaminated Water Soruces - Air Emissions and Control."

Another article from the Journal of the Air Pollution Control Association, entitled "Treatment of Contaminated Groundwaters with Granular Activated Carbon (GAC) and Air Stripping" by Mark H. Stenzel estimates the capital cost of adding GAC to an air stripper at between $30-50 per CFM.

Since we do not currently have air toxics regulations and the guidelines that we have are based only on Department's policies, the bureau recommends the following alternatives to justify the exceedances of the AAC.

1) Use of monochloramine during the breakpoint chlorination as an alternative disinfectant instead of free chlorine.

I don't feel Air Program should be involved in this. why not? JP

2) Calculate the threshold limit value (TLV) for the mixture of THMs instead of each compound separately.

Good idea

John says the AAC safety factors will protect against the potential additive effects. what does JFG think about that?

3) Evaluate the two field locations as two separate emission sources.

Yes How far apart are they?

4) Schedule the breakpoint chlorination process for each facility at different times of the year.

Good possibility

Is this practical?

5) Consider ~~365 day rolling average~~ (AAC) for ~~trichloromethane (cloroform)~~ trihalomethanes. ~~Allow an instantaneous emission rate approximately equal to mg/m^3 for THMs.~~

24 hours averaging period (AAC)

may be

to what?

The Bureau feels that it is better from the overall environmental standpoint, to allow a two week period exceedance of the AAC for THMs in a ~~365 day rolling~~ 24 hour average that to allow a known unacceptable concentration of THMs in the drinking water. It is estimated that, the concentration of carcinogens in the Preston Wellfield water supply can be reduced from 58 ppb to 5 ppb by air stripping and human health risk can be reduced from approximately 333 to 3 predicted cancer incidents per one million persons by this treatment. On the other hand, the acceptable ambient levels are not rigorously determined thresholds for human health

what is the risk at exposure estimate?

Good reason from an overall environmental viewpoint

are the drinking water values any better

and studies are more extensive than anticipated

efects. They are used in the conjunction with other factor to assess the adequacy of proposed emission control. For these facility additional control was not deemed necessary to protect the health of the community. (Please see air quality analysis)

↑ why?

AAC will not be needed

TH/ks

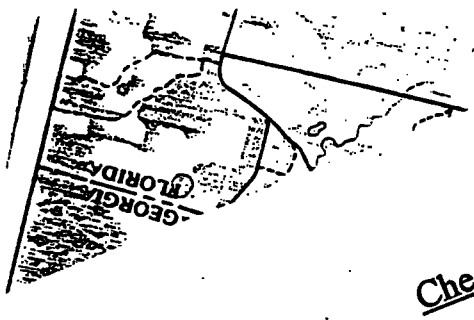
Clair: The concentrations in the water that are in the draft permit are too stringent. After the meeting with Barry, John, Tom, we concluded that it is o.k to accept the proposed concentration in the water. I will have to change table 1 and specific condition No 2 for the final determination.

Tom Rogers, who evaluated the modeling for this project can give you more details about his analysis.

Clair - ~~From~~ a policy point of view it makes sense to allow short term higher emissions ① If they do not cause an acute toxicity problem ② The overall risk from air exposure is clearly less than the risk from drinking the water

6-19-88

- Tom is going to load chemical that will need N A C during the 2 weeks,
- He modified work can all chemical for 2 weeks.
- His emergency time was 8 hours.
- Tom is going to change 24 hrs the one Tina was exceeded this would indicate they could or could not process during the break chromatogram through



Check Sheet

Company Name: Miami-Dade Water & Sewer Authority
Permit Number: AC 13-147823, -147824
PSD Number:
Permit Engineer:

Cross References:
- ☐
- ☐
- ☐

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

Revision #5

- Critical

High TTHM case – chloroform exceed 140 ppb

originally → AC permit ~ [3 ppm] ⟸

JG testing → actual recorded values lower than predicted!

- Process Change to go to Breakpoint Chlor → (how long)
  - < 100 ppb – to deal with use Chloramines –
    limited time free Chlorine
  - Constraints → finicky operations;

> bottom line: Conclusions –

- continue to meet < 40 TTHM
  AA – as measured by Mor
- continue to meet Water Qual stds.

1. address cond in air permit
   - → open chlorine
   - → VOC em. influence to air stripping columns

→ Tests → minor process changes to provide flexibility

[Over time between Cl & THM application]

CH2M Hill

Dade [redacted] Rep.

- Water crisis → Changes in method of treating water
- Largest Utility 350 X 10^6 MGD → 3 ST Plants
- Hialeah + Preston - Air Strippers (2.5 PPM // Air stripping not the norm)

Wells → Biscayne Aq —

[Newest of Wells NW Dade More Color —

- Way water Mgt delivery — holding — decaying → Pumping — 3 fold Col 110 PCU → ICR tea
- Hard time correcting color

→

Conditions → Chloramination → 2 wks/yr — Break

limiting 140 ppb VOC TTHM's

5/6/14
CH2MHill
Conf
1:30
SS
by
Phone
CA

JS

- All Cond IN Ac are valid cond
- to change → req Ac Per Rev ↓ Tolf.
- AO MUST agree W/Ac
- IF Complete INfo → rev ± 30 Days.
- Burden on ~~Permittee~~ owner to Make case for Rev.
- John/Chris — modeling req'd
- Will try to Meticulously & Professionally review
- Must Protect against Hentle Impacts
  -
  -
- CAn promise Nothing UNTil we review data.

Preston $\mu s/m^3 / \mu g/s\text{-}m^2$

Max Annual .03307 (250, 270)

Max 1-hr 2.00448 (95, 339.5)

Max 8-hr .61431 (95, 315)

MAX 24-hr .23032 (250, 270)

Preston - area size: 4,199 m^2 (44 towers)

	E ($\mu g/m^2 \cdot s$)	Max 24-hour	Max 8-hr (mg/m^3)	
1,1,2,2-Tetrachloroethane	5.826		.00358	
1,1-Dichloroethane	105.835		.065-02	
Vinyl Chloride	152.570	.03514	.09373	✓
1,1-Dichloroethylene	42.439		.02607	
Methylene Chloride	12.365		.00760	
Trichloromethane	385.616	.08882	.23689	✓
Dichlorobromomethane	67.902		.04171	
Chlorodibromomethane	23.053		.01416	
Tribromomethane	6.067		.00373	

MDWS ~~Rt. Skippers~~ Hialeah

$\mu g/m^2 / \mu g/s\text{-}m^2$

Max Ann .00718

Max 1-hr .62462 @ (100, 67.5)

Max 8-hr .15144 @ (75, 315)

MAX 24-hr .05521 @ (250, 270)

Hialeah - area size 905.5 m^2 (20 towers)

	E ($\mu g/s\text{-}m^2$)	Max 24-hour	Max 8-hr (mg/m^2)	
1,1,2,2 Tetrachloroethane	12.280		.00186	
1,1, Dichloroethane	223.080		.03378	
Vinyl Chloride	321.600	.01775	.04870	✓
1,1-Dichloroethylene	89.460		.01355	
Methylene Chloride	26.060		.00395	
Trichloromethane	812.820	.04488	.12309	✓
Dichlorobromomethane	143.120		.02167	
Chlorodibromomethane	48.600		.00736	
Tribromomethane	12.780		.00194	

Miami Dade Water and Sewer

4 12 14 24 30 34 56 58 60
4 1 1 1 1 1 2 2 2

6 12 18
1 7 16

10 20 30 40 50 60 70
50. 75. 100. 125. 150 250. 400.

10 20
22.5 22.5

10
7.0

5

1

1

1

1

1

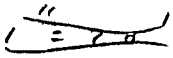
44
12839 86 12839 86 27. 0.2 4.27
5 6 18 25 32 44 50 56 62
10 2 1.0 -15.0 -15.0 14.4 350

.000000

Preston → -32.4 -32.4 64.8

$\frac{15}{8} \times \frac{15}{8}$ $1'' = 30'$

$56.25' \times 56.25' = 3,164.06\ ft^2 = 294\ m^2$

$\frac{17}{8} \times \frac{15}{8}$  $\frac{17}{32}'' = 20' \Rightarrow 1'' = 37.65'$

$80' \times 70.6' = 5,647.5\ ft^2 = 525\ m^2$

Preston

$1.35\ cm = 20'$

$H = 14.4\ m$

$T = 299\ K$

$V = 0.2\ m/s$

$d = 4.27\ m$

$\varepsilon = 1$

14.1×14.5

$209' \times 215' = 44,935\ ft^2$

$68.7\ m \times 65.5 = 4,172\ m^2$

Hicleh

$2.52\ cm = 30'$

8.1×8.5

$96.4' \times 101.2' = 9,756\ ft^2$

$29.4\ m \times 30.8 = 905.5\ m^2$

2.95×10^{-3} @ $25\ m$

$\varepsilon = 19/5\ m^2$

AIR STRIPPING EVALUATION WORKSHEET

Contaminant Name	Previously Submitted Max. Conc. (ppb)	Average Concentrations Maximum Use of Contaminated Wells: Chloramine Disinfection (ppb)	Average Concentrations Maximum Use of Contaminated Wells: Breakpoint Chlorination (ppb)	Annual Emission Rate - Proposed Operation - Maximum Use of Contaminated: Hialeah Plant @ 52 MGD (Tons/Yr.) 20 Towers	Annual Emission Rate - Proposed Operation - Maximum Use of Contaminated: Preston Plant @ 142 MGD (Tons/Yr.) 44 Towers	Annual Emission Rate - Proposed Operation - Maximum Use of Contaminated: Hialeah & Combined @ 194 MGD (Tons/Yr.)
olatile Organic Compounds (VOC's)						
1. 1,1,2,2 Tetrachloroethane	3.0	0.13	0.13	0.0103	0.0281	0.0384
2. 1,1 Dichloroethane	51.0	2.60	2.60	0.2058	0.5618	0.7676
3. Vinyl Chloride	74.7	3.22	3.22	0.2548	0.6958	0.9506
4. 1,1 Dichlorethylene	20.7	0.43	10.43	0.0340	0.0930	0.1270
5. Methylene Chloride	6.0	0.26	0.26	0.0206	0.0562	0.0768
6. 1,2 Dichloroethene	NA	17.70	17.70	1.4010	3.8250	5.2260
7. Trichloroethylene	NA	2.50	2.50	0.1979	0.5403	0.7382
8. Chlorobenzene	NA	0.84	0.84	0.0665	0.1815	0.2480
9. O,M,P Chlorotoluene		0.95	0.95	0.0752	0.2053	0.2805
0. Dichlorobenzene	NA	0.65	0.65	0.0515	0.1405	0.1920
1. M,P Dichlorobenzene	NA	0.84	0.84	0.0665	0.1815	0.2480
rihalomethanes (THM's)						
2. Trichloromethane	300.0	18.55	300.00	2.3225	6.3443	8.6668
3. Dichlorobromomethane	59.0	3.65	59.00	0.4568	1.2477	1.7045
4. Chlorodibromomethane	26.3	1.63	26.30	0.2036	0.5562	0.7598
5. Tribromomethane	19.0	1.17	19.00	0.1471	0.4018	0.5491
TOTAL VOC		30.12	30.12	2.3841	6.5090	8.8931
TOTAL THM		25.00	404.30	3.1300	8.5500	11.6800
TOTAL VOC & THM		55.12	434.42	5.5141	15.0590	20.5731

ISCST (DATED 88207)
AN AIR QUALITY DISPERSION MODEL IN
SECTION 1. GUIDELINE MODELS
IN UNAMAP (VERSION 6) JUN. 88.
SOURCE: FILE 6 ON UNAMAP MAGNETIC TAPE FROM NTIS.

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

CALCULATE (CONCENTRATION=1,DEPOSITION=2)	ISW(1) = 1
RECEPTOR GRID SYSTEM (RECTANGULAR=1 OR 3, POLAR=2 OR 4)	ISW(2) = 4
DISCRETE RECEPTOR SYSTEM (RECTANGULAR=1,POLAR=2)	ISW(3) = 1
TERRAIN ELEVATIONS ARE READ (YES=1,NO=0)	ISW(4) = 0
CALCULATIONS ARE WRITTEN TO TAPE (YES=1,NO=0)	ISW(5) = 0
LIST ALL INPUT DATA (NO=0,YES=1,MET DATA ALSO=2)	ISW(6) = 1
COMPUTE AVERAGE CONCENTRATION (OR TOTAL DEPOSITION)	
WITH THE FOLLOWING TIME PERIODS:	
HOURLY (YES=1,NO=0)	ISW(7) = 1
2-HOUR (YES=1,NO=0)	ISW(8) = 0
3-HOUR (YES=1,NO=0)	ISW(9) = 0
4-HOUR (YES=1,NO=0)	ISW(10) = 0
6-HOUR (YES=1,NO=0)	ISW(11) = 0
8-HOUR (YES=1,NO=0)	ISW(12) = 1
12-HOUR (YES=1,NO=0)	ISW(13) = 0
24-HOUR (YES=1,NO=0)	ISW(14) = 1
PRINT 'N'-DAY TABLE(S) (YES=1,NO=0)	ISW(15) = 1
PRINT THE FOLLOWING TYPES OF TABLES WHOSE TIME PERIODS ARE	
SPECIFIED BY ISW(7) THROUGH ISW(14):	
DAILY TABLES (YES=1,NO=0)	ISW(16) = 0
HIGHEST & SECOND HIGHEST TABLES (YES=1,NO=0)	ISW(17) = 1
MAXIMUM 50 TABLES (YES=1,NO=0)	ISW(18) = 0
METEOROLOGICAL DATA INPUT METHOD (PRE-PROCESSED=1,CARD=2)	ISW(19) = 1
RURAL-URBAN OPTION (RU.=0,UR. MODE 1=1,UR. MODE 2=2,UR. MODE 3=3)	ISW(20) = 0
WIND PROFILE EXPONENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(21) = 1
VERTICAL POT. TEMP. GRADIENT VALUES (DEFAULTS=1,USER ENTERS=2,3)	ISW(22) = 1
SCALE EMISSION RATES FOR ALL SOURCES (NO=0,YES)0)	ISW(23) = 0
PROGRAM CALCULATES FINAL PLUME RISE ONLY (YES=1,NO=2)	ISW(24) = 1
PROGRAM ADJUSTS ALL STACK HEIGHTS FOR DOWNWASH (YES=2,NO=1)	ISW(25) = 1
PROGRAM USES BUOYANCY INDUCED DISPERSION (YES=1,NO=2)	ISW(26) = 0
CONCENTRATIONS DURING CALM PERIODS SET = 0 (YES=1,NO=2)	ISW(27) = 0
REG. DEFAULT OPTION CHOSEN (YES=1,NO=2)	ISW(28) = 2
TYPE OF POLLUTANT TO BE MODELLED (1=SO2,2=OTHER)	ISW(29) = 2
DEBUG OPTION CHOSEN (YES=1,NO=2)	ISW(30) = 2
ABOVE GROUND (FLAGPOLE) RECEPTORS USED (YES=1,NO=0)	ISW(31) = 0
NUMBER OF INPUT SOURCES	NSOURC = 1
NUMBER OF SOURCE GROUPS (=0,ALL SOURCES)	NGROUP = 0
TIME PERIOD INTERVAL TO BE PRINTED (=0,ALL INTERVALS)	IPERD = 0
NUMBER OF X (RANGE) GRID VALUES	NXPNTS = 7
NUMBER OF Y (THETA) GRID VALUES	NYPNTS = 16
NUMBER OF DISCRETE RECEPTORS	NXWYPT = 0
SOURCE EMISSION RATE UNITS CONVERSION FACTOR	TK =.10000E+07
HEIGHT ABOVE GROUND AT WHICH WIND SPEED WAS MEASURED	ZR = 7.00 METERS
LOGICAL UNIT NUMBER OF METEOROLOGICAL DATA	IMET = 9
DECAY COEFFICIENT FOR PHYSICAL OR CHEMICAL DEPLETION	DECAY = .000000E+00
SURFACE STATION NO.	ISS = 12839
YEAR OF SURFACE DATA	ISY = 86
UPPER AIR STATION NO.	IUS = 12844

YEAR OF UPPER AIR DATA	IUY = 86
ALLOCATED DATA STORAGE	LIMIT = 43500 WORDS
REQUIRED DATA STORAGE FOR THIS PROBLEM RUN	MIMIT = 2326 WORDS

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

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

```
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1  1 1 1 1 1 0
```

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

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
B	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01	.70000E-01
C	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00	.10000E+00
D	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
E	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00	.35000E+00
F	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00	.55000E+00

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

STABILITY	WIND SPEED CATEGORY					
CATEGORY	1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

1

*** RANGES OF POLAR GRID SYSTEM ***
(METERS)

50.0, 75.0, 100.0, 125.0, 150.0, 250.0, 400.0,

*** RADIAL ANGLES OF POLAR GRID SYSTEM ***

(DEGREES)

22.5, 45.0, 67.5, 90.0, 112.5, 135.0, 157.5, 180.0, 202.5, 225.0,
247.5, 270.0, 292.5, 315.0, 337.5, 360.0,

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

*** SOURCE DATA ***

SOURCE NUMBER	TYPE	WAK	NUMBER PART. CATS.	EMISSION RATE TYPE=0,1 (GRAMS/SEC) TYPE=2 (GRAMS/SEC) *PER METER**2	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	HEIGHT (METERS)	TEMP. TYPE=0 (DEG.K); VERT.DIM TYPE=1 (METERS)	EXIT VEL. TYPE=0 (M/SEC); HORZ.DIM TYPE=1,2 (METERS)	DIAMETER TYPE=0 (METERS)	BLDG. HEIGHT TYPE=0 (METERS)	BLDG. LENGTH TYPE=0 (METERS)	BLDG. WIDTH TYPE=0 (METERS)
10	2	0	0	.10000E-05	-15.0	-15.0	.0	14.40	.00	30.00	.00	1.00	1.00	1.00

'N'-DAY
365 DAYS
SGROUP£ 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* 365-DAY AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .00718 AND OCCURRED AT (250.0, 270.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 50.0	75.0	100.0	125.0	150.0	250.0	400.0
360.0 /	.00105	.00193	.00244	.00272	.00285	.00265	.00201
337.5 /	.00158	.00310	.00400	.00450	.00474	.00434	.00310
315.0 /	.00166	.00341	.00447	.00502	.00523	.00462	.00326
292.5 /	.00131	.00290	.00396	.00461	.00495	.00471	.00335
270.0 /	.00110	.00262	.00401	.00523	.00618	.00718	.00573
247.5 /	.00078	.00186	.00288	.00378	.00446	.00508	.00394
225.0 /	.00054	.00113	.00162	.00206	.00240	.00274	.00218
202.5 /	.00047	.00102	.00136	.00158	.00172	.00177	.00145
180.0 /	.00043	.00106	.00166	.00222	.00266	.00324	.00290
157.5 /	.00074	.00166	.00245	.00315	.00371	.00452	.00418
135.0 /	.00080	.00149	.00192	.00224	.00246	.00260	.00216
112.5 /	.00066	.00129	.00167	.00191	.00205	.00207	.00176
90.0 /	.00047	.00083	.00103	.00115	.00121	.00118	.00097
67.5 /	.00046	.00085	.00106	.00119	.00127	.00129	.00111
45.0 /	.00058	.00107	.00133	.00145	.00148	.00132	.00106
22.5 /	.00077	.00135	.00164	.00178	.00184	.00179	.00154

1

HIGH
1-HR
SGROUP£ 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* HIGHEST 1-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *

* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .62462 AND OCCURRED AT (100.0, 67.5) *

DIRECTION / (DEGREES) /	RANGE (METERS) 50.0	75.0	100.0	125.0	150.0
360.0 /	.41730 (200,14)	.42125 (200,14)	.50885 (172,16)	.59066 (172,16)	.58696 (172,16)
337.5 /	.60340 (191,12)	.59917 (191,12)	.51755 (175, 9)	.60438 (175, 9)	.60288 (175, 9)
315.0 /	.55406 (108,11)	.53082 (108,11)	.50885 (157, 9)	.59066 (157, 9)	.58696 (157, 9)
292.5 /	.28590 (353,12)	.38780 (353,12)	.36275 (3,12)	.35886 (192, 9)	.35135 (192, 9)
270.0 /	.30961 (353,12)	.45083 (353,12)	.42007 (353,12)	.36300 (168,13)	.30404 (168,13)
247.5 /	.41670 (206,14)	.42036 (206,14)	.47472 (173,19)	.53828 (173,19)	.52703 (173,19)
225.0 /	.22163 (102,12)	.32017 (190, 9)	.51755 (165,18)	.60438 (165,18)	.60288 (165,18)
202.5 /	.35087 (306,10)	.59129 (306,10)	.58893 (306,10)	.51034 (306,10)	.42599 (306,10)
180.0 /	.35087 (177,10)	.59129 (177,10)	.58893 (177,10)	.59066 (300, 8)	.58696 (300, 8)
157.5 /	.34682 (247,10)	.57495 (247,10)	.56839 (247,10)	.49078 (247,10)	.40883 (247,10)
135.0 /	.34662 (119,11)	.46385 (119, 9)	.53249 (209,19)	.62184 (209,19)	.62029 (209,19)
112.5 /	.35738 (183,12)	.61921 (183,12)	.62462 (183,12)	.60438 (208,18)	.60288 (208,18)
90.0 /	.28443 (117,11)	.41281 (106,10)	.50885 (216,19)	.59066 (216,19)	.58696 (216,19)
67.5 /	.35738 (190,10)	.61921 (190,10)	.62462 (190,10)	.54450 (190,10)	.45607 (190,10)
45.0 /	.40226 (211,12)	.39945 (211,12)	.36145 (159,19)	.40292 (336,12)	.40192 (336,12)
22.5 /	.35087 (180,14)	.59129 (180,14)	.58893 (180,14)	.60438 (183, 9)	.60288 (183, 9)

HIGH
1-HR
SGROUP& 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* HIGHEST 1-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .62462 AND OCCURRED AT (100.0, 67.5) *

DIRECTION / (DEGREES) /	RANGE (METERS) 250.0	400.0
360.0 /	.52361 (227, 8)	.39381 (227, 8)
337.5 /	.47658 (321, 9)	.38671 (250,19)
315.0 /	.38930 (157, 9)	.21899 (4, 1)
292.5 /	.22700 (192, 9)	.17410 (197, 5)
270.0 /	.26007 (307,12)	.22942 (165, 2)
247.5 /	.34050 (173,19)	.17393 (173,19)
225.0 /	.40251 (165,18)	.26935 (143, 7)
202.5 /	.21349 (205, 8)	.22600 (266,23)
180.0 /	.42697 (173,20)	.34880 (140,23)
157.5 /	.34676 (251,19)	.33901 (176,21)
135.0 /	.53517 (208, 7)	.40451 (208, 7)
112.5 /	.49037 (206, 6)	.36652 (206, 6)
90.0 /	.38930 (216,19)	.27193 (160, 6)
67.5 /	.47658 (172, 8)	.35314 (172, 8)
45.0 /	.33928 (203, 7)	.25517 (203, 7)
22.5 /	.47658 (208,20)	.35314 (208,20)

1

2ND HIGH
1-HR
SGROUP& 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* SECOND HIGHEST 1-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .60536 AND OCCURRED AT (100.0, 112.5) *

DIRECTION / (DEGREES) /	RANGE (METERS) 50.0	75.0	100.0	125.0	150.0
360.0 /	.28590 (206, 8)	.40904 (164, 9)	.41156 (164, 9)	.40292 (159, 8)	.40192 (159, 8)
337.5 /	.48031 (108,11)	.45083 (301,10)	.47384 (191,12)	.40292 (133,10)	.40192 (133,10)
315.0 /	.38823 (191,12)	.48026 (193, 8)	.45401 (193, 8)	.38359 (193, 8)	.31549 (193, 8)
292.5 /	.25997 (163,11)	.37027 (3,12)	.36275 (205,16)	.31187 (3,12)	.30144 (122, 9)
270.0 /	.25997 (163,11)	.41281 (168,13)	.41641 (168,13)	.35235 (353,12)	.28856 (353,12)
247.5 /	.22163 (197,12)	.28699 (173,19)	.33375 (206,14)	.31732 (353,11)	.28877 (353,11)
225.0 /	.21301 (190, 9)	.30678 (29,11)	.30867 (29,11)	.26875 (29,11)	.22598 (205, 9)
202.5 /	.21301 (102,10)	.32017 (102,10)	.30267 (102,10)	.33438 (63, 9)	.32386 (63, 9)
180.0 /	.18816 (247,10)	.29712 (300, 8)	.50885 (300, 8)	.51034 (177,10)	.42599 (177,10)
157.5 /	.34662 (119,11)	.45083 (301,11)	.42007 (301,11)	.40601 (16,10)	.40552 (16,10)
135.0 /	.31855 (119, 9)	.41987 (307,10)	.47472 (336, 8)	.53828 (336, 8)	.52703 (336, 8)
112.5 /	.35395 (180,13)	.60421 (180,13)	.60536 (180,13)	.58477 (206, 7)	.57748 (206, 7)
90.0 /	.27213 (323,14)	.35507 (323,14)	.41641 (106,10)	.36300 (106,10)	.30404 (106,10)
67.5 /	.30961 (323,14)	.45083 (323,14)	.42007 (323,14)	.35886 (111,13)	.35135 (111,13)
45.0 /	.25002 (248,12)	.25853 (206, 9)	.34503 (336,12)	.39377 (174, 9)	.39131 (174, 9)
22.5 /	.24225 (211,12)	.41281 (352,12)	.51755 (183, 9)	.51034 (180,14)	.42599 (180,14)

2ND HIGH
1-HR
SGROUP& 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* SECOND HIGHEST 1-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .60536 AND OCCURRED AT (100.0, 112.5) *

DIRECTION / (DEGREES) /	RANGE (METERS) 250.0	400.0
360.0 /	.47658 (175, 8)	.35314 (175, 8)
337.5 /	.40251 (175, 9)	.35314 (321, 9)
315.0 /	.26007 (174, 8)	.20201 (310, 5)
292.5 /	.20126 (122, 9)	.16950 (124, 2)
270.0 /	.20806 (149, 6)	.21899 (165, 3)
247.5 /	.20357 (181,19)	.15469 (172, 7)
225.0 /	.31772 (249,19)	.23605 (173, 3)
202.5 /	.21033 (306,10)	.19336 (141,24)
180.0 /	.38930 (300, 8)	.30871 (173,20)
157.5 /	.31772 (164, 7)	.27193 (257, 7)
135.0 /	.50892 (278, 8)	.38671 (180, 6)
112.5 /	.40251 (208,18)	.25517 (192, 8)
90.0 /	.25335 (160, 6)	.20177 (216,19)
67.5 /	.36568 (167, 6)	.25560 (167, 6)
45.0 /	.26834 (336,12)	.22942 (250, 5)

22.5 / .42697 (207, 8) .30871 (207, 8)

1 HIGH 8-HR SGROUP& 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* HIGHEST 8-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .15144 AND OCCURRED AT (75.0, 315.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 50.0	75.0	100.0	125.0	150.0
360.0 /	.07735 (200, 2)	.09937 (200, 2)	.09501 (200, 2)	.08295 (249, 2)	.08100 (249, 2)
337.5 /	.09550 (191, 2)	.11617 (191, 2)	.11108 (191, 2)	.09779 (191, 2)	.08801 (175, 2)
315.0 /	.12501 (108, 2)	.15144 (108, 2)	.13441 (108, 2)	.11014 (108, 2)	.09689 (157, 2)
292.5 /	.04506 (163, 2)	.07714 (122, 2)	.10736 (122, 2)	.11464 (122, 2)	.10925 (122, 2)
270.0 /	.04265 (197, 2)	.06178 (128, 2)	.07063 (268, 2)	.08388 (268, 2)	.08589 (268, 2)
247.5 /	.05257 (206, 2)	.05539 (265, 2)	.06687 (265, 2)	.07100 (270, 2)	.07106 (270, 2)
225.0 /	.05053 (102, 2)	.05787 (102, 2)	.06469 (165, 3)	.07555 (165, 3)	.07536 (165, 3)
202.5 /	.05115 (102, 2)	.07900 (306, 2)	.07909 (306, 2)	.07432 (351, 2)	.06598 (351, 2)
180.0 /	.04395 (177, 2)	.07396 (177, 2)	.07364 (177, 2)	.07383 (300, 1)	.07337 (300, 1)
157.5 /	.08794 (119, 2)	.09858 (119, 2)	.09235 (337, 2)	.09621 (337, 2)	.09211 (337, 2)
135.0 /	.09819 (119, 2)	.12336 (119, 2)	.11023 (119, 2)	.09047 (119, 2)	.08729 (209, 3)
112.5 /	.04824 (190, 2)	.07740 (183, 2)	.09698 (208, 3)	.11003 (208, 3)	.11684 (206, 1)
90.0 /	.04158 (190, 2)	.06365 (106, 2)	.07004 (106, 2)	.07755 (216, 3)	.07722 (216, 3)
67.5 /	.05156 (323, 2)	.07831 (190, 2)	.07869 (190, 2)	.06849 (190, 2)	.05732 (190, 2)
45.0 /	.05287 (211, 2)	.08280 (206, 2)	.08208 (206, 2)	.07136 (206, 2)	.06669 (54, 2)
22.5 /	.04781 (206, 2)	.08465 (352, 2)	.08632 (352, 2)	.07555 (183, 2)	.07536 (183, 2)

1 HIGH 8-HR SGROUP& 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* HIGHEST 8-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .15144 AND OCCURRED AT (75.0, 315.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 250.0	400.0
360.0 /	.07812 (227, 1)	.06282 (227, 1)
337.5 /	.08330 (321, 2)	.06594 (251, 1)
315.0 /	.06041 (157, 2)	.04689 (303, 1)
292.5 /	.06824 (122, 2)	.04604 (47, 3)
270.0 /	.08465 (143, 3)	.07355 (144, 3)
247.5 /	.05706 (256, 3)	.05525 (303, 3)
225.0 /	.05031 (165, 3)	.05246 (173, 1)
202.5 /	.04343 (361, 2)	.03085 (193, 3)
180.0 /	.05924 (360, 1)	.05157 (140, 3)
157.5 /	.08372 (251, 3)	.07083 (229, 1)
135.0 /	.07160 (208, 1)	.07333 (192, 1)

112.5 /	.12132 (206, 1)	.08381 (206, 1)
90.0 /	.05089 (216, 3)	.03889 (39, 3)
67.5 /	.05957 (172, 1)	.04414 (172, 1)
45.0 /	.04856 (54, 2)	.03570 (279, 1)
22.5 /	.05957 (208, 3)	.06537 (202, 1)

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* SECOND HIGHEST 8-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .10784 AND OCCURRED AT (150.0, 112.5) *

DIRECTION / (DEGREES) /	RANGE (METERS) 50.0	75.0	100.0	125.0	150.0
360.0 /	.05300 (157, 2)	.06895 (140, 2)	.07373 (249, 2)	.08275 (200, 2)	.07337 (172, 2)
337.5 /	.08501 (108, 2)	.08870 (108, 2)	.07878 (175, 2)	.08959 (175, 2)	.08788 (48, 2)
315.0 /	.08549 (191, 2)	.09106 (191, 2)	.09495 (157, 2)	.10162 (157, 2)	.09287 (207, 2)
292.5 /	.04376 (116, 2)	.06617 (182, 2)	.08137 (128, 2)	.08255 (128, 2)	.07619 (128, 2)
270.0 /	.03871 (353, 2)	.05873 (266, 2)	.07054 (144, 2)	.08070 (144, 2)	.08006 (144, 2)
247.5 /	.03435 (265, 2)	.05322 (206, 2)	.06158 (270, 2)	.06729 (173, 3)	.06588 (173, 3)
225.0 /	.02663 (190, 2)	.04047 (265, 2)	.04925 (102, 2)	.04450 (265, 2)	.04612 (155, 2)
202.5 /	.04561 (306, 2)	.07062 (351, 2)	.07865 (351, 2)	.06852 (306, 2)	.05711 (306, 2)
180.0 /	.02352 (306, 2)	.04504 (359, 2)	.06361 (300, 1)	.06381 (177, 2)	.05359 (15, 2)
157.5 /	.04337 (247, 2)	.07876 (301, 2)	.08756 (301, 2)	.09164 (355, 2)	.08597 (355, 2)
135.0 /	.03749 (307, 2)	.05662 (264, 3)	.06939 (209, 3)	.08420 (209, 3)	.07305 (119, 2)
112.5 /	.04467 (183, 2)	.07631 (180, 2)	.08065 (180, 2)	.10034 (206, 1)	.10784 (208, 3)
90.0 /	.03674 (117, 2)	.05360 (98, 2)	.06625 (216, 3)	.06631 (106, 2)	.05965 (106, 2)
67.5 /	.04614 (190, 2)	.07246 (323, 2)	.06652 (323, 2)	.05539 (323, 2)	.04516 (323, 2)
45.0 /	.05175 (206, 2)	.06249 (172, 2)	.06450 (166, 3)	.06639 (166, 3)	.06118 (166, 3)
22.5 /	.04721 (352, 2)	.07503 (180, 2)	.07446 (180, 2)	.07546 (352, 2)	.06321 (352, 2)

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* SECOND HIGHEST 8-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .10784 AND OCCURRED AT (150.0, 112.5) *

DIRECTION / (DEGREES) /	RANGE (METERS) 250.0	400.0
360.0 /	.05978 (175, 1)	.04810 (300, 1)
337.5 /	.06776 (175, 3)	.06505 (175, 3)
315.0 /	.05864 (207, 2)	.04164 (7, 1)
292.5 /	.06803 (309, 2)	.04273 (309, 2)
270.0 /	.08092 (144, 3)	.06148 (143, 3)
247.5 /	.05385 (188, 2)	.05340 (256, 3)
225.0 /	.04659 (155, 2)	.04300 (143, 1)

202.5 /	.03679 (351, 2)	.03071 (301, 1)
180.0 /	.05505 (217, 1)	.04993 (188, 1)
157.5 /	.06751 (363, 1)	.06811 (251, 3)
135.0 /	.06484 (209, 3)	.05712 (336, 1)
112.5 /	.06988 (208, 3)	.06488 (289, 1)
90.0 /	.04211 (158, 3)	.03399 (160, 1)
67.5 /	.04571 (167, 1)	.03294 (111, 3)
45.0 /	.04291 (203, 1)	.03259 (203, 1)
22.5 /	.05376 (231, 3)	.04414 (208, 3)

1 HIGH
24-HR
SGROUP& 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .05521 AND OCCURRED AT (250.0, 270.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 50.0	75.0	100.0	125.0	150.0
360.0 /	.02578 (200, 1)	.03312 (200, 1)	.03167 (200, 1)	.03006 (210, 1)	.03111 (227, 1)
337.5 /	.03184 (191, 1)	.03897 (191, 1)	.03835 (191, 1)	.04107 (175, 1)	.04578 (175, 1)
315.0 /	.04167 (108, 1)	.05048 (108, 1)	.04480 (108, 1)	.03970 (182, 1)	.03752 (182, 1)
292.5 /	.01502 (163, 1)	.02576 (122, 1)	.03592 (122, 1)	.03838 (122, 1)	.03659 (122, 1)
270.0 /	.01422 (197, 1)	.02060 (128, 1)	.03061 (144, 1)	.04153 (144, 1)	.04913 (144, 1)
247.5 /	.01752 (206, 1)	.02043 (265, 1)	.02584 (265, 1)	.02798 (270, 1)	.03006 (270, 1)
225.0 /	.01684 (102, 1)	.01929 (102, 1)	.02156 (165, 1)	.02518 (165, 1)	.02832 (124, 1)
202.5 /	.01705 (102, 1)	.02643 (306, 1)	.02677 (306, 1)	.02477 (351, 1)	.02199 (351, 1)
180.0 /	.01469 (177, 1)	.02472 (177, 1)	.03013 (142, 1)	.03309 (142, 1)	.03255 (142, 1)
157.5 /	.02963 (119, 1)	.03331 (119, 1)	.03241 (355, 1)	.03766 (355, 1)	.03936 (355, 1)
135.0 /	.03368 (119, 1)	.04610 (119, 1)	.04529 (119, 1)	.04007 (119, 1)	.03419 (119, 1)
112.5 /	.01608 (190, 1)	.02580 (183, 1)	.03899 (208, 1)	.04339 (208, 1)	.04205 (208, 1)
90.0 /	.01386 (190, 1)	.02157 (106, 1)	.02503 (106, 1)	.02758 (216, 1)	.02723 (216, 1)
67.5 /	.01719 (323, 1)	.02629 (190, 1)	.02700 (190, 1)	.02409 (190, 1)	.02657 (172, 1)
45.0 /	.01763 (211, 1)	.02760 (206, 1)	.02736 (206, 1)	.03042 (336, 1)	.03010 (336, 1)
22.5 /	.01611 (206, 1)	.02822 (352, 1)	.02885 (352, 1)	.02647 (183, 1)	.02686 (183, 1)

1 HIGH
24-HR
SGROUP& 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .05521 AND OCCURRED AT (250.0, 270.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 250.0	400.0
360.0 /	.03505 (227, 1)	.02777 (175, 1)
337.5 /	.05402 (175, 1)	.04558 (175, 1)
315.0 /	.03109 (72, 1)	.02583 (303, 1)

292.5 /	.03006 (332, 1)	.02401 (332, 1)			
270.0 /	.05521 (144, 1)	.04094 (144, 1)			
247.5 /	.03052 (348, 1)	.02473 (258, 1)			
225.0 /	.03559 (124, 1)	.02568 (124, 1)			
202.5 /	.01509 (23, 1)	.01368 (266, 1)			
180.0 /	.02577 (142, 1)	.01840 (25, 1)			
157.5 /	.04622 (363, 1)	.03458 (363, 1)			
135.0 /	.03338 (363, 1)	.02444 (192, 1)			
112.5 /	.04275 (206, 1)	.02910 (206, 1)			
90.0 /	.02150 (106, 1)	.01599 (;n1Kk4hP	67.5 /	.02665 (177,, 1)	.01778 (172, 1)
45.0 /	.02224 (336, 1)	.01959 (336, 1)			
22.5 /	.02449 (201, 1)	.02952 (202, 1)			

1 2ND HIGH
24-HR
SGROUP£ 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* SECOND HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .04389 AND OCCURRED AT (250.0, 270.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 50.0	75.0	100.0	125.0	150.0
360.0 /	.01767 (157, 1)	.02316 (140, 1)	.02519 (210, 1)	.02772 (249, 1)	.03104 (210, 1)
337.5 /	.02834 (108, 1)	.02957 (108, 1)	.03324 (175, 1)	.03541 (140, 1)	.03947 (48, 1)
315.0 /	.02850 (191, 1)	.03139 (182, 1)	.03900 (182, 1)	.03671 (108, 1)	.03233 (157, 1)
292.5 /	.01459 (116, 1)	.02232 (182, 1)	.02792 (128, 1)	.02922 (128, 1)	.02794 (128, 1)
270.0 /	.01290 (353, 1)	.01963 (266, 1)	.02672 (268, 1)	.03572 (268, 1)	.04139 (268, 1)
247.5 /	.01191 (265, 1)	.01774 (206, 1)	.02295 (236, 1)	.02746 (265, 1)	.02680 (265, 1)
225.0 /	.00888 (190, 1)	.01536 (265, 1)	.01827 (265, 1)	.02130 (124, 1)	.02512 (165, 1)
202.5 /	.01521 (306, 1)	.02354 (351, 1)	.02622 (351, 1)	.02369 (306, 1)	.02046 (306, 1)
180.0 /	.00784 (306, 1)	.01965 (142, 1)	.02470 (177, 1)	.02585 (300, 1)	.02618 (300, 1)
157.5 /	.01446 (247, 1)	.02627 (301, 1)	.03182 (337, 1)	.03468 (337, 1)	.03514 (363, 1)
135.0 /	.01578 (264, 1)	.02639 (264, 1)	.02853 (264, 1)	.02807 (209, 1)	.03274 (363, 1)
112.5 /	.01489 (183, 1)	.02570 (180, 1)	.02856 (180, 1)	.03610 (206, 1)	.04195 (206, 1)
90.0 /	.01225 (117, 1)	.01787 (98, 1)	.02395 (216, 1)	.02570 (106, 1)	.02538 (106, 1)
67.5 /	.01538 (190, 1)	.02415 (323, 1)	.02217 (323, 1)	.02394 (172, 1)	.02227 (111, 1)
45.0 /	.01725 (206, 1)	.02104 (172, 1)	.02659 (336, 1)	.02865 (216, 1)	.02899 (216, 1)
22.5 /	.01574 (352, 1)	.02501 (180, 1)	.02513 (202, 1)	.02565 (202, 1)	.02480 (202, 1)

1 2ND HIGH
24-HR
SGROUP£ 1

*** MIAMI DADE WATER AND SEWER -- AIR STRIPPER MODELING ***

* SECOND HIGHEST 24-HOUR AVERAGE CONCENTRATION (MICROGRAMS/CUBIC METER) *
* FROM ALL SOURCES *
* FOR THE RECEPTOR GRID *

* MAXIMUM VALUE EQUALS .04389 AND OCCURRED AT (250.0, 270.0) *

DIRECTION / (DEGREES) /	RANGE (METERS) 250.0	400.0

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     360.0 /       .03407 (175,  1)       .02525 (227,  1)
     337.5 /       .04193 ( 48,  1)       .03333 ( 48,  1)
     315.0 /       .03107 ( 78,  1)       .02498 (299,  1)
     292.5 /       .02665 (147,  1)       .01899 (309,  1)
     270.0 /       .04389 (268,  1)       .03391 (342,  1)
     247.5 /       .02952 (188,  1)       .02337 (256,  1)
     225.0 /       .03052 (155,  1)       .02480 (155,  1)
     202.5 /       .01506 (236,  1)       .01152 (193,  1)
     180.0 /       .02504 ( 15,  1)       .01832 ( 44,  1)
     157.5 /       .03753 (338,  1)       .02977 (251,  1)
     135.0 /       .02924 (339,  1)       .02311 (339,  1)
     112.5 /       .03314 ( 55,  1)       .02697 ( 65,  1)
      90.0 /       .01770 (216,  1)       .01538 ( 46,  1)
      67.5 /       .02259 (111,  1)       .01584 (111,  1)
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      22.5 /       .02377 (202,  1)       .02612 (201,  1)
1T
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  SRU ACCUMULATOR.

    SRU       104.122 UNTS.
1T
 1

  CPU ACCUMULATOR.

    CPU TIME   104.164 SECS.
 LINES    568
 0?
```

D.E.P.

TEL:407-433-2650 MDWASAD May 06 94 15:34 No.012 P.01

5/16/94

NAME	COMPANY	TH.
Ken Kosier	CHEM HILL	Plant File w/ Dade Air Stripper File
Ty LaBahn	DEP	
Nick Kadivar	FDEP/Air	
Len Drago	CHEM HILL	
Bob Bailey	CHEM Hill	
Tom Tittle	FDEP/Air	
Michele Owens	DEP/Drinking Water	
Pam Smith	DEP/Drinking Water	
Tom Sears	MDWASD	
Robert Ready	MDWASD	
Iraj Dolatshahi	DEP - Drinking water	
BERTHA GOLDENBERG	MDWASD	
Jorge S. Rodriguez	"	
Albert Muniz	CHEM HILL	
John Brown	Trilly FDEP	
John Glunn	" "	
T. Heron	" "	

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To John Brown	From Nick Kadivar
Co.	Co. DEP/LWP&
Dept. Air Regulation	Phone # 433-2650
Fax # 278-6979	Fax # (407) 433-7666

- Find out from WPB-DEP what the issues Compliance-, order,
- Background on Dade County Water & Sewer issue is TOXIC air emissions, DEP TOXIC Policy, EXCEEDances of Florida AIR Reference Concentration
- Meeting on Friday May 6 Consultant for Dade Water Sewer wants a DEP authority person to attend.
- Recommend we not attend the meeting. However arrange a Conf. call with WPB DEP and Consultant/applicant to explain that we are currently developing revisions to the toxic policy which Florida has used for past 6 or 7 years

Engineers
Planners
Economists
Scientists

April 28, 1994
FLE36668.E0

Ms. Teresa Heron
Florida Department of
Environmental Protection
Bureau of Air Regulation, MS5505
2400 Blair Stone Road
Tallahassee, FL 32399-2400

Dear Ms. Heron:

Subject: Dade County Water and Sewer Department Air Construction Permit Modification Meeting

As we discussed on April 26, 1994, this letter confirms that it is extremely important that a meeting be held with appropriate FDEP staff on May 6, 1994, with the Florida Department of Environmental Protection (FDEP) at the Southeast Florida District office in West Palm Beach. This meeting will address compliance with air and water quality regulations for the Dade County Water and Sewer Department (WASD) Hialeah and John E. Preston Water Treatment Plants (WTPs). These WTP's operate multiple air strippers as part of the WTP process, and are currently under construction permits (Hialeah AC 13-147823 and John E. Preston AC 13-147824).

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Additional information regarding this issue will be presented in our meeting. Please confirm with me as soon as possible. If you have any questions regarding this confirmation letter, please call me at 305/443-6401.

Sincerely,

CH2M HILL

David Lindberg FOR

Leonard C. Drago
Project Manager

MIA100138C9.WP
cc: Clair Fancy/FDEP-Tallahassee
Cleve Holiday/FDEP-Tallahassee
Nick Kadivar/FDEP-WPB
Jorge Rodriguez/WASD
Tom Segars/WASD
Albert Muniz/CH2M HILL

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. Lejeune Road
Telephone 665-7471

Federal Express

June 7, 1988

Mr. Clair H. Fancy
Deputy Chief
Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Modification of Air Permit Applications for the Hialeah and Preston Air Stripping Projects Application Numbers AC13-147823 and AC13-147824

Dear Mr. Fancy:

Your letter of May 5, 1988 indicated that the VOC emissions for the subject projects will exceed the 100 ton per year threshold limit making it subject to FAC 17-2.510. We have reviewed your letter and believe that there is a misunderstanding regarding the intended operation of the proposed installation as stated in our letter of April 4, 1988.

The primary purpose of the air stripping facilities is to remove the volatile organic compounds (VOC's) from the treated potable water in order to comply with Florida's VOC MCL's. A secondary benefit of the facilities might allow the optional treatment by breakpoint chlorination of the water for improved color removal. The breakpoint chlorination process forms approximately 16 times the concentration of trihalomethanes (THMs) formed by the presently practiced method of chloramine disinfection. The proposed air stripping process would then remove the THMs formed by this disinfection process. The 100 ton per year threshold would only be exceeded if we applied breakpoint chlorination on a continual basis. We have had to abandon the breakpoint chlorination concept and our application is based on the present operating mode of chloramine disinfection supplemented with breakpoint chlorination for an annual two week period each November to purge the water distribution system of possible chloramine resistant bacterial growths. This annual

application of breakpoint chlorination has been practiced during the past five years.

The attached Air Stripping Evaluation Worksheet has been modified by the addition of several compounds which are detected in the raw water but are not of significant health risk in the potable water. Because of the reduced concern for these compounds, they were not included in the Air Quality Study by Stone and Webster previously submitted. Another modification includes the addition of the average concentration of all VOC's and THM's after chloramine disinfection and after breakpoint chlorination disinfection during full utilization of the contaminated wells.

The average VOC concentrations are based on Table 2 of "The Northwest Wellfield Protection Plan", October 1985. A factor determined by the maximum installed capacity from the contaminated wellfield is multiplied times the average contamination of the inner wellfield to determine the average concentration of the contaminants to the air stripping towers. The average concentration of 1,1,2,2, tetrachloroethane which was not included in the Northwest Wellfield Report, was calculated by multiplying the vinyl chloride ratio of average concentration divided by peak concentration times the peak concentration for 1,1,2,2 tetrachlorethane. The THM concentrations for chloramine disinfection are based on the THM for the Northwest Wellfield which is slightly higher than the contaminated wellfields. For the THM concentrations formed by breakpoint chlorination, the analyses performed during November 1987 are presented.

As presented above, these water treatment plants operate using chloramine disinfection for 50 weeks of the year. For 2 weeks of each year, the subject facilities use breakpoint chlorination for disinfection. Based on full utilization of the contaminated wells, the VOC and THM emissions for the current treatment process are presented for each facility and for the combined facilities on the attached worksheet. The Hialeah Plant's annual emission rate is 5.51 tons per year. The Preston Plant has an annual emission rate of 15.06 tons per year. The combined annual emission rate of 20.57 tons per year is well below the 100 tons per year threshold for FAC 17-2.510.

Also, the low concentration of the emitted VOC's and THM's are well below all established standards. We believe that air pollution reduction methods would be of very limited benefit and should not be required for this facility. Based on data in the enclosed article, the cost of processing the air is over three times the cost of treating the water. You will recall from our

previous letter that EPA believes that potable water air stripping towers do not require air pollution control devices.

These projects have been designed, reviewed and approved by EPA and other DER divisions for the performance of air stripping. They are to be partially funded (41 percent) under the Super Fund program of EPA, so that a timely resolution of the outstanding issues is vital to our maintaining funding eligibility and proceeding with construction. If you require additional information, or have any questions, please call me or Mr. Robert Fergen at 305-665-7471.

Very truly yours,

Garrett Sloan
Director

GS/REF/fb

cc: Mr. D. Twachtmann, Secretary, FDER Tallahassee
Mr. N. Rhodes, Division Director of Environmental Program
Mr. Wilkins, Division Director, Division of Waste Mgmt.
Mr. Anthony Clemente, Director, DERM

Copied: Teresa Heron
CHF/BT
Anthony Clemente, DERM
T. Forcht, SE Dist
6.9.88 mr

Dade Water and Sewer

The Department has reviewed the proposed project to determine the potential for ambient air quality impacts. The pollutants which will be emitted to the atmosphere include a wide variety of hydrocarbon and chlorine compounds. A special class of these compounds are volatile organic compounds (VOC's); VOC's as a group participate in the formation of ozone. The annual emissions of VOC's from the two proposed facilities combined are approximately 20 tons per year. This is less than the 100 ton-per-year threshold necessary to invoke the new source review requirements of the ozone nonattainment regulations. The Department is satisfied that these facilities will not significantly contribute to the ozone exceedances occurring in Dade County.

The Department has also reviewed the specific toxic compounds emitted, many of which are carcinogenic. The applicant has provided a list of these compounds and their associated emission rates. Most of these compounds are not specifically regulated; however, the Department has developed guidelines for evaluating their potential impact. Two of these compounds, trichloromethane and vinyl chloride, may approach or exceed their respective guideline acceptable ambient air quality level. This would only occur during the two-week breakpoint chlorination period completed annually. The acceptable ambient levels are not rigorously determined thresholds for human health effects. They are used in conjunction with other factors to assess the adequacy of proposed emissions control. For these facilities, additional control was not deemed necessary.

Charles Stone
AKU Watergr
Norcross, Georgia
404 441-8622

DEP ROUTING AND TRANSMITTAL SLIP

TO: (NAME, OFFICE, LOCATION)

1. Teresa
2.
3.
4.
5.

PLEASE PREPARE REPLY FOR:

___ SECRETARY'S SIGNATURE
___ DIV/DIST DIR SIGNATURE
___ MY SIGNATURE
___ YOUR SIGNATURE
___ DUE DATE _____

ACTION/DISPOSITION

___ DISCUSS WITH ME
___ COMMENTS/ADVISE
___ REVIEW AND RETURN
___ SET UP MEETING
___ FOR YOUR INFORMATION
___ HANDLE APPROPRIATELY
___ INITIAL AND FORWARD
___ SHARE WITH STAFF
___ FOR YOUR FILES

COMMENTS:

SWD will set up a T/c on Friday @ 1:30; ~~CF~~ CH2M Hill will call. TS

1:30 Friday

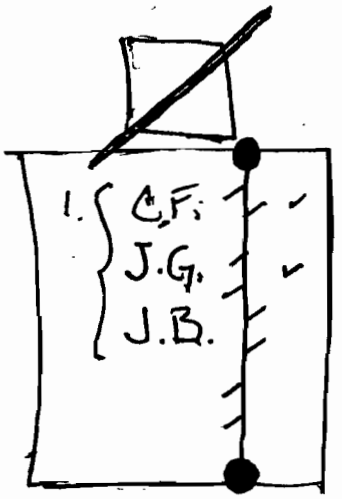
CF
JG
CH
TH
JB

need to attend;

Send Memo when you find out where T/c will be - TS

FROM: _____ DATE: 4/29 PHONE: _____

DEP 15-026 (12/93)



1. Len Drago
   Lauderdale, H_2M Hill

- Meeting next week
  - Miami Dade modify AC permit
    due to color problem —
    Modify TMT at Presoon THIT Plant
  - Verbally - follow up report + Water req.
- ⇒ Raw water Quality
  Exist temp.
  - 2 wks Chlorination —

Tele #

Pam Smith
T/C
Jordan

Engineers
Planners
Economists
Scientists

April 28, 1994
FLE36668.E0

Ms. Teresa Heron
Florida Department of
Environmental Protection
Bureau of Air Regulation, MS5505
2400 Blair Stone Road
Tallahassee, FL 32399-2400

Dear Ms. Heron:

Subject: Dade County, Water and Sewer Department Air Construction Permit Modification Meeting

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Additional information regarding this issue will be presented in our meeting. Please confirm with me as soon as possible. If you have any questions regarding this confirmation letter, please call me at 305/443-6401.

Sincerely,

CH2M HILL

David Lindberg FOR

Leonard C. Drago
Project Manager

MIA100138C9.WP
cc: Clair Fancy/FDEP-Tallahassee
Cleve Holiday/FDEP-Tallahassee
Nick Kadivar/FDEP-WPB
Jorge Rodriguez/WASD
Tom Segars/WASD
Albert Muniz/CH2M HILL

CH2M HILL
Engineers
Planners
Economists
Scientists

FAX REQUEST FORM
FOR IMMEDIATE DELIVERY

Office Telephone Number: 305/426-4008
Fax Telephone Number: 305/698-6010

To: Teresa Heron **Firm Name:** FDEP

FAX Telephone Number: 904/922-6979 **Date:** 5/06/94

From: Jon Drago **Project Number:**

Total Number of Pages Including This Page:

If you do not receive ALL of the pages, or if any of the page did not transmit clearly, please call as soon as possible. Thank you.

COMMENTS:

Teresa,

Attached is a copy of the outline for our discussion with you today. We'll talk to you @ 1:30 pm.

Jon

OBJECTIVE

Short Term

- Obtain an air stripping operating permit that provides flexibility in the water treatment operation while meeting air and water quality regulations

Long Term

- Modify the treatment process to address forthcoming air and water regulations

BACKGROUND/PROBLEM

- Air strippers were originally installed to remove VOC contamination from the Hialeah, Preston, and Miami Springs wellfields
- Existing air construction permit conditions allow the MDWASD to perform the chloramination process continuously, while limiting the use of breakpoint chlorination to 2 weeks/yr., and limits influent concentrations to the stripping columns to <140 ppb

THM/VOC primarily chloroform

- Recent deterioration of raw water quality (color) in the Northwest wellfield has required the Preston WTP to initiate a color control program (operate at breakpoint chlorination since color reduction by chloramination is inadequate) to meet the secondary drinking water standard

Northwest field like dark tea
breakpoint chlorination
TTH removal & VOC

1500 complaints per week for water color

APPLICABLE AIR & WATER STANDARDS THAT IMPACT MDWASD

Air

- Construction and operating permit required
- New Source Review is triggered for increases in THM/VOC emissions of >40 tons/year
  Monitor & Report actual emissions
- Ambient Air Concentration Guidelines (FDEP 8 hour, 24 hour, and annual ambient reference concentration

Water

- Maintain THM concentrations less than 100 ppb (Primary Drinking Water Standard)
  leaving ms of water
- Maintain the color at 15 pcu (Secondary Drinking Water Standard)
  from the Northwest well
  3 times the color level 40 units ↓ 110 units

CH2M HILL

WATER TREATMENT PROCESS ALTERNATIVES FOR REDUCING SOURCE EMISSIONS AT THE JOHN E. PRESTON PLANT

- Reduce water influent THMs (Inflow to Strippers)
  - Use breakpoint chlorination for Northwest Wellfield only (Chloramination for Miami Springs Water)
  - Minimize chlorine contact time (add ammonia after chlorine contact basin)
- Allow THM levels to increase in the treated water
  - Reduce number of active blowers

CRITICAL COMPLIANCE ISSUES

Air

- High THM concentrations (primarily chloroform) associated with the breakpoint chlorination process exceed existing air construction permit condition (140 ppb influent)
- High VOC emissions (including THM compounds) that potentially could exceed emission limits of 40 tons per year, triggering New Source Review
- Emission modeling show potential impacts of FDEP ARC limits (ambient reference concentrations), while actual ambient air monitoring results indicate compliance.

Water

- Public perception of color in the treated water.
- THM concentration must be below the 100 ppb Primary Drinking Water Standard. Breakpoint chlorination produces high THM and low color; however, THM are reduced during air stripping.
- The chloramination process produces low THMs, but may increase color levels above 15 pcu.

CH2M HILL

Free chlorine
& added ammonia
combined

to prevent the level of THM

add the rest level it doesn't volatize

Separation
@ chlorine
↓ separate
ammonia

15 - 30 minutes

@ carcinogens

CONCLUSION

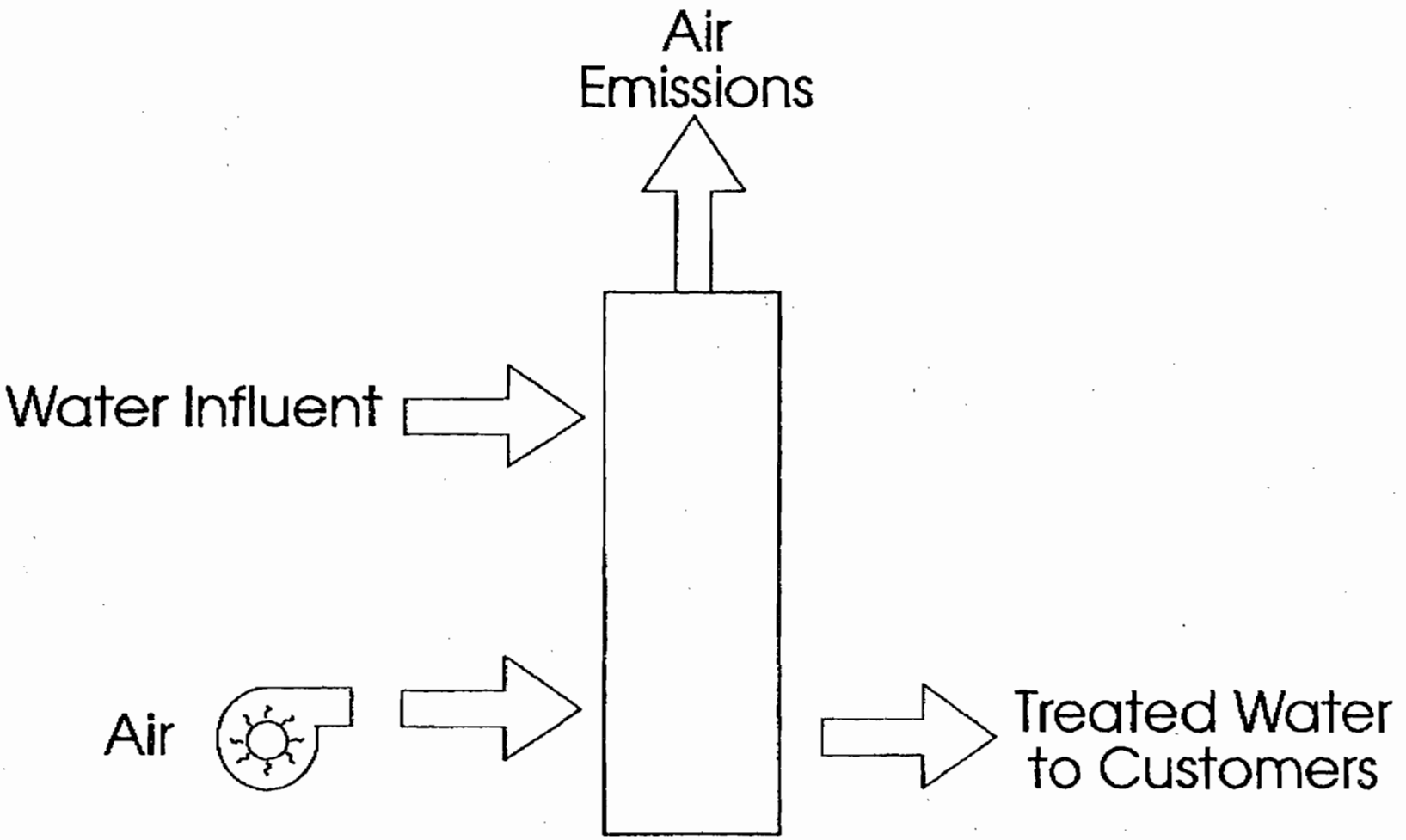
- MDWASD will continue to meet applicable source emission criteria
  - Annual tons/year VOCs
  - Ambient Air Quality
- MDWASD will continue to meet all applicable water quality standards
- Remove Conditions in Air construction Permit that place un-necessary constraints on water treatment processes
- Manage treatment processes to maintain VOC emissions <40 tons per year (monitor and report actual emissions on a routine basis)
- MDWASD will continue to conduct ambient air monitoring to verify actual AAC levels
- Commence planning for future air and water regulations

less 40

free chlorine is maintained 2 1/2 ppm; it changes to different pH and at annual S it will force free chlorine into the combine adding supplem quantities of chlorination total combined pH ince

CH2M HILL

TYPICAL STRIPPING COLUMN



CH2M HILL

TO14 evaluate tst ams enc.

CH2M HILL

FAX TRANSMITTAL REQUEST FORM
FOR IMMEDIATE DELIVERY

DATE: April 28, 1994

PROJECT NUMBER: FLE36668.E0

FAX OPERATOR: Dave Lindberg

TIME SENT: 9:15 ☒ AM ☐ PM

TO: Clair Fancy OFFICE:

FIRM NAME: Florida Department of Environmental Protection

CITY: Tallahassee STATE: Florida COUNTRY:

Fax Phone Number: (904) 922-6979 Verification Phone Number: (904) 488-1344

[redacted]

John
Attached is the letter
Clair

BEST AVAILABLE COPY

CH2M HILL
Engineers
Planners
Economists
Scientists

April 28, 1994
FLE36668.E0

Ms. Teresa Heron
Florida Department of
Environmental Protection
Bureau of Air Regulation, MS5505
2400 Blair Stone Road
Tallahassee, FL 32399-2400

Dear Ms. Heron:

Subject: Dade County Water and Sewer Department Air Construction Permit Modification Meeting

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Sincerely,

CH2M HILL

David Lindberg FOR

Leonard C. Drago
Project Manager

MIA100138C9.WP
cc: Clair Fancy/FDEP-Tallahassee
Cleve Holiday/FDEP-Tallahassee
Nick Kadivar/FDEP-WPB
Jorge Rodriguez/WASD
Tom Segars/WASD
Albert Muniz/CH2M HILL

CH2M HILL

DATE: April 28, 1994

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FOR IMMEDIATE DELIVERY

PROJECT NUMBER: FLE36668.E0

FAX OPERATOR: Dave Lindberg

TIME SENT: [illegible] ☒ AM ☐ PM

Conf call FAI 6M at 1:30

TO: Clair Fancy **OFFICE:**

FIRM NAME: Florida Department of Environmental Protection

CITY: Tallahassee **STATE:** Florida **COUNTRY:**

Fax Phone Number: (904) 922-6979 **Verification Phone Number:** (904) 488-1344

Total number of pages, including this page: 2 **Return original?:** ■ YES ☐ NO

From: Leonard C. Drago **Office:** DFB **Employee No.:** 5666

IF YOU DO NOT RECEIVE ALL OF THE PAGES OR THE TRANSMISSION IS UNCLEAR, PLEASE CONTACT YOUR FAX OPERATOR.

REMARKS:

Attached is a confirmation letter for the Miami-Dade Water and Sewer Department (WASD), appropriate FDEP staff, and CH2M HILL to meet at your Southeast Florida District office in West Palm Beach. The letter is in regards to the permitting and operating of WASD's Hialeah and John E. Preston Air Stripping Tower facilities.

4/28

John

I cannot attend this and neither can you. Maybe we can hook us up on a conference call or something like that. Willard & Teresa might should be there. I have appointment on the 6th in pm and Willard leaves at noon. Budget such that we cannot afford this trip

Clair

Date Fax Received: _____ Time: ☐ AM ☐ PM

Engineers
Planners
Economists
Scientists

April 28, 1994
FLE36668.E0

Ms. Teresa Heron
Florida Department of
Environmental Protection
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We look forward to meeting with you on May 6, 1994. Please contact me as soon as possible if you have any questions regarding this confirmation letter, please call me at 305/443-6401.

Sincerely,

CH2M HILL

David Lindberg HLA

Leonard C. Drasy
Project Manager

MIA190138C9.WP

cc: Clair Fancy/FDEP-Tallahassee
Clovis Holliday/FDEP-Tallahassee
[illegible]
Jorge Rodriguez/WASD
Tom Segner/WASD
Albert Muniz/CH2M HILL

CH2M HILL

FAX TRANSMITTAL REQUEST FORM
FOR IMMEDIATE DELIVERY

DATE: April 28, 1994

PROJECT NUMBER: FLE36668.E0

FAX OPERATOR: Dave Lindberg

TIME SENT: 9:15 ☒ AM ☐ PM

TO: Cleve Holiday **OFFICE:**

FIRM NAME: Florida Department of Environmental Protection

CITY: Tallahassee **STATE:** Florida **COUNTRY:**

Fax Phone Number: (904) 922-6979 **Verification Phone Number:** (904) 488-1344

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Date Fax Received: _____ Time: _____ ☐ AM ☐ PM

CH2M HILL
Engineers
Planners
Economists
Scientists

April 28, 1994
FLE36668.E0

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Florida Department of
Environmental Protection
Bureau of Air Regulation, MS5505
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CH2M HILL

David Lindberg FOR

Leonard C. Drago
Project Manager

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cc: Clair Fancy/FDEP-Tallahassee
Cleve Holiday/FDEP-Tallahassee
Nick Kadivar/FDEP-WPB
Jorge Rodriguez/WASD
Tom Segars/WASD
Albert Muniz/CH2M HILL

I think this is not official

TO: District Air Program Administrators
County Air Program Administrators
Office of Policy Analysis and Management Staff
Bureau of Air Regulation Staff

FROM: Howard L. Rhodes
Director
Division of Air Resources Management

~~to~~ Do not quote.

DATE: April 13, 1994

SUBJECT: Guidance on the Permitting of Sources Emitting Hazardous Air Pollutants

The purpose of this guidance and flowchart is to standardize the permitting of sources emitting hazardous air pollutants (HAPs). Sources with potential HAP emissions that subject them to Title V and without permits need to be permitted prior to the due dates for Title V permit applications under Rule 17-213.420, F.A.C. In order to render the permits federally enforceable, air construction permits are needed. The attached flowchart shall be used for the permitting of new and existing air pollution sources that emit one or more of the 189 hazardous air pollutants (or compounds of those substances) pursuant to Rule 17-213.100(18)(b), F.A.C. If the hazardous air pollutant is not listed, then no Title V permit will be required unless the source is subject to to NSPS, NESHAPS, acid rain, lead or the potential emissions of some other pollutant (actual hourly emissions times 8,760 hours) are greater than 100 TPY. Sources that are not subject to Title V are subject to Rule 17-210.300 unless exempted by the Department under Rule 17-210.300(3) or Rule 17-4.040, F.A.C.

Only if a source has the potential to emit more than 8 tons per year of a single HAP or 20 TPY of two or more HAPs, or the source is of heightened public concern (a NIMBY), would the Department compare modeled results to the Florida Air Reference Concentration (FARC). If the Department-run screening model (typically screen2, Tscreen2 or ISC-screen) showed a value greater than 5 times the short term (8 or 24 hr) FARC or 2 times the annual FARC, the application would be deemed incomplete as we would not have reasonable assurance that the source would not cause possible health problems. In these cases, an incompleteness letter should be sent to the applicant indicating that emissions must be reduced or more refined modeling must be performed by the applicant. The following statement should be included in the incomplete letter to the applicant:

> "Screening modeling indicates that operation of this source, as requested by your application, could create potential health problems. Therefore, the Department must have additional information that provides reasonable assurance that the emissions inherent in the release of

hazardous air pollutants will not result in levels that will deprive the public reasonable protection from such emissions before we can proceed with processing the application. A more detailed modeling demonstration or an emissions reductions plan will be required before your application can be considered complete. This requirement is clearly stated in Section 403.021, F.S.

Rule 17-296.320, F.A.C., gives the Department authority to impose control devices for volatile organic compounds as deemed necessary, should the refined modeling indicate a need for control."

Of course, the last sentence in the statement does not apply to non-VOC sources.

If the inital screening or the detailed modeling shows the ambient levels to be greater than the annual FARC or 3 times the short term FARC, then the permit engineer and the PE shall determine which of the following actions should be taken:

a. The control strategy proposed by the applicant is reasonable and additional control to reduce the pollutant(s) for which a FARC is exceeded would be too costly or otherwise infeasible. The permit, given that everything else is OK, may be issued.

b. The permit engineer believes additional control strategies may be more appropriate and are available at a reasonable cost. The additional control would reduce emissions of the pollutant(s) for which a FARC is exceeded. The permit engineer could cite the exceedance of the FARC as one of the reasons for requiring additional control. Control strategies could include process changes, chemical substitutions, installation of air pollution control equipment or raising the stack.

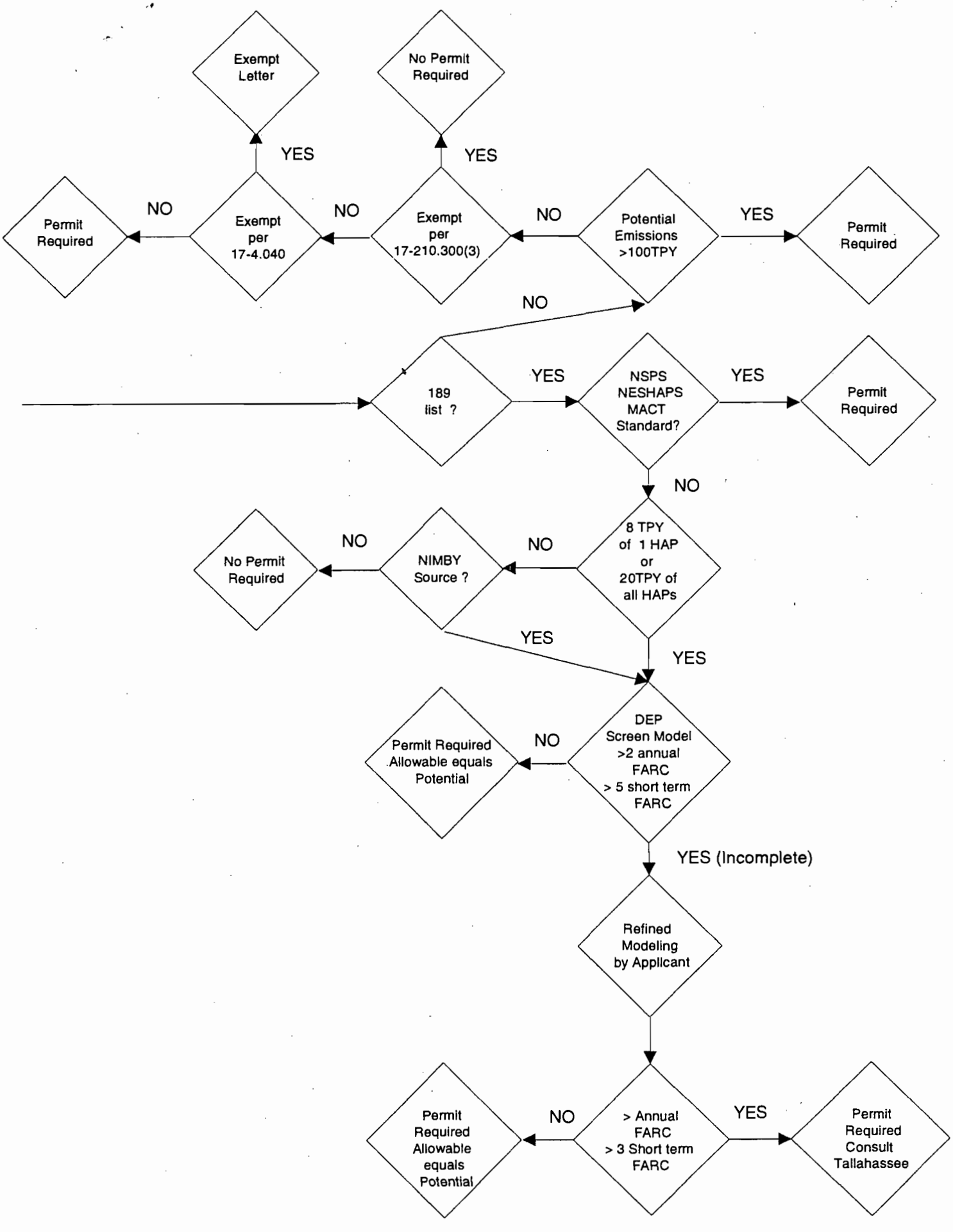
c. If the FARC level is exceeded by a large amount (more than 5 times the FARC for short term averages and more than two times the FARC for annual averages after refined modeling), the permit engineer should have real concerns regarding the safety of persons living near or working at the facility. The permit engineer should contact the permitting section in Tallahassee, the toxics section in Tallahassee, and the OGC for further guidance on what can be done. These options could include those listed in item b. or could also include an <u>intent</u> to deny.

This should greatly help standardize how the district, local, and central office staff deal with HAPs during the next year or so. If you have any questions, call John Glunn, Tom Rogers or Clair Fancy on FARCs, modeling, or permitting, respectively.

HLR/CHF/cjh

attachment

Hazardous Air Pollutant Permitting Flowchart



CH2M HILL
Engineers
Planners
Economists
Scientists

February 21, 1994

FLE36668.L0

Preston:
Willard
Patty-file

Mr. Nick Kadivar
Florida Department of
Environmental Protection
Air Quality Section
1900 South Congress Avenue, Suite A
West Palm Beach, FL 33406

Dear Mr. Kadivar:

Subject: Miami-Dade Water and Sewer Authority
Hialeah and John E. Preston Air Stripping Towers

The purpose of this letter is to inform you of our progress in modifying the Florida Air Pollutant Facility Construction Permits for the Hialeah (AC 13-147823) and John E. Preston (AC 13-147824) Air Stripping Tower facilities. The Miami-Dade Water and Sewer Department (WASD) conducted a 7-day sampling event the week of February 7, 1994, to quantify volatile organic carbon (VOC) and trihalomethane (THM) concentrations representative of the influent to the John E. Preston Air Stripping Towers. Sampling was conducted while the water treatment plant was operating with the break-point chlorination disinfection process. When the analytical results become available, they will be used to propose VOC and THM emission limits for inclusion into the special conditions of the operating permits. The proposed limits will be representative of actual operating conditions while allowing for operational flexibility.

It is our understanding that the Florida Department of Environmental Protection (FDEP)-Tallahassee will issue the modified construction permits, and the FDEP Southeast District Office will review these permits and then issue the operating permits. According to FDEP, construction permit numbers AC 13-147823 and AC 13-147824 will be superseded by AO 13-232908 (Hialeah) and AO 13-232902 (John E. Preston), respectively.

Attached to this letter are requests for Waiver of the 90 Day Time Limit to issue the operating permits for the two facilities. We are requesting an extension of the waiver from February 28, 1994, to May 27, 1994. This extension should allow FDEP adequate time to review the proposed construction permit modifications, and issue the required

construction and operating permits for these facilities. We would appreciate a written response concerning our request for the waiver. However, if a response is not received by February 28, 1994, we will assume that this request has been granted.

If you have any questions, please call Dave Lindberg or me at 305/426-4008.

Sincerely,

CH2M HILL

Leonard C. Drago
Project Manager

DFB10013567.WP5
cc: Jorge Rodriguez/WASD
Bertha Goldenberg/WASD
Tom Segars/WASD
John Brown/FDEP-Tallahassee
Albert Muniz/CH2M HILL
Dave Lindberg/CH2M HILL

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

WAIVER OF 90 DAY TIME LIMIT
UNDER SECTIONS 120.60(2) AND 403.0876, FLORIDA STATUTES

License (Permit, Certification) Application No. AO 13-232908[1] Supercedes AC 13-147823

Applicant's Name: Miami-Dade Water and Sewer Department

The undersigned has read Sections 120.60(2) and 403.0876, Florida Statutes, and fully understands the applicant's rights under that section.

With regard to the above reference license (permit, certification) application, the applicant hereby with full knowledge and understanding of (his) (her) (its) rights under Sections 120.60(2) and 403.0876, Florida Statutes, waives the right under Sections 120.60(2) and 403.0876, Florida Statutes, to have the application approved or denied by the State of Florida Department of Environmental Regulation within the 90 day time period prescribed in Sections 120.60(2) and 403.0876, Florida Statutes. Said waiver is made freely and voluntarily by the applicant, ia in (his) (her) (its) self-interest, and without any pressure or coercion by anyone employed by the State of Florida Department of Environmental Regulation.

This waiver shall expire on the 27 day of May 19 94.

The undersigned is authorized to make this waiver on behalf of the applicant.

Signature

Tom Segars
Water Production Superintendent
Please Type Name of Signee

2-22-94
Date

Sworn to and subscribed before me this ____ day of _____ 19___.

DER Form 17-1.201(8)
Effective November 30, 1982

[1] Hialeah Air Stripping Towers

Section 120.60, Florida Statutes

(2) When an application for a license is made as required by law, the agency shall conduct the proceedings required with reasonable dispatch and with due regard to the rights and privileges of all affected parties or aggrieved persons. Within 30 days after receipt of an application for a license, the agency shall examine the application, notify the applicant of any apparent errors or omissions, and request any additional information the agency is permitted by law to require. Failure to correct an error or omission or to supply additional information shall not be grounds for denial of the license unless the agency timely notified the applicant within this 30 day period. The agency shall notify the applicant if the activity for which he seeks a license is exempt from the licensing requirement and return any tendered application fee within 30 days after receipt of the original application or within 10 days after receipt of the timely requested additional information or correction of errors or omissions. Every application for license shall be approved or denied within 90 days after receipt of the original application or receipt of the timely requested additional information or correction of errors or omissions unless a shorter period of time for agency action is provided by law. The 90-day or shorter time period shall be tolled by the initiation of a proceeding under Section 120.57 and shall resume 10 days after the recommended order is submitted to the agency and the parties. Any application for a license not approved or denied within the 90-day period or shorter time period, within 15 days after conclusion of a public hearing held on the application, or within 45 days after the recommended order is submitted to the agency and the parties, whichever is latest, shall be deemed approved and, subject to the satisfactory completion of an examination, if required as prerequisite to licensure, the license shall be issued. The Public Service Commission, when issuing a license, and any other agency, if specifically exempted by law, shall be exempt from the time limitations within this subsection. Each agency, upon issuing or denying a license, shall state with particularity the grounds or basis for the issuance or denial of same, except where issuance is a ministerial act. On denial of a license application on which there has been no hearing, the denying agency shall inform the applicant of any right to a hearing pursuant to Section 120.57.

Section 403.0876, Florida Statutes

Permits; processing. ---Within 30 days after receipt of an application for a permit under this chapter, the department shall review the application and shall request submittal of all additional information the department is permitted by law to require. If the applicant believes any departmental request for additional information is not authorized by law or departmental rule, the applicant may request a hearing pursuant to s. 120.57. Within 30 days after receipt of such additional information, the department shall review it and may request only that information needed to clarify such additional information or to answer new questions raised by or directly related to such additional information. If the applicant believes the request of the department for such additional information is not authorized by law or departmental rule, the department, at the aplicant's request, shall proceed to process the permit application. Permits shall be approved or denied within 90 days after receipt of the original application, the last item of timely requested additional material, or the applicant's written request to begin processing the permit application.

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

WAIVER OF 90 DAY TIME LIMIT
UNDER SECTIONS 120.60(2) AND 403.0876, FLORIDA STATUTES

License (Permit, Certification) Application No. AO 13-232902[1] Supercedes AC 13-147824

Applicant's Name: Miami-Dade Water and Sewer Department

The undersigned has read Sections 120.60(2) and 403.0876, Florida Statutes, and fully understands the applicant's rights under that section.

With regard to the above reference license (permit, certification) application, the applicant hereby with full knowledge and understanding of (his) (her) (its) rights under Sections 120.60(2) and 403.0876, Florida Statutes, waives the right under Sections 120.60(2) and 403.0876, Florida Statutes, to have the application approved or denied by the State of Florida Department of Environmental Regulation within the 90 day time period prescribed in Sections 120.60(2) and 403.0876, Florida Statutes. Said waiver, is made freely and voluntarily by the applicant, is in (his) (her) (its) self-interest, and without any pressure or coercion by anyone employed by the State of Florida Department of Environmental Regulation.

This waiver shall expire on the 27 day of May 19 94.

The undersigned is authorized to make this waiver on behalf of the applicant.

Signature

Tom Segars
Water Productions Superintendent
Please Type Name of Signee

2-22-94
Date

Sworn to and subscribed
before me this ____ day
of _____ 19___.

DER Form 17-1.201(8)

Effective November 30, 1982 Page 1 of 2

[1] John E. Preston Air Stripping Towers

Section 120.60, Florida Statutes

(2) When an application for a license is made as required by law, the agency shall conduct the proceedings required with reasonable dispatch and with due regard to the rights and privileges of all affected parties or aggrieved persons. Within 30 days after receipt of an application for a license, the agency shall examine the application, notify the applicant of any apparent errors or omissions, and request any additional information the agency is permitted by law to require. Failure to correct an error or omission or to supply additional information shall not be grounds for denial of the license unless the agency timely notified the applicant within this 30 day period. The agency shall notify the applicant if the activity for which he seeks a license is exempt from the licensing requirement and return any tendered application fee within 30 days after receipt of the original application or within 10 days after receipt of the timely requested additional information or correction of errors or omissions. Every application for license shall be approved or denied within 90 days after receipt of the original application or receipt of the timely requested additional information or correction of errors or omissions unless a shorter period of time for agency action is provided by law. The 90-day or shorter time period shall be tolled by the initiation of a proceeding under Section 120.57 and shall resume 10 days after the recommended order is submitted to the agency and the parties. Any application for a license not approved or denied within the 90-day period or shorter time period, within 15 days after conclusion of a public hearing held on the application, or within 45 days after the recommended order is submitted to the agency and the parties, whichever is latest, shall be deemed approved and, subject to the satisfactory completion of an examination, if required as prerequisite to licensure, the license shall be issued. The Public Service Commission, when issuing a license, and any other agency, if specifically exempted by law, shall be exempt from the time limitations within this subsection. Each agency, upon issuing or denying a license, shall state with particularity the grounds or basis for the issuance or denial of same, except where issuance is a ministerial act. On denial of a license application on which there has been no hearing, the denying agency shall inform the applicant of any right to a hearing pursuant to Section 120.57.

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Permits; processing. ---Within 30 days after receipt of an application for a permit under this chapter, the department shall review the application and shall request submittal of all additional information the department is permitted by law to require. If the applicant believes any departmental request for additional information is not authorized by law or departmental rule, the applicant may request a hearing pursuant to s. 120.57. Within 30 days after receipt of such additional information, the department shall review it and may request only that information needed to clarify such additional information or to answer new questions raised by or directly related to such additional information. If the applicant believes the request of the department for such additional information is not authorized by law or departmental rule, the department, at the aplicant's request, shall proceed to process the permit application. Permits shall be approved or denied within 90 days after receipt of the original application, the last item of timely requested additional material, or the applicant's written request to begin processing the permit application.

Florida Department of
Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

September 1, 1993

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Tom Segars, Water Production Superintendent
Miami-Dade Water and Sewer Authority Department
Water Production Division
P. O. Box 110006
Hialeah, Florida 33011-0006

Re: Free Chlorine Treatment Test
AC13-147824

Dear Mr. Segars:

The Department will need more information before the free chlorine treatment test at the John E. Preston Water Treatment Plant proposed in your August 24, 1993, letter can be approved. Please have an engineer registered to practice in Florida submit the following information:

1. Description of the proposed free chlorine treatment test program. What data will be collected during the test? What are the specific goals of the test?

2. Provide an analysis of the maximum expected trihalomethanes concentrations in the raw water in ppb. Is the concentration of any other VOC expected to increase during the test period in comparison with the chloroamine treatment process or the breakpoint chlorination treatment process?

3. Estimate the increase in ambient air concentration in mg/m^3 and in lbs/hr for all affected VOC emissions?

If the Department concludes that the treatment test will not have an adverse environmental impact, we will draft a letter approving the treatment test along with a public notice to be published at your expense in a paper having circulation in Dade County. If there is no objection from the public for the treatment, the Department will issue the letter authorizing a 30 day water treatment test of the method of chlorination at the John E. Preston Water Treatment Plant.

Should you have any questions on this matter, please write to me or call Doug Outlaw at (904) 488-1344.

Sincerely,

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

CHF/DO/bb

cc: Isidore Goldman, DEP/WPB
Patrick Wong, DERM

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

WATER PRODUCTION DIVISION
P.O. BOX 110006
HIALEAH, FLORIDA 33011-0006

700 W. 2nd Avenue
Telephone: (305) 888-2522
(305) 885-2172
Fax: (305) 889-0156

RECEIVED

AUG 24 1993

Division of Air
Resources Management

August 20, 1993

Clair Fancy, P.E.
Chief, Air Programs
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Air Stripping Permit to Construct: AC 13-14782
(Operating Permit Applied For)

Dear Mr. Fancy:

In an effort to evaluate an alternative treatment technique for controlling finished water color in the areas served by the John E. Preston Water Treatment Plant, the method of chlorination will be temporarily changed for thirty (30) days in September/October 1993.

In this test free chlorine treatment will be used to reduce excess color levels followed by the addition of ammonia to form combined chlorine which is normally used at our regional water plants for residual disinfection.

We are concerned regarding air quality and are working in concert with Dade County Department of Environmental Regulation (DERM) to review test protocol and results. Test parameters are being developed to evaluate stack emissions and receptor sites. A preliminary evaluation with DERM indicates that these emissions will not approach any of the yearly permitted discharges.

An independent laboratory will conduct the air tests. Their final analyses will be provided under separate cover for your evaluation.

By way of this letter we are requesting permission to begin the test period. We anticipate your response at your earliest convenience; however, should you need additional information, please do not hesitate to contact me.

Very truly yours,

Tom Segars
Water Production Superintendent

TS:EMK:e
cc: DEP, Air Section, West Palm Beach
Patrick Wong, DERM

BEST AVAILABLE COPY

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt Fee will provide you the signature of the person delivered to and the date of delivery.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Mrs. Bertha Goldenberg, P.E.
Process Eng. Miami-Dade
Water & Sewer Auth. Dept.
P.O. Box 330316
Miami, Fl 33233-0316

4a. Article Number
P 617 884 156

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery

5. Signature (Addressee)

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

6. Signature (Agent)

PS Form 3811, November 1990 *U.S. G... 0868 DOMESTIC RETURN RECEIPT

P 617 884 156

Certified Mail Receipt
No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

UNITED STATES POSTAL SERVICE

Sent to Bertha Goldenberg	
Street & No. Miami-Dade W+S A.D. Dept.	
P.O. State & ZIP Code Miami, Fl	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Address of Delivery	
TOTAL Postage & Fees	$
Postmark or Date 3-17-92 AC 13-147823 147824	

PS Form 3800, June 1990

Florida Department of Environmental Regulation

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

Lawton Chiles, Governor

Carol M. Browner, Secretary

March 13, 1992

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mrs. Bertha M. Goldenberg, P.E.
Process Engineer, Miami-Dade Water
and Sewer Authority Department
P.O. Box 330316
Miami, Florida 33233-0316

Dear Mrs. Goldenberg:

Re: Hialeah and Preston Water Treatment Plants
Permit Nos. AC 13-147823 and 147824

The Department is in receipt of your letter dated February 6, 1992, requesting an extension of the expiration date of the above mentioned permits. This request is acceptable. The expiration date of these permits will be changed as follows:

FROM: March 30, 1992
TO: January 31, 1993

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant and the parties listed below must be filed within 14 days of receipt of this intent. Petitions filed by other persons must be filed within 14 days of publication of the public notice or within 14 days of their receipt of this intent, whichever first occurs. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information:

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

(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
(d) A statement of the material facts disputed by Petitioner, if any;
(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;
(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and
(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this intent. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of receipt of this intent in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

This letter shall be attached to the above mentioned permits and shall become a part of the permits.

Sincerely,

STEVE SMALLWOOD, P.E.
Director
Division of Air Resources
Management

SS/TH/plm

Attachment to be Incorporated:
Mrs. Goldenberg's letter of February 6, 1992.

c: S. Brooks, SED
P. Wong, Dade Co.

Clair

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

FEDERAL EXPRESS

February 6, 1992

Mr. Steve Smallwood, P.E.
Director
Division of Air Resources Management
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Permit Nos. AC 13-147823 and 147824, Air Stripping Units - Hialeah and Preston Water Treatment Plants Contract S-581B & C

Dear Mr. Smallwood:

The subject permits to construct 64 air stripping units, will expire March 30, 1992. The units will not be completed by this date. Therefore, we are hereby requesting an extension of these permits until January 31, 1993. The additional time is required to complete the construction and allow time for start-up, testing and troubleshooting.

Should you have any questions, please call me at 305 669-7781.

Sincerely,

BMGoldenberg

Bertha M. Goldenberg, P.E.
Process Engineer

BMG/la
020692

cc: Dulce Rodriguez
Howard Fallon
D. Heron
S. Brooks
P. Wong

BEST AVAILABLE COPY

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL PACKAGE TRACKING NUMBER 1118030745

1216M 1118030745

RECIPIENT'S COPY

Date 2/6/92

From (Your Name) Please Print: Bertha M. Goldenberg, P.E.
Your Phone Number (Very Important): (305)665-7471
Company: MIAMI DADE WATER & SEWER AUTH
Department/Floor No.:
Street Address: 75 S LEJUENE RD RM 211
City: AMI State: FL ZIP Required: 3 3 1 3 3

To (Recipient's Name) Please Print: Mr. Steve Smallwood, P.E.
Recipient's Phone Number (Very Important): ( )
Company: Director, Div. of Air Resources Mgmt
Department/Floor No.:
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): FL DER 2600 Blair Stone Rd
City: Tallahassee State: FL ZIP Required: 32399-2400

YOUR INTERNAL BILLING REFERENCE INFORMATION (First 24 characters will appear on invoice.)

RECEIVED
FEB 10 1992
Division of Air Resources Management

HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address:
City: State: ZIP Required:

PAYMENT 1 ☐ Bill Sender 2 ☐ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card
5 ☐ Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)	Standard Overnight (Delivery by next business afternoon†)
11 ☐ YOUR PACKAGING	51 ☐ YOUR PACKAGING
16 ☐ FEDEX LETTER *	56 ☐ FEDEX LETTER *
12 ☐ FEDEX PAK *	52 ☐ FEDEX PAK *
13 ☐ FEDEX BOX	53 ☐ FEDEX BOX
14 ☐ FEDEX TUBE	54 ☐ FEDEX TUBE
Economy Two-Day (Delivery by second business day†)	**Government Overnight** (Restricted for authorized users only)
30 ☐ ECONOMY	46 ☐ GOVT LETTER
	41 ☐ GOVT PACKAGE

Freight Service (for Extra Large or any package over 150 lbs.)
70 ☐ OVERNIGHT FREIGHT ** (Confirmed reservation required)
80 ☐ TWO-DAY FREIGHT **
†Delivery commitment may be later in some areas.
*Declared Value Limit $100.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

1 ☐ HOLD FOR PICK-UP (Fill in Box H)
2 ☒ DELIVER WEEKDAY
3 DELIVER SATURDAY (Extra charge) ☐ (Not available to all locations)
4 ☐ DANGEROUS GOODS (Extra charge)
5 ☐
6 ☐ DRY ICE _____ Lbs
7 ☐ OTHER SPECIAL SERVICE _____
8 ☐
9 ☐ SATURDAY PICK-UP (Extra charge)
10 ☐
11 ☐ DESCRIPTION
12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only
Total	Total

DIM SHIPMENT (Chargeable Weight) ☐ _____ lbs.
_____ X _____ X _____ = _____

Received At
1 ☐ Regular Stop 3 ☐ Drop Box
2 ☐ On-Call Stop 4 ☐ B.S.C. 5 ☐ Station

7

Emp. No. Date
☐ Cash Received ☐ Return Shipment ☐ Third Party ☐ Hold ☐ Chg. To Hold
Street Address
City State Zip
Received By: X
Date/Time Received FedEx Employee Number
Release Signature:
FedEx Emp. No. Date/Time

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 4/91
PART #137204 FXEM 6/91
FORMAT #082
082

Add. App. # 8166769569
Miami, FL
1-3-89

file copy

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

January 3, 1989

FEDERAL EXPRESS

RECEIVED
JAN 04 1989
DER-BAQM

Mr. Bill Thomas
Bureau of Air Quality
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Hialeah and Preston Water Treatment Plants Air Stripping Facilities (Contracts W-581B and W-581C)

Dear Mr. Thomas:

This letter will confirm our telephone conversation today regarding permits for the construction of air stripping towers.

We are enclosing a copy of our letter dated October 6, 1988 to your Department's Southeast District in which we submitted the proof of publication of the Notice of Intent. We understand that the proof of publication is the only outstanding item and upon your receipt of the enclosed, you will complete the permit for issuance.

Thank you for your assistance in this matter. Should you have any questions, please do not hesitate to call me.

Very truly yours,

Bonnie P. Wells

Bonnie P. Wells
Grants Coordinator

BPW/cd
Enclosure

010389.1B
copied: Teresa Heron

FEDERAL EXPRESS

AIRBILL

USE THIS AIRBILL FOR DOMESTIC SHIPMENTS WITHIN THE CONTINENTAL U.S.A., ALASKA AND HAWAII.
USE THE INTERNATIONAL AIR WAYBILL FOR SHIPMENTS TO PUERTO RICO.
QUESTIONS? CALL 800-238-5355 TOLL FREE.

PACKAGE TRACKING NUMBER 816676956 4

364 816676956 4

Date 1-3-89

RECIPIENT'S COPY

1 From (Your Name) Please Print: Bonnie Wells
Your Phone Number (Very Important): (305) 665-7471
Company: MIAMI DADE WATER & SEWER AUTH DEPT
Department/Floor No.:
Street Address: 3575 S LEJEUNE RD PH 2nd 205
City: MIAMI **State:** FL **ZIP Required:** 3 3 1 3 3

2 To (Recipient's Name) Please Print: Bill Thomas
Recipient's Phone Number (Very Important): ( )
Company: Bureau of Air Quality State of Florida DER
Department/Floor No.:
Exact Street Address *(We Cannot Deliver to P.O. Boxes or P.O. ® Zip Codes.)*: 2600 Blairstone Road
City: Tallahassee **State:** FL. **ZIP Required:** 32399-2400

3 YOUR BILLING REFERENCE INFORMATION (FIRST 24 CHARACTERS WILL APPEAR ON INVOICE.)

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address:
City: State: ZIP Required:

PAYMENT ☒ Bill Sender ☐ Bill Recipient's FedEx Acct. No. ☐ Bill 3rd Party FedEx Acct. No. ☐ Bill Credit Card ☐ Cash

4 SERVICES

1 ☐ PRIORITY 1 Overnight Delivery
2 ☐ COURIER-PAK OVERNIGHT ENVELOPE*
3 ☐ OVERNIGHT BOX
4 ☐ OVERNIGHT TUBE
5 ☐ STANDARD AIR Delivery not later than second business day
6 ☐ OVERNIGHT LETTER*
7 ☐
8 ☐
9 ☐
10 ☐
*Declared Value Limit $100.

DELIVERY AND SPECIAL HANDLING

1 ☐ HOLD FOR PICK-UP (Fill In Box H)
2 ☐ DELIVER WEEKDAY
3 ☐ DELIVER SATURDAY (Extra charge)
4 ☐ DANGEROUS GOODS (Extra charge)
5 ☐ CONSTANT SURVEILLANCE SERVICE (CSS) (Extra charge) (Release Signature Not Applicable)
6 ☐ DRY ICE _____ Lbs.
7 ☐ OTHER SPECIAL SERVICE
8 ☐
9 ☐ SATURDAY PICK-UP (Extra charge)
10 ☐
11 ☐
12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

PACKAGES	WEIGHT	YOUR DECLARED VALUE	OVER SIZE
1	LBS		
	LBS		
	LBS		
	LBS		
Total	Total	Total	

Received At: 1☐ Regular Stop 2☐ On-Call Stop 3☐ Drop Box 4☐ B.S.C. 5☐ Station
FEDEX Corp. Employee No.:
Date/Time for FEDEX Use:

Emp. No.: Date:
☐ Cash Received ☐ Return Shipment ☐ Third Party ☐ Chg. To Del. ☐ Chg. To Hold
Street Address:
City: State: Zip:
Received By: X
Date/Time Received: FedEx Employee Number:

5 Sender authorizes Federal Express to deliver this shipment without obtaining a delivery signature and shall indemnify and hold harmless Federal Express from any claims resulting therefrom.
Release Signature: _____

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

PART #111800
REVISION DATE 1/88
PRINTED IN U.S.A. NCREC
009

The Miami Herald
A KNIGHT-RIDDER NEWSPAPER

PUBLISHED DAILY
MIAMI — DADE — FLORIDA

STATE OF FLORIDA
COUNTY OF DADE:

Before the undersigned authority personally appeared

ANN MARTULA

who on oath says that he/she is

CUSTODIAN OF RECORDS

of The Miami Herald, a daily newspaper published at Miami in Dade County, Florida; that the attached copy of advertisement was published in said newspaper in the issues of

SEPTEMBER 19, 1988

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

Ann Martula

Sworn to and subscribed before me this 20th day of September A.D. 1988

My commission expires Elyse Bent

NOTARY PUBLIC STATE OF FLORIDA
MY COMMISSION EXP. MAR 15, 1991
BONDED THRU GENERAL INS. UND.

W-581B
W-581C

RECEIVED
JAN 04 1989
DER - BAQM

Environmental Regulation
Notice of Intent

The Department of Environmental hereby gives notice of its intent to issue permits Miami-Dade Water & Sewer Authority Department to construct 64 air stripping towers located at the Hialeah and Preston Water Treatment Plants, in Hialeah, Dade County, Florida. The Department is issuing this intent to issue for the reasons stated in the Technical Evaluation and Preliminary Determination.

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

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Rule 23-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearing, Department of Administration, 2009 Apalachee Parkway, Tallahassee, Florida, 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Failure to petition to intervene with the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

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

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

Dept. of Environmental Regulation
Southeast Florida District Office
1900 S. Congress Avenue, Suite A
West Palm Beach, Florida
33406

Dade County Department of Environmental Resources Management
Jose Marti Building
801 Southwest 3rd Avenue, 2nd Floor
Miami, Florida 33130

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

September 19, 1988
Ad No. 80127

Air Stripping

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

October 6, 1988

FEDERAL EXPRESS

Mr. J. Scott Benyon
Deputy Assistant Secretary
State of Florida Department
of Environmental REgulation
1900 S. Congress Avenue
Suite A
West Palm Beach, Florida 33406

Attn: Mr. Al Mueller

Re: Hialeah and Preston Air Stripping Facilities Permit Applications (Contracts W-581B and W-581C)

Dear Mr. Mueller:

We are enclosing proofs of publication of the "Notice of Proposed Agency Action on Permit Application" for the referenced project.

Should you have any questions, please call me.

Very truly yours,

James Cowgill

for Bonnie P. Wells
Grants Coordinator

BPW/cd
Enclosure
10688.3

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 900 242 324

February 28, 1992

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

Subject: Hialeah and Preston Water Treatment Plants
Permit Nos. AC- 13-147823 and 147824
(Contracts W-581C & W-581B)

Dear Mr. Fancy:

We are in receipt of your letter of February 14, 1992, requesting a $50.00 permit fee to process each of the subject permit extensions. Enclosed please find two (2) checks in the amount of $50.00 each to process the request.

Should you have any further questions, please call me.

Sincerely

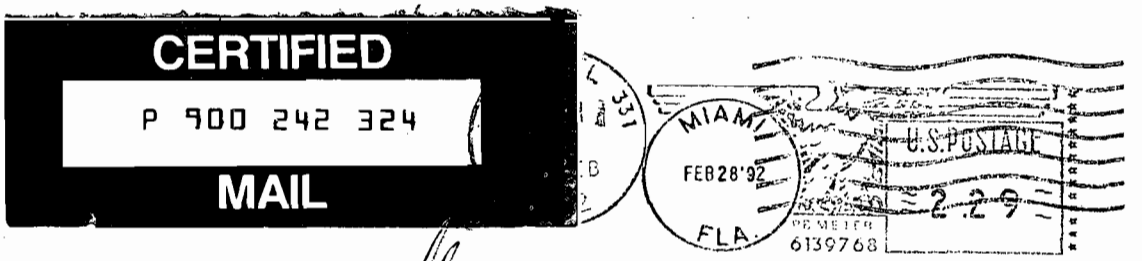
B M Goldenberg

Bertha M. Goldenberg, P.E.
Process Engineer

001031

cc: J. Heron

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT
P. O. BOX 330316
MIAMI, FLORIDA 33233-0316
110.01-15



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

METRO-DADE

METROPOLITAN DADE COUNTY, FLORIDA 025605

660

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT-POOLED CASH FUND

BEST AVAILABLE COPY

VOID AFTER SIX MONTHS

SOUTHEAST BANK, N.A.
MIAMI, FLORIDA

Date	Control Number	Amount of Check
02/27/92	025605	$50.00

PAY

EXACTLY **********50 DOLLARS AND******00CENTS

BOARD OF COUNTY COMMISSIONERS

To The Order Of

STATE OF FLORIDA
Dept. of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

[redacted]

METRO-DADE

METROPOLITAN DADE COUNTY, FLORIDA 025606

63-58
660

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT-POOLED CASH FUND

VOID AFTER SIX MONTHS

SOUTHEAST BANK, N.A.
MIAMI, FLORIDA

Date	Control Number	Amount of Check
02/27/92	025606	$50.00

PAY

EXACTLY **********50 DOLLARS AND******00CENTS

BOARD OF COUNTY COMMISSIONERS

To The Order Of

STATE OF FLORIDA
DEPT. OF ENVIRONMENTAL REGULATION
2600 BLAIR STONE ROAD
TALLAHASSEE, FL 32399-2400

[redacted]

Florida Department of Environmental Regulation

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

Lawton Chiles, Governor

Carol M. Browner, Secretary

February 14, 1992

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Bertha M. Goldenberg, P.E.
Process Engineer
Miami-Dade Water and Sewer
Authority Department
P. O. Box 330316
Miami, FL 33233-0316

Dear Mrs. Goldenberg:

RE: Hialeah and Preston Water Treatment Plants
Permit Nos. AC 13-147823 and 147824

The Bureau of Air Regulation received your request to extend the above referenced air construction permits. On October 30, 1991, Rule 17-4.050(4)(o), F.A.C., (copy enclosed) was changed to require a $50 fee per permit to process extension requests; therefore, we will not be able to take action on your request until the fee is received. If you have any questions, please call Patty Adams at (904)488-1344.

Sincerely,

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

CHF/pa

Enclosure

P 617 884 193

Certified Mail Receipt

No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

UNITED STATES POSTAL SERVICE

Sent to: Robert Cuevas	
Street & No.: Miami-Dade Wtr & Swr Dept.	
P.O. State & ZIP Code: Miami, Fl	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Address of Delivery	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form **3800**, June 1990

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece next to the article number.

I also wish to receive the following services (for an extra fee):

1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Mr. Robert Cuevas,
Miami-Dade Water & Sewer Authority Dept.
P.O. Box 330316
Miami, Fl 33233-0316

4a. Article Number
P 617 884 193

4b. Service Type
☐ Registered ☐ Insured
☑ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

7. Date of Delivery
12/6

5. Signature (Addressee)

6. Signature (Agent)
A Sandoz

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

PS Form **3811**, October 1990 ☆U.S. GPO: 1990—273-861 **DOMESTIC RETURN RECEIPT**

Florida Department of Environmental Regulation

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

Lawton Chiles, Governor

Carol M. Browner, Secretary

November 26, 1991

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Robert Cuevas, Chief Engineer
Miami-Dade Water and Sewer
Authority Department
Post Office Box 330316
Miami, Florida 33233-0316

Dear Mr. Cuevas:

Re: Revised Expiration Date
Permit Numbers: AC 13-147823 and -147824, Air Stripping Units - Hialeah and Preston Water Treatment Plants

Based on our telephone conversation of November 14, 1991, we are revising our letter of November 9, 1990 authorizing an extension of the expiration date of the above mentioned permits. The expiration date for both permits will be changed as follows:

From: October 30, 1991
To: March 30, 1992

This letter must be attached to the above mentioned permits and shall become a part of each permit.

Sincerely,

for STEVE SMALLWOOD, P.E.
Director
Division of Air Resources Management

SS/TH/t

attachment

cc: David James, BWC
Isidore Goldman, NED
Patrick Wong, DERM
Berta Goldenberg

Florida Department of Environmental Regulation

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

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

November 9, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Robert Cuevas, Chief Engineer
Miami-Dade Water and Sewer Authority
Department
Post Office Box 330316
Miami, Florida 33233-0316

Dear Mr. Cuevas:

Re: Permits Nos. AC 13-147823 and 824
Air Stripping Units at the Hialeah and Preston Water Treatment Plants.

The Department is in receipt of your letter dated September 26, 1990, requesting an extension of the expiration date of the aboved mentioned permits. These sources are located at the Hialeah and Preston Water Treatment plants in Dade County, Florida. This request is acceptable. The expiration date for both permits will be changed as follows:

From: November 30, 1990
To: October 30, 1991

This letter must be attached to the above mentioned permit and shall become a part of each permit.

Attachment to be Incorporated:

• Mr. Robert Cuevas' letter of September 26, 1990.

Sincerely,

STEVE SMALLWOOD, P.E.
Director
Division of Air Resources
Management

SS/TH/plm

c: David James, BWC - Tallahassee
Isidore Goldman, NE District
Patrick Wong, DERM

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 520 021 074

September 26, 1990

Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Request for Extension Permit
No. AC 13-147823 and
AC 13-147824

Gentlemen:

This letter will serve as our request for an extension of the two subject permits, which expire on November 30, 1990. The permits cover the construction of 64 air stripping units at the Hialeah and Preston Water Treatment Plants. Commencement of Construction was delayed due to a bid protest. In accordance with Specific Condition No. 6 we are also enclosing a revised construction schedule indicating a project completion date of October, 1991.

Please extend the permit to March 1992 to allow for project completion. Should you have any questions, please call Mr. Murray Grant at (305) 665-7471.

Very truly yours,

Robert A. Cuevas
Chief Engineer

Attachment
cc: Murray Grant
David James, Bureau of Waste Clean-up
DER/Tallahassee

C. Heron
J. Goldman, SE Dist
P. Hong, DERM

P 256 396 239

RECEIPT FOR CERTIFIED MAIL

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

Sent to Robert Cuevas	
Street and No. Miami-Dade Water &	
P.O., State and ZIP Code Sewer Authority	
Postage Miami, FL	
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 11-19-90 AC 13-147823 824	

PS Form 3800, June 1985 ☆U.S.G.P.O. 1989-234-555

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

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

1. ☐ Show to whom delivered, date, and addressee's address. *(Extra charge)*
2. ☐ Restricted Delivery *(Extra charge)*

3. Article Addressed to:
Robert Cuevas, Chief Eng.
Miami-Dade Water & Sewer Authority Dept.
P.O. Box 330316
Miami, FL 33233-0316

4. Article Number
P 256 396 239

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Addressee
X

6. Signature — Agent
X

7. Date of Delivery
11 21 90

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

PS Form **3811**, Apr. 1989 ★U.S.G.P.O. 1989-238-815 **DOMESTIC RETURN RECEIPT**

Florida Department of Environmental Regulation

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

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

November 9, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Robert Cuevas, Chief Engineer
Miami-Dade Water and Sewer Authority
Department
Post Office Box 330316
Miami, Florida 33233-0316

Dear Mr. Cuevas:

Re: Permits Nos. AC 13-147823 and 824
Air Stripping Units at the Hialeah and Preston Water Treatment Plants.

The Department is in receipt of your letter dated September 26, 1990, requesting an extension of the expiration date of the aboved mentioned permits. These sources are located at the Hialeah and Preston Water Treatment plants in Dade County, Florida. This request is acceptable. The expiration date for both permits will be changed as follows:

From: November 30, 1990
To: October 30, 1991

This letter must be attached to the above mentioned permit and shall become a part of each permit.

Attachment to be Incorporated:

- Mr. Robert Cuevas' letter of September 26, 1990.

Sincerely,

STEVE SMALLWOOD, P.E.
Director
Division of Air Resources Management

SS/TH/plm

c: David James, BWC - Tallahassee
Isidore Goldman, NE District
Patrick Wong, DERM

METROPOLITAN DADE COUNTY, FLORIDA

METRO-DADE

METRO-DADE CENTER

ENVIRONMENTAL RESOURCES MANAGEMENT
SUITE 1310
111 N.W. 1st STREET
MIAMI, FLORIDA 33128-1971
(305) 375-3376

October 11, 1990

RECEIVED
OCT 16 1990
DER-BAQM

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

RE: Request for Permit Extension - P-387
AC 13-147823 and AC 13-147824

Dear Mr. Fancy:

The FDER subject permits are scheduled to expire on November 30, 1990. The Miami Dade Water & Sewer Authority Department requested, by letter dated September 26, 1990, a permit extension to March 1992. DERM has no objection to the permit extension as requested.

If you should have any further questions regarding this matter, please do not hesitate to contact me at (305) 858-0601.

Sincerely,

Ewart L. Anderson, P.E.
Air Permitting Engineer
Environmental Monitoring Division

ELA/aas

cc: J. Heron

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 520 021 074

September 26, 1990

Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Request for Extension Permit
No. AC 13-147823 and
AC 13-147824

Gentlemen:

This letter will serve as our request for an extension of the two subject permits, which expire on November 30, 1990. The permits cover the construction of 64 air stripping units at the Hialeah and Preston Water Treatment Plants. Commencement of Construction was delayed due to a bid protest. In accordance with Specific Condition No. 6 we are also enclosing a revised construction schedule indicating a project completion date of October, 1991.

Please extend the permit to March 1992 to allow for project completion. Should you have any questions, please call Mr. Murray Grant at (305) 665-7471.

Very truly yours,

Robert A. Cuevas
Chief Engineer

Attachment
cc: Murray Grant
David James, Bureau of Waste Clean-up
DER/Tallahassee

C. Heron
J. Goldmeer, SE Dist
P. Hong, DERM

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

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

1. ☒ Show to whom delivered, date, and addressee's address. *†(Extra charge)†*
2. ☐ Restricted Delivery *†(Extra charge)†*

3. Article Addressed to:

Mr. Garrett Sloan, Director
Miami Dade Water and Sewer
Authority Department
3575 S. LeJeune Road
P. O. Box 330316
Miami, FL 33233-0316

4. Article Number
P 274 007 443

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature — Addressee
X R Roberts

6. Signature — Agent
X

7. Date of Delivery 9 2 88

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

PS Form **3811**, Mar. 1987 ★ U.S.G.P.O. 1987-178-268 **DOMESTIC RETURN RECEIPT**

P 274 007 443

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

Sent to Mr. Garrett Sloan, MDW&SA	
Street and No. P.O. Box 330316	
P.O., State and ZIP Code Miami, FL 33233-0316	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Mailed: 8-30-88 Permit: AC 13-147823, -24	

PS Form 3800, June 1985 ★ U.S.G.P.O. 1985-480-794

Florida Department of Environmental Regulation

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

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

August 29, 1988

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. Garrett Sloan, Director
Miami Dade Water & Sewer Authority Dept.
Post Office Box 330316
Miami, Florida 33233-0316

Dear Mr. Sloan:

Attached is one copy of the Technical Evaluation and Preliminary Determination and proposed permits for Miami-Dade Water & Sewer Authority Department to construct 64 air stripping towers located at the Hialeah and Preston Water Treatment Plants in Hialeah, Dade County, Florida.

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

Sincerely,

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

CHF/th

Attachments

cc: R. A. Cuevas, P.E.
R. Fergen
F. Echanique
S. Brooks, SE District
P. Wong, DERM
J. Gentry, DER

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of
Application for Permits by:

Miami-Dade Water & Sewer
Authority Department
3575 S. LeJeune Road
Miami, Florida 33146

DER File Nos. AC 13-147823
AC 13-147824

INTENT TO ISSUE

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

The applicant, Miami-Dade Water & Sewer Authority Department, applied on July 11, 1988, to the Department of Environmental Regulation for permits to construct 64 air stripping towers to be located at the Preston and Hialeah Water Treatment Plants in Hialeah, Dade County, Florida.

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

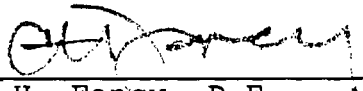
Pursuant to Section 403.815, F.S. and DER Rule 17-103.150, FAC, you (the applicant) are required to publish at your own expense the enclosed Notice of Proposed Agency Action on permit applications. The notice must be published one time only in a section of a major local newspaper of general circulation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

The Department will issue these permits with the attached conditions unless a petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S. A person whose substantial interests are affected by the

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

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION



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

Copies furnished to:

S. Brooks, SE District
R. A. Cuevas, P.E.
R. Fergen
F. Echanique

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF INTENT TO ISSUE and all copies were mailed before the close of business on August 30, 1988.

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

Martha M Vise — Clerk

August 30, 1988 — Date

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

28-5.15 Requests for Formal and Informal Proceedings

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

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

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

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

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

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

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

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

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

State of Florida
Department of Environmental Regulation
Notice of Intent

The Department of Environmental Regulation hereby gives notice of its intent to issue permits to Miami-Dade Water & Sewer Authority Department to construct 64 air stripping towers located at the Hialeah and Preston Water Treatment Plants, in Hialeah, Dade County, Florida. The Department is issuing this Intent to Issue for the reasons stated in the Technical Evaluation and Preliminary Determination.

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

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

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

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

Dept. of Environmental Regulation
Southeast Florida District
1900 S. Congress Avenue, Suite A
West Palm Beach, Florida 33406

Dade County Department of Environmental
Resources Management
Jose Marti Building
801 Southwest 3rd Avenue, 2nd Floor
Miami, Florida 33130

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

Technical Evaluation
and
Preliminary Determination

Miami-Dade Water & Sewer Authority
Air Stripping Project

Permit Numbers: AC 13-147823
AC 13-147824

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

August 26, 1988

I. NAME AND ADDRESS OF APPLICANT

Miami-Dade Water and Sewer Authority Department
Post Office Box 330316
Miami, Florida 33233-0316

II. REVIEWING AND PROCESSING SCHEDULE

Date of Receipt of Applications: April 6, 1988

30 Days Completeness Review: Department's letters dated May 5 and June 29, 1988

Response to Incompleteness Letter: Company's letters dated June 7 and July 11, 1988

Application Completeness Date: July 11, 1988

III. FACILITY INFORMATION

III.1 Facility Location

The proposed air stripping facilities are located at Hialeah and John E. Preston Water Treatment Plant Wellfields. The coordinates are latitude 25°49'50" North and longitude 80°17'14" longitude West.

III.2 Standard Industrial Classification Code

This facility is classified as follows:

Major Group No. 49 - Electric, Gas, and Sanitary Services

Group No. 494 - Water Supply

Industry No. 4941 - Water Supply System

III.3 Facility Category

Miami-Dade Water and Sewer Authority Department (Hialeah and Preston Wastewater Treatment plants) is classified as a minor facility.

The proposed project will emit approximately 25 tons/year of volatile organic compounds (VOC). The impact of these pollutant emissions are under the acceptable ambient concentration levels (AAC) recommended by the Department.

IV. PROJECT DESCRIPTION

This project consists of 64 stripping towers (Hialeah, 20 units and Preston, 44 units). The Hialeah and John E. Preston Water Plant Wellfields have provided a water supply for northern

Dade County for many years. During the 1970's, the wellfields became contaminated with volatile organic compounds (VOC) from industrial activity within the area. An air stripping process was selected to remove the VOC from the potable water supply. Air stripping is a physical process which exposes a large surface area of the water to a much larger volume of the turbulent air. This allows the release of the VOC from the water into the process air. The contaminated air is exhausted into the atmosphere.

Background Information

The Biscayne Aquifer is one of the most productive aquifiers in the world and the sole source of drinking water for three million residents of southeast Florida. Due to the close proximity of the Biscayne Aquifer to the ground surface and the limestone composition of this aquifer, it is extremely vulnerable to contamination. The Biscayne Aquifer was contaminated by three of Florida's highest priority sites for super fund assistance (Varsol Spill site, Northwest 58th Street Landfill, and Miami Drum Company) in addition to areawide contamination of the Biscayne Aquifer.

There are four public wellfields in the study area; 1) Medley Well Field, 2) Miami Springs Well Fields, 3) Preston Well Field, and 4) Northwest Well Field. The Medley Well Field has been closed since 1982. The Northwest Well Field, with an installed capacity of 150 million gallons per day (mgd), became operational in mid-1983. Since the installation of the Northwest Well Field, production at the Miami Springs and Preston Well Fields has been cut dramatically, to approximately 10 mgd.

The Centers for Disease Control consider the contamination of the Biscayne Aquifer a serious potential threat to the public health. Contaminants found in the aquifier include vinyl chloride, 1,1,2,2,-tetrachloro- ethane, methylene chloride, 1,1,-dichlorethane, 1,1-dichloroethene, benzene, and acrylonitrile.

The vinyl chloride detected in the groundwater is a result of biodegradation of tri- and tetrachloroethylene to vinyl chloride and its derivatives. The vinyl chloride contamination is not caused strictly by improper disposal methods of business handling this chemical compound but, instead, anyone handling common solvents such as tri- and tetrachloroethylene. This includes handlers of large quantities of solvents as well as small quantities, businesses and homeowners alike.

Clean up goals for each contaminant were established based on the few existing potable water standards and the most recent toxicological information available.

V. RULE APPLICABILITY

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2, FAC.

Hialeah and John E. Preston Water Treatment Plant Wellfields are located in a designated nonattainment area for ozone. This area, Dade County, is designated attainment for the remaining pollutants, Rule 17-2.410 and 17-2.420, FAC.

This project, construction and operation of the air stripping towers, is exempt from the New Source Review Requirements for Nonattainment Areas, Rule 17-2.510, FAC, because it will not cause a significant increase of emissions of volatile organic compounds (VOC) and any regulated pollutant.

This facility shall be permitted under Rule 17-2.520, FAC, Sources Not Subject to Prevention of Significant Deterioration or Nonattainment Requirements. The proposed source shall comply with Florida Administrative Code 17-2.620(1) and 17-2.620(2).

VI. EMISSIONS SUMMARY

VI.1 Emission Limitations

The operation of the air stripping towers will produce emissions of VOC and non-criteria air pollutants. The impact of the toxic pollutant emissions are below the acceptable ambient concentration levels (AAC). These AAC are calculated according to the Department procedures. Table 1 and Table 2 list each contaminant and its concentration level.

VI.2 Air Quality Analysis

The Department has reviewed the proposed project to determine the potential for the ambient air quality impacts contributing to the ambient air quality exceedance for ozone. The pollutants which will be emitted to the atmosphere include a wide variety of hydrocarbon and chlorine compounds (VOC). VOC as a group, participate in the formation of ozone. The annual emissions of VOC from the two proposed facilities combined are approximately 20 tons per year. This is less than the 100 tons per year threshold necessary to invoke the new source review requirements of the ozone nonattainment regulations. The Department is satisfied that these facilities will not significantly contribute to the ozone exceedances occurring in Dade County.

The Department has also reviewed the specific toxic compounds emitted, many of which are carcinogenic. The applicant has provided a list of these compounds and their estimated

emission rates. Most of these compounds are not specifically regulated, however, the Department has developed guidelines for evaluating their potential impact on health. Two of these compounds, trichloromethane and vinyl chloride, may approach their respective guideline acceptable ambient air quality level. This would only occur during the two-week breakpoint chlorination period completed annually. The acceptable ambient levels are not rigorously determined thresholds for human health effects. They are used in conjunction with other factors to assess the adequacy of proposed emissions control. For these facilities, additional control was not deemed necessary to protect the health of the community.

VII. CONCLUSION

Based on the review of the data submitted by Miami-Dade Water and Sewer Authority, the Department of Environmental Regulation concludes that compliance with all applicable state air quality regulations will be achieved provided certain specific conditions are met. The impact of installing and operating the 64 stripping towers at their facility will not cause or contribute to a violation of any ambient air quality standard or endanger health.

Table 1 Acceptable Ambient Concentrations

Contaminant	Max. Concentration in Raw Water ppb	Preston Wellfield after Air Stripping (1) ppb	Removal (percent) (2)	Acceptable Ambient Concentration (mg/m^3)	Annual Emission Rate - Proposed Annual Operation - Max. Use of Contaminated Water Hialeah Plant @ 52 MGD (tons/yr) 20 Towers	Preston Plant @ 142 MGD (tons/yr) 44 Towers	Hialeah & Pre Combined @ 194 MGD (tons/yr)
1,1,2,2, Tetrachloroethane	20			0.017	0.0103	0.0281	0.0384
1,1, Dichloroethane	22.3			0.019	0.2058	0.5618	0.7676
Vinyl Chloride	28	0.003	99.62%	0.024	0.2548	0.6958	0.9506
1,1 Dichloroethylene			98.9%		0.0340	0.0930	0.1270
Vinylidene Chloride	56	0.006	98.9%	0.048			
Methylene Chloride	294			0.25	0.0206	0.0562	0.0768
1,2 Dichloroethene 1,2 Dichloroethylene	2,214	1.92	78%	1.88	1.4010	3.8250	5.2260
Trichloroethylene	756	.03	98.9%	0.64	0.1979	0.5403	0.7382
Chlorobenzene	980	.01	98.9%	0.83	0.0665	0.1815	0.2480
o-Chlorotoluene	700	.01	98.9%	0.59	0.0752	0.2053	0.2805
p-Dichlorobenzene	1,260	0.1	99.92%	1.07	0.0665	0.1815	0.2480
o-Dichlorobenzene	840	.001	98.4%	0.71	0.0515	0.1405	0.1920
Trichloromethane (chloroform)	140			0.12	2.3225	6.3443	8.6668
Dichlorobromomethane	144	2.3	99%	0.1223	0.4568	1.2477	1.7045
Chlorodibromomethane	255			0.2174	0.2036	0.5562	0.7598
Tribromomethane	14			0.012	0.1471	0.4018	0.5491
Total VOC					2.3841	6.5090	8.8931
Total THM					3.1300	8.5500	11.6800
Total VOC and THM					5.5141	15.0590	20.5731

(1) and (2) Source: Northwest Wellfield Protection Plan, Table 2, Page 27, October 1985.
(3) Acceptable Ambient Concentrations levels calculated according to DER-BAQM air stripping policy.
(1) It is estimated that the Hialeah and Miami-Springs Wellfields are similarly contaminated. Therefore the air stripping process will have the same effect.

Table 2
Effectiveness of Air Stripping at Preston WTP
(100:1 air to water ratio)

Parameter	Preston Wellfield after current treatment		Removal (percent)	Preston Wellfield after air stripping		DER Drinking Water Standards (ppb)	Blending 70% Northwest Wellfield with 30% Preston Wellfield & Air Stripping	
	Concentration (ppb)	Predicted Cancer Risk per 10^6 pop.		Concentration (ppb)	Predicted Cancer Risk per 10^6 pop.		Concentration (ppb)	Predicted Cancer Risk per 10^6 pop.
Vinyl Chloride	3.79	252.7	99.92	.003**	2.000	1	.001**	.667
Vinylidene Chloride	.51	2.1	98.9*	.006**	.088		.002**	.030
Trans-1,2-Dichloroethene	8.71		78*	1.92			.58	
1,1-Dichloroethane	3.06		98.9*				.01**	
Cis-1,2-Dichloroethene	12.12		78	2.67			.80	
1,1,1-Trichloroethane	.00		98.9*			200		
1,2-Dichloroethane	.00		78*			3		
Tetrachloromethane	.00					3		
Trichloroethylene	2.97	1.7	98.9	.03	.017	3		
Tetrachloroethylene	.00		98.9*			3		
Chlorobenzene	.99		98.9	.01**			.02**	
O,M,P-chlorotoluene	1.12		98.9	.01**			.01**	
M,P-dichlorobenzene	.99		99.92	.001**			.01**	
0-dichlorobenzene	.76		98.4	.01**			.003**	
Benzene	--					1		
Ethylene Dibromide	.00					.02		
THMs	22.5	76.5***	99%	.23	.810***	100	.25	.850***
TOTALS	57.52	333		4.92	2.915		1.69	1.547

* Presumed % removal determined by comparing Henry's Coefficient of each compound to Henry's Coefficient of compounds evaluated during EPA air stripping demonstration in February, 1984.

** Below analytical detection limit for that compound.

***Risk calculated assuming 100% of THM analysis is chloroform.

Note: Probablistic risk estimations are based on data published in the June 12 Federal Register and presume consumption of 2 liters of drinking water over a 70 year lifespan.

Source: Northwest Wellfield Protection Plan, Page 27, October 1985.

Florida Department of Environmental Regulation

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

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

PERMITTEE:
Miami-Dade Water and Sewer Authority Dept.
P. O. Box 330316
Miami, FL 33233-0316

Permit Number: AC 13-147823
Expiration Date: Nov. 30, 1990
County: Dade
Latitude/Longitude: 25° 49' 50" N
80° 17' 14" W
Project: Hialeah Air Stripping Towers

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

For the construction of 20 air stripping units to be located at 700 West 2nd Avenue in Hialeah, Dade County, Florida. The UTM coordinates are 71,510 M east and 56,580 M north.

Construction shall be in accordance with the permit application, plans, documents, amendments, and drawings submitted, except as noted in the General Conditions and the Specific Conditions.

Attachments:

1. Application to Operate/Construct Air Pollution Sources, DER Form 17-1.202(1) dated April 6, 1988.
2. Department's letters dated May 5 and June 29, 1988.
3. Miami-Dade Water and Sewer Authority Department's letters of June 7 and July 7, 1988.

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147823
Expiration Date: November 30, 1990

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. This facility shall be allowed to operate continuously, 168 hours/week.

2. The acceptable ambient concentration levels (AAC) and the emission rates listed in the following (Table 1) for each pollutant shall not be exceeded. The actual ambient air impact shall be based on the calculated emissions and the PTPLU Model results.

PERMITTEE:
Miami-Dade Water and Sewer Authority Dept.

Permit Number: AC 13-147823
Expiration Date: November 30, 1990

SPECIFIC CONDITIONS:

Table 1
Contamination, Acceptable Ambient Concentrations, and Emissions

	Max. Concentration in Raw Water ppb	Acceptable Ambient Concentration (mg/m^3)	Hialeah & Preston Combined @ 194 MGD (tons/year)
1,1,2,2, Tetrachloroethane	20	0.017	0.0384
1,1, Dichloroethane	22.3	0.019	0.7676
Vinyl Chloride	28	0.024	0.9506
Vinylidene Chloride	56	0.048	
1,1 Dichloroethylene			0.1270
Methylene Chloride	294	0.25	0.0768
1,2 Dichloroethene 1,2 Dichloroethylene	2,214	1.88	5.2260
Trichloroethylene	756	0.64	0.7382
Chlorobenzene	980	0.83	0.2480
o-chlorotoluene	700	0.59	0.2805
p-Dichlorobenzene	1,260	1.07	0.2480
o-Dichlorobenzene	840	0.71	0.1920
Trichloromethane (chloroform)	140	0.12	8.6668
Dichlorobromomethane	144	0.1223	1.7045
Chlorodibromomethane	255	0.2174	0.7598
Tribromomethane	14	0.012	0.5491
Total VOCs and Trihalomethane (THM)			20.5731

3. The concentration in the raw water feeding the stripping tower shall not exceed the value listed in Table 1.

4. This facility is allowed to perform the chloramine process continuously. The breakpoint chlorination process shall not be performed for more than 2 weeks in a calendar year.

5. In accordance with FAC Rule 17-2.620(2), no person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor.

6. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, the Department must be notified in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit, (Rule 17-2, FAC).

7. To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with compliance test results and Certificate of Completion, to the Department's Southeast Florida District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate (Rules 17-2 and 17-4, FAC).

8. If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application (Rule 17-4, FAC).

9. Upon obtaining an operating permit, the permittee will be required to submit quarterly reports on the actual operation of these air stripping towers. These reports shall include but are not limited to the following: influent concentration (ppb), effluent concentration (ppb), stripping factor, maximum influent flowrate (GPM), maximum air flow rate (CFM), calculated ambient air impact concentrations, etc. These reports shall be sent to the Department's Southeast Florida Distict office.

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147823
Expiration Date: November 30, 1990

SPECIFIC CONDITIONS:

10. This facility shall comply with all applicable provisions under Florida Statutes Chapter 403 and Department Rules Chapter 17-2 and 17-4, Florida Administrative Code.

Issued this_____day of_____, 1988

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

_____
Dale Twachtmann, Secretary

Florida Department of Environmental Regulation

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

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

PERMITTEE:
Miami-Dade Water and Sewer Authority Dept.
P. O. Box 330316
Miami, FL 33233-0316

Permit Number: AC 13-147824
Expiration Date: Nov. 30, 1990
County: Dade
Latitude/Longitude: 25° 49' 50" N
80° 17' 14" W
Project: Preston Water Treatment Plant

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

For the construction of 44 air stripping units to be located at 1100 West 2nd Avenue Preston Water Treatment Plant in Hialeah, Dade County, Florida. The UTM coordinates are 71,510 M east and 56,580 M north.

Construction shall be in accordance with the permit application and plan, documents, amendments, and drawings submitted, except as noted in the General Conditions and the Specific Conditions.

Attachments:

1. Application to Operate/Construct Air Pollution Sources, DER Form 17-1.202(1) dated April 6, 1988.
2. Department's letters dated May 5 and June 29, 1988.
3. Miami-Dade Water and Sewer Authority Department's letters of June 7 and July 7, 1988.

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147824
Expiration Date: November 30, 1990

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147824
Expiration Date: November 30, 1990

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. This facility shall be allowed to operate continuously, 168 hours/week.

2. The acceptable ambient concentration levels (AAC) and the emission rates listed in the following (Table 1) for each pollutant shall not be exceeded. The actual ambient air impact shall be based on the calculated emissions and the PTPLU Model results.

PERMITTEE:
Miami-Dade Water and Sewer Authority Dept.

Permit Number: AC 13-147824
Expiration Date: November 30, 1990

SPECIFIC CONDITIONS:

Table 1
Contamination, Acceptable Ambient Concentrations, and Emissions

	Max. Concentration in Raw Water ppb	Acceptable Ambient Concentration (mg/m^3)	Hialeah & Preston Combined @ 194 MGD (tons/year)
1,1,2,2, Tetrachloroethane	20	0.017	0.0384
1,1, Dichloroethane	22.3	0.019	0.7676
Vinyl Chloride	28	0.024	0.9506
Vinylidene Chloride	56	0.048	
1,1 Dichloroethylene			0.1270
Methylene Chloride	294	0.25	0.0768
1,2 Dichloroethene 1,2 Dichloroethylene	2,214	1.88	5.2260
Trichloroethylene	756	0.64	0.7382
Chlorobenzene	980	0.83	0.2480
o-chlorotoluene	700	0.59	0.2805
p-Dichlorobenzene	1,260	1.07	0.2480
o-Dichlorobenzene	840	0.71	0.1920
Trichloromethane (chloroform)	140	0.12	8.6668
Dichlorobromomethane	144	0.1223	1.7045
Chlorodibromomethane	255	0.2174	0.7598
Tribromomethane	14	0.012	0.5491
Total VOCs and Trihalomethane (THM)			20.5731

3. The concentration in the raw water feeding the stripping tower shall not exceed the value listed in Table 1.

4. This facility is allowed to perform the chloramine process continuously. The breakpoint chlorination process shall not be performed for more than 2 weeks in a calendar year.

5. In accordance with FAC Rule 17-2.620(2), no person shall cause, suffer, allow, or permit the discharge of air pollutants which cause or contribute to an objectionable odor.

6. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, the Department must be notified in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit, (Rule 17-2, FAC).

7. To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with compliance test results and Certificate of Completion, to the Department's Southeast Florida District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate (Rules 17-2 and 17-4, FAC).

8. If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application (Rule 17-4, FAC).

9. Upon obtaining an operating permit, the permittee will be required to submit quarterly reports on the actual operation of these air stripping towers. These reports shall include but are not limited to the following: influent concentration (ppb), effluent concentration (ppb), stripping factor, maximum influent flowrate (GPM), maximum air flow rate (CFM), calculated ambient air impact concentrations, etc. These reports shall be sent to the Department's Southeast Florida Distict office.

PERMITTEE:
Miami-Dade Water and
Sewer Authority Dept.

Permit Number: AC 13-147824
Expiration Date: November 30, 1990

SPECIFIC CONDITIONS:

10. This facility shall comply with all applicable provisions under Florida Statutes Chapter 403 and Department Rules Chapter 17-2 and 17-4, Florida Administrative Code.

Issued this_____day of_____, 1988

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

_____
Dale Twachtmann, Secretary

ATTACHMENTS AVAILABLE UPON REQUEST

Federal Express Airbill No. 774-8714-142
7.8.88
Miami, FL

File Copy

RECEIVED
JUL 11 1988
DER - BAQM

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT
P. O. BOX 330316
MIAMI, FLORIDA 33233-0316
Main Office
3575 S. LeJeune Road
Telephone 665-7471

Federal Express

July 7, 1988

RECEIVED
JUL 08 1988
DER - BAQM

Mr. Clair H. Fancy
Deputy Chief
Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Air Stripping Permit Applications for the Hialeah and Preston Air Stripping Facilities AC13-147823 and AC13-147824

Dear Mr. Fancy:

On April 4, 1988, our Department forwarded air permit applications for the subject projects. Your letter of May 5, 1988 requested additional information which was provided by our letter of June 7, 1988. Your Department has questioned the reduction of volatile organic compound (VOC) concentrations listed in our letter of June 7 which were much lower than the concentrations listed in our original application.

The VOC concentrations in our initial application were taken from the Stone and Webster Report titled "Air Quality Study - Final Report", dated August 1987. These concentrations represent the maximum VOC concentrations detected in any monitoring or production well within the wellfield study area during the EPA Biscayne Aquifer Study Project. The concentrations do not necessarily indicate peak VOC's in any one production well. They do not represent the peak concentrations present for any of the four wellfields and certainly do not indicate the peak concentrations in the raw water supply to the subject project. The updated concentrations forwarded in our June 7, 1988 letter were based on values given in Table II, on page 27, of the attached report titled the "Northwest Wellfield Protection Plan." The report was written by a Technical Advisory Committee whose membership included representatives of the Environmental Protection Agency, the State of Florida Department of Environmental Regulation and Dade County Department of Environmental Resources Management. These values represent the

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AIRBILL NUMBER 7748714142

7748714142

Date 7/8/88

From (Your Name) Please Print: Robert B. Fergen, P.E.

Your Phone Number (Very Important): (305) 665-7471

Company: MIAMI DADE WATER & SEWER AUTH

Department/Floor No.:

Street Address: 3575 S LEJUENE RD RM 212

City: MIAMI State: FL ZIP Required For Correct Invoicing: 3 3 1 3 3

To (Recipient's Name) Please Print: Mr. Clair H. Fancy

Recipient's Phone Number (Very Important): ( )

Company: Bureau of Air Quality Management Florida DER

Department/Floor No.:

Exact Street Address (Use of P.O. Boxes or P.O. • Zip Codes Will Delay Delivery And Result In Extra Charge.): 2600 Blair Stone Road

City: Tallahassee State: Florida ZIP Street Address Zip Required: 32399-2400

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Street Address

City State Zip

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9 ☐ SATURDAY PICK-UP (Extra charge)

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		LBS		
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average VOC concentrations of the raw water supply for the subject projects. The calculation of yearly emissions forwarded in our June 7, 1988 letter are based on the average concentration of VOC's and the ultimate combined plant flow capacity of 194 million gallons per day.

We apologize for the misunderstanding and trust that this additional information fully addresses your concerns.

Very truly yours,

Garrett Sloan
Director

GS/REF/fb

Enclosure

cc: Mr. John Renfrow, Director, DERM
Copied: Teresa Heron - NW Wellfield Protection Plan study - will be returned to main file after review

CHF/BT
Stephanie Brooks - SE FL Dist.

Return to Main File
AC 13-147823 & -147824
Air Stripping Permits.

NORTHWEST WELLFIELD PROTECTION PLAN

October 1985

Wellfield Policy Advisory Committee
Wellfield Technical Committee
Department of Environmental Resources Management
Dade County Planning Department
111 N.W. First Street
Miami, Florida 33128

P 702 175 468

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
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(See Reverse)

Sent to Mr. Garrett Sloan, Miami-Dade W & SA	
Street and No. P.O. Box 331316	
P.O., State and ZIP Code Miami, FL 33233-0316	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date: Mailed: 6-29-88 Permit: AC 13-147823 AC 13-147824	

PS Form 3800, June 1985

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

3. Article Addressed to:
Mr. Garrett Sloan, Director
Miami-Dade Water and Sewer
Authority Department
P. O. Box 330316
Miami, FL 33233-0316

4. Article Number
P 702 175 468

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

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X

7. Date of Delivery 7 1 88

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

PS Form **3811**, Mar. 1987 ★ U.S.G.P.O. 1987-178-268 **DOMESTIC RETURN RECEIPT**

Florida Department of Environmental Regulation

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

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

June 29, 1988

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Garrett Sloan, Director
Miami-Dade Water and Sewer Authority
Department
P.O. Box 330316
Miami, Florida 33233-0316

Dear Mr. Sloan:

Re: Air Stripping Projects - Application Numbers AC 13-147823
AC 13-147824

The Bureau of Air Quality Management (BAQM) has received the additional information for your air permit applications submitted on June 8, 1988.

We have reviewed your data and determined that all the requested information was not provided, therefore, your applications are still not complete.

We acknowledge the fact that the breakpoint chlorination vs the chlorination process increases 16 times the concentration of trihalomethanes (THMs). However, it is not clear why the concentrations of the other VOC compounds (including vinyl chloride) listed on the table submitted are also reduced. Please explain.

We will resume processing your applications as soon as the requested information is provided.

If you have any questions, please call Teresa M. Heron at (904)488-1344 or write to me at the above address.

Sincerely,

for C. H. Thomas

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

CHF/plm
cc: Isidore Goldman
Patrick Wong

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee

To: _____ Location: _____

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To: _____ Location: _____

From: _____ Date: _____

Interoffice Memorandum

TO: Steve Smallwood

FROM: Clair Fancy

DATE: November 9, 1990

SUBJ: Amendments to Construction Permit Nos. 13-147823 and 824
Miami-Dade Water and Sewer Authority

Attached for your approval and signature is a letter extending the expiration dates for the above referenced construction permits.

The Bureau recommends approval of this amendment.

CF/TH/plm

Attachment

OK
BA

Federal Express

Airbill 774-8714-282
6-7-88
Miami, FL

File Copy

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

Federal Express

June 7, 1988

RECEIVED
JUN 8 1988
DER-BAQM

Mr. Clair H. Fancy
Deputy Chief
Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Subject: Modification of Air Permit Applications for the Hialeah and Preston Air Stripping Projects Application Numbers AC13-147823 and AC13-147824

Dear Mr. Fancy:

Your letter of May 5, 1988 indicated that the VOC emissions for the subject projects will exceed the 100 ton per year threshold limit making it subject to FAC 17-2.510. We have reviewed your letter and believe that there is a misunderstanding regarding the intended operation of the proposed installation as stated in our letter of April 4, 1988.

The primary purpose of the air stripping facilities is to remove the volatile organic compounds (VOC's) from the treated potable water in order to comply with Florida's VOC MCL's. A secondary benefit of the facilities might allow the optional treatment by breakpoint chlorination of the water for improved color removal. The breakpoint chlorination process forms approximately 16 times the concentration of trihalomethanes (THMs) formed by the presently practiced method of chloramine disinfection. The proposed air stripping process would then remove the THMs formed by this disinfection process. The 100 ton per year threshold would only be exceeded if we applied breakpoint chlorination on a continual basis. We have had to abandon the breakpoint chlorination concept and our application is based on the present operating mode of chloramine disinfection supplemented with breakpoint chlorination for an annual two week period each November to purge the water distribution system of possible chloramine resistant bacterial growths. This annual

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21 6060N 7748714282

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Date 6/7/88

1 From (Your Name) Please Print: Mr. Robert E. Fergen, P.E.
Your Phone Number (Very Important): (305) 665-7471
Company: MIAMI DADE WATER & SEWER AUTH
Department/Floor No.:
Street Address: 3575 S LEJEUNE RD RM 215
City: MIAMI
State:
ZIP Required For Correct Invoicing: 33133

2 To (Recipient's Name) Please Print: Mr. Clair H. Fancy
Recipient's Phone Number (Very Important):
Company: Bureau of Air Quality Management
Florida DER
Department/Floor No.:
Exact Street Address (Use of P.O. Boxes or P.O. Zip Codes Will Delay Delivery And Result in Extra Charge.): 2600 Blair Stone Road
City: Tallahassee
State: Florida
ZIP Street Address Zip Required: 32399-2400

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6 DRY ICE ____ Lbs.
7 OTHER SPECIAL SERVICE
8
9 SATURDAY PICK-UP (Extra charge)
10

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	LBS		
	LBS		
	LBS		
Total	Total	Total	

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Cash Received
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Street Address
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Date/Time Received FedEx Employee Number

Federal Express Use
Base Charges
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Origin Agent Charge
Other
Total Charges

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application of breakpoint chlorination has been practiced during the past five years.

The attached Air Stripping Evaluation Worksheet has been modified by the addition of several compounds which are detected in the raw water but are not of significant health risk in the potable water. Because of the reduced concern for these compounds, they were not included in the Air Quality Study by Stone and Webster previously submitted. Another modification includes the addition of the average concentration of all VOC's and THM's after chloramine disinfection and after breakpoint chlorination disinfection during full utilization of the contaminated wells.

The average VOC concentrations are based on Table 2 of "The Northwest Wellfield Protection Plan", October 1985. A factor determined by the maximum installed capacity from the contaminated wellfield is multiplied times the average contamination of the inner wellfield to determine the average concentration of the contaminants to the air stripping towers. The average concentration of 1,1,2,2, tetrachloroethane which was not included in the Northwest Wellfield Report, was calculated by multiplying the vinyl chloride ratio of average concentration divided by peak concentration times the peak concentration for 1,1,2,2 tetrachlorethane. The THM concentrations for chloramine disinfection are based on the THM for the Northwest Wellfield which is slightly higher than the contaminated wellfields. For the THM concentrations formed by breakpoint chlorination, the analyses performed during November 1987 are presented.

As presented above, these water treatment plants operate using chloramine disinfection for 50 weeks of the year. For 2 weeks of each year, the subject facilities use breakpoint chlorination for disinfection. Based on full utilization of the contaminated wells, the VOC and THM emissions for the current treatment process are presented for each facility and for the combined facilities on the attached worksheet. The Hialeah Plant's annual emission rate is 5.51 tons per year. The Preston Plant has an annual emission rate of 15.06 tons per year. The combined annual emission rate of 20.57 tons per year is well below the 100 tons per year threshold for FAC 17-2.510.

Also, the low concentration of the emitted VOC's and THM's are well below all established standards. We believe that air pollution reduction methods would be of very limited benefit and should not be required for this facility. Based on data in the enclosed article, the cost of processing the air is over three times the cost of treating the water. You will recall from our

previous letter that EPA believes that potable water air stripping towers do not require air pollution control devices.

These projects have been designed, reviewed and approved by EPA and other DER divisions for the performance of air stripping. They are to be partially funded (41 percent) under the Super Fund program of EPA, so that a timely resolution of the outstanding issues is vital to our maintaining funding eligibility and proceeding with construction. If you require additional information, or have any questions, please call me or Mr. Robert Fergen at 305-665-7471.

Very truly yours,

Garrett Sloan
Director

GS/REF/fb

cc: Mr. D. Twachtmann, Secretary, FDER Tallahassee
Mr. N. Rhodes, Division Director of Environmental Program
Mr. Wilkins, Division Director, Division of Waste Mgmt.
Mr. Anthony Clemente, Director, DERM

Copied: Teresa Heron
CHF/BT
Anthony Clemente, DERM
S. Brooks, SE Dist
6.9.88 mp

AIR STRIPPING EVALUATION WORKSHEET

Contaminant Name	Previously Submitted Max. Conc. (ppb)	Average Concentrations Maximum Use of Contaminated Wells: Chloramine Disinfection (ppb)	Average Concentrations Maximum Use of Contaminated Wells: Breakpoint Chlorination (ppb)	Annual Emission Rate - Proposed Annual Operation - Maximum Use of Contaminated Wells: Hialeah Plant @ 52 MGD (Tons/Yr.) 20 Towers	Annual Emission Rate - Proposed Annual Operation - Maximum Use of Contaminated Wells: Preston Plant @ 142 MGD (Tons/Yr.) 44 Towers	Annual Emission Rate - Proposed Annual Operation - Maximum Use of Contaminated Wells: Hialeah & Preston Combined @ 194 MGD (Tons/Yr.)
Volatile Organic Compounds (VOC's)						
1. 1,1,2,2 Tetrachloroethane	3.0	0.13	0.13	0.0103	0.0281	0.0384
2. 1,1 Dichloroethane	51.0	2.60	2.60	0.2058	0.5618	0.7676
3. Vinyl Chloride	74.7	3.22	3.22	0.2548	0.6958	0.9506
4. 1,1 Dichlorethylene	20.7	0.43	10.43	0.0340	0.0930	0.1270
5. Methylene Chloride	6.0	0.26	0.26	0.0206	0.0562	0.0768
6. 1,2 Dichloroethene	NA	17.70	17.70	1.4010	3.8250	5.2260
7. Trichloroethylene	NA	2.50	2.50	0.1979	0.5403	0.7382
8. Chlorobenzene	NA	0.84	0.84	0.0665	0.1815	0.2480
9. O,M,P Chlorotoluene		0.95	0.95	0.0752	0.2053	0.2805
10. Dichlorobenzene	NA	0.65	0.65	0.0515	0.1405	0.1920
11. M,P Dichlorobenzene	NA	0.84	0.84	0.0665	0.1815	0.2480
Trihalomethanes (THM's)						
12. Trichloromethane	300.0	18.55	300.00	2.3225	6.3443	8.6668
13. Dichlorobromomethane	59.0	3.65	59.00	0.4568	1.2477	1.7045
14. Chlorodibromomethane	26.3	1.63	26.30	0.2036	0.5562	0.7598
15. Tribromomethane	19.0	1.17	19.00	0.1471	0.4018	0.5491
TOTAL VOC		30.12	30.12	2.3841	6.5090	8.8931
TOTAL THM		25.00	404.30	3.1300	8.5500	11.6800
TOTAL VOC & THM		55.12	434.42	5.5141	15.0590	20.5731

Using GAC to Remove VOCs From Air Stripper Off-Gas

John C. Crittenden, Randy D. Cortright, Brad Rick, Shin-Ru Tang, and David Perram

This article focuses on the technical and economic feasibility of treating air stripper off-gas with granular activated carbon (GAC). For dichloroethene and trichloroethene, air stripping followed by off-gas GAC treatment was shown to be very effective and economical compared with aqueous-phase GAC treatment, with GAC usage rates for gas-phase adsorption being less than one half those for aqueous-phase adsorption. Also, because gas-phase adsorption kinetics are much faster than liquid-phase kinetics, the required bed depth and diameter are much smaller for gas-phase beds. Steam regeneration was found to be ineffective for regeneration gas-phase GAC at low concentrations.

In recent years, air strippers have been used to remove volatile organic chemicals (VOCs) from contaminated groundwater. There have been concerns, however, about the air pollution resulting from VOC removal. In this study, a treatment scheme that uses a fixed-bed granular activated carbon (GAC) adsorber with on-site steam regeneration was evaluated for removing VOCs from air stripper off-gas (Figure 1).

During this process, air from the top of the air stripper is heated to reduce the relative humidity, and then the VOCs are removed by GAC. Once the treatment objective is exceeded, the GAC is taken off-line and steam-regenerated. It was anticipated that, following this step, the steam condensate would form a separate organic phase that could be decanted. In this study, however, a large amount of steam was required to desorb trichloroethene (TCE) at the low GAC loadings found with off-gas concentrations of 1-5 μg TCE/L (STP). Consequently, very little separate organic phase was formed, and TCE in the steam condensate had to be treated with aqueous-phase GAC. The success of steam regeneration for other VOCs will depend on their adsorbability, and it is likely that similar problems will occur for similar gas-phase concentrations. Finally, once the gas-phase GAC is regenerated, it must be dried to remove the water from its pores and cool it down. Because the drying gas is also a considerable source of pollution, it must be treated by mixing it with the off-gas from the tower (Figure 1).

The following issues concerning the design of the integrated stripping and GAC process were evaluated:

- mass transfer models were developed to predict the effluent concentration history from gas-phase adsorbers and were verified by comparing them with field pilot data,
- the GAC usage rates and bed sizes for aqueous- and gaseous-phase treatment were compared for the commonly occurring VOCs in groundwater by Cortright et al,[1]
- a thermodynamic model describing

TABLE 1
Properties of carbon used in study

Parameter	Value
Carbon	A*
Size of carbon	4 × 6 mesh
Average diameter (d_p)	0.3715 cm
Apparent density (ρ_a)	0.85 g/cm³
Density of carbon (ρ_c)	2.1 g/cm³
Particle void fraction (ϵ_p)	0.595
Bed density (ρ_b)	0.52-0.55 g/cm³
Bed void fraction (ϵ)	$1.0 - \rho_b/\rho_a$
Total surface area (N_2, BET)	1,050-1,150 m²/g

*Calgon Corp., Pittsburgh, Pa.

TABLE 2
Henry's constants for volatile organic chemicals

Compound	Henry's Constant (50°F [10°C])	Reference	Heat of Dissolution cal/gM
Trichloroethylene	0.116	Hand et al[24]	3.41×10^3
Tetrachloroethylene	0.295	Hand et al[24]	4.29×10^3
Carbon tetrachloride	0.556	Kavanaugh et al[25]	4.05×10^3
1,1,1-Trichloroethane	0.172	Kavanaugh et al[25]	3.96×10^3
1,2-Dichloroethane	0.023	Solubility, vapor pressure data	3.93×10^3
Vinyl chloride	265.0	Kavanaugh et al[25]	
Dichloromethane	0.0484	Solubility, vapor pressure data	
1,1-Dichloroethene	0.935	Singley et al[26]	5.66×10^3
cis-1,2-Dichloroethene	0.0934	Hand et al[24]	3.48×10^3
Benzene	0.106	Kavanaugh et al[25]	3.68×10^3
Toluene	0.117	Singley et al[26]	4.17×10^3
m-Xylene	0.093	Solubility, vapor pressure data	3.80×10^3
Chlorobenzene	0.069	Singley et al[26]	
1,2-Dichlorobenzene	0.0896	Solubility, vapor pressure data	

the impact of relative humidity on GAC equilibrium capacity for VOCs was developed and verified by Tang et al,[2]

- thermodynamic models that predict competitive interactions for a binary mixture were developed and verified by Tang et al,[2]
- a correlation that may be used to estimate single solute isotherm capacity was verified,[2]
- the feasibility of using steam and liquid carbon dioxide to regenerate VOC-laden GAC was evaluated by Rick et al,[3] and
- based on bench- and pilot-scale work, the costs of air stripping with and without GAC treatment and of aqueous-phase GAC treatment were compared by Rick et al.[3]

In the parts of the study just cited, both the thermodynamic and mass transfer models were verified by comparing them with field data; consequently, they may be used for design purposes. This article focuses on the use of models for determining the cost of treatment, GAC usage rate, and bed design and examines the feasibility of steam regeneration.

Experimental methods and materials

Figure 2 is a schematic diagram of the gas-phase adsorption pilot plant. The source of contaminated air was a slip stream from an existing full-scale stripping tower. The relative humidity was controlled by passing the air through an electric heater. Temperature and relative humidity were measured and the gas was analyzed before and after each vessel. An accumulated air flow meter was used to determine the total amount of gas flowing through the pilot plant. The diameter of the pilot-plant column was 10.42 in. (26.47 cm), which is sufficient to prevent channeling.

The physical properties of the GAC used in the experimental phase of the study are listed in Table 1.

Gas-phase samples were analyzed according to US Environmental Protection Agency reference method 23, the only difference being that an electron capture detector and a 10-ft (3-m) packed column* were used.[4]

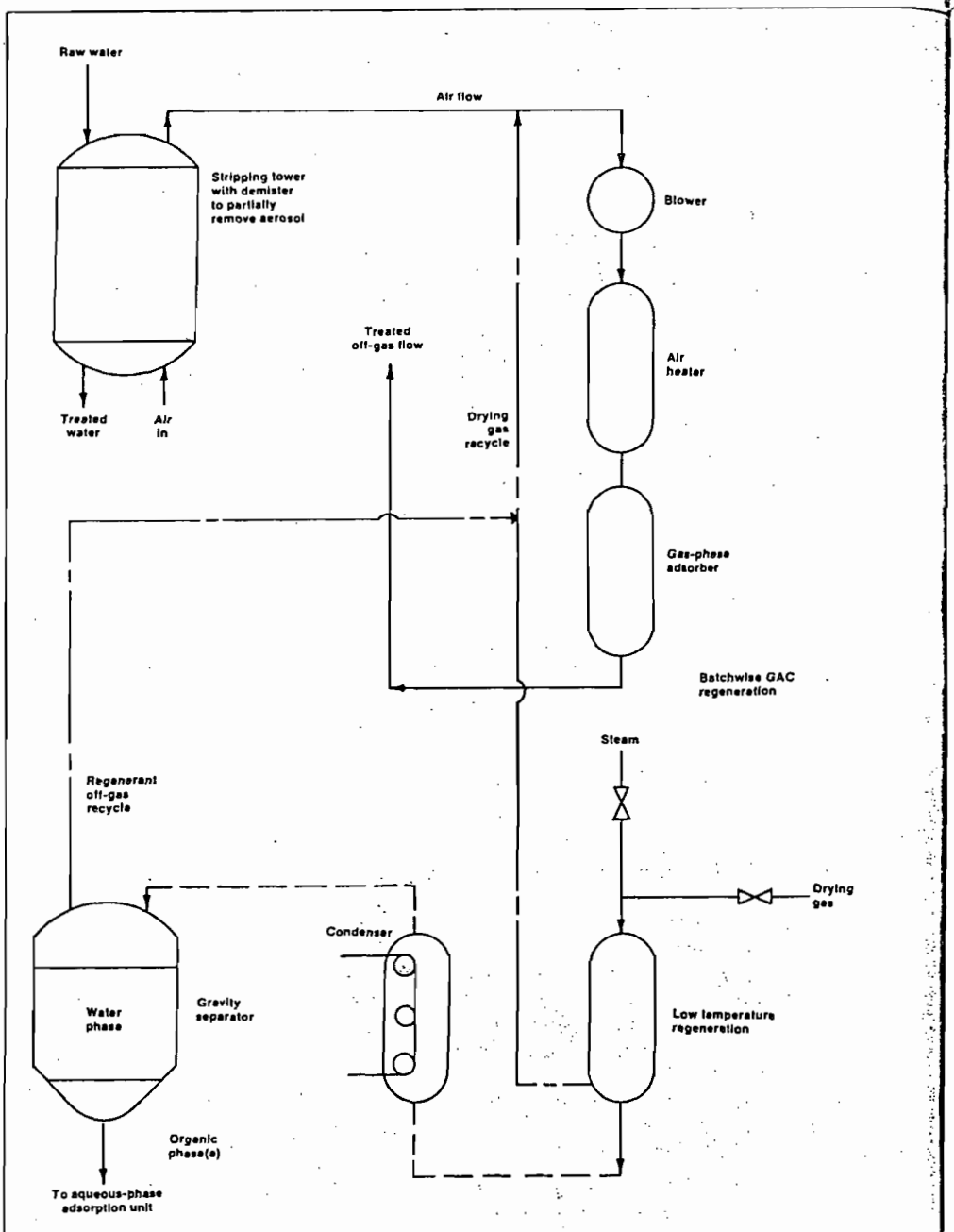

Figure 1. Treatment scheme for removing VOCs from air stripper off-gas

Thermodynamic and mass transfer models

Correlation of single-solute gas-phase isotherms. In this study, the Dubinin-Radushkevich (D-R) isotherm was shown to correlate the isotherms of several VOCs.[2] Based on that work and the work of Reucroft et al[5] and Rasmuson,[6] the following form of the D-R equation was used to estimate the gas-phase capacity:

$$q = \rho_L W = \rho_L W_o \exp\left[(-B\epsilon_D^2)/\alpha^2\right] \quad (1)$$

$$\epsilon_D = RT \ln (P_s/P) \quad (2)$$

in which α, the polarizability, may be calculated from the Lorentz-Lorenz equation if it is not known:

$$\alpha = [(n^2 - 1)M]/[(n^2 + 2)\rho_L] \quad (3)$$

If the refractive index is not known, it may be estimated from a summation of atomic and structural contributions.[7]

Equations 1 and 2 were found to correlate isotherm data for compounds with dipole moments less than 2 debyes [2×10^{-18} esu-cm];[5] W_o and B depend only on the nature of the adsorbent. Therefore, when the data are plotted as W versus $(\epsilon_D/\alpha)^2$ for a given adsorbent, the data conform to essentially one line for different adsorbates and temperatures. For this study, the constants W_o and B for carbon A† were 0.46 cm^3/g and 3.22×10^{-5} cm^6/cal^2, respectively.

An important limitation of the D-R equation, which must be considered when it is used to predict gas-phase capacity, is that it accounts for only physical adsorption by weak physical forces. Thus, it cannot be used to account for adsorption capacity when capillary condensation occurs. If P/P_s is much less than 0.2, capillary condensation is unimportant. This condition is met for typical VOC levels in air stripping off-gas.

Correlation of single-solute liquid-phase isotherms. Speth[8] demonstrated that the following correlation could be used to

*0.2 percent carbowax 1500 on 60/80 carbopack C, Supelco Inc., Bellefonte, Pa.

†BPL Calgon Corp., Pittsburgh, Pa.

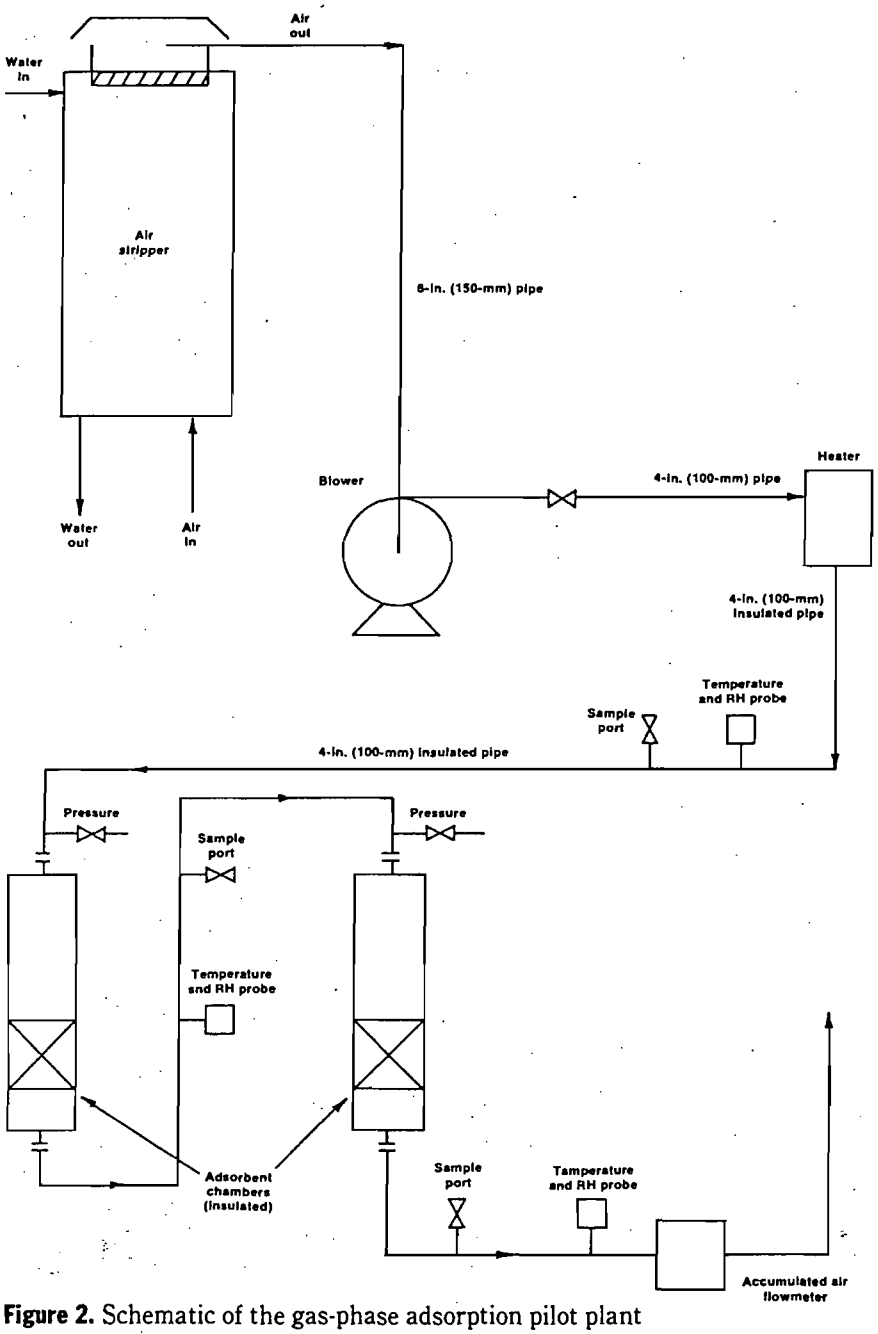

Figure 2. Schematic of the gas-phase adsorption pilot plant

calculate the Freundlich isotherm parameters for 10 hydrophobic liquid compounds, including halogenated aliphatic and aromatic compounds:

$$q = \rho_L W = \rho_L W_o \exp\left\{-B[(RT \ln C_S/C)/V]^\gamma\right\} \quad (4)$$

An average error of about 10 percent was observed for the Freundlich parameters. This correlation was therefore used to predict the single-solute capacity of liquid-phase GAC. When the aqueous-phase GAC capacity is compared with the gas-phase GAC capacity, the parameters used in Eq 4 are for carbon B.† For carbon B, W_o, B, and γ were found by Speth[8] to be 0.6299 cm³/g, 0.02766 (cm³/cal),[1.208] and 1.208, respectively.

Impact of relative humidity. The thermodynamic model proposed by Okazaki et al[9] was used to predict the impact of relative humidity (RH) on VOC adsorption capacity. The three basic mechanisms included in the model are shown in Figure 3. In larger pores that have not been filled by the capillary condensation of water vapor, VOCs adsorb onto essentially dry walls without competition from adsorbed water because there are very few hydrophilic sites on the GAC surface. The VOC capacity of this surface area, Q^o_{o1}, is given by the D-R equation.

In smaller pores where capillary condensation of water has taken place, VOCs will be dissolved into the condensed phase. The amount of VOCs in the condensed phase, Q_{o2}, is given by the following equations:

$$C_i = (P_i/H) \exp[-(V_{mi}/V_{H_2O}) \ln (RH/100)] \quad (5)$$

$$Q_{o2} = V_c C_i \quad (6)$$

Equation 5 contains a term that accounts for the impact of a curved meniscus on the partitioning of solute into the pore. A detailed derivation of this equation is given by Tang et al.[2] The Henry's constants for TCE as a function of temperature were calculated using the results of Gosset et al.[10]

The amount of condensed volume, V_c, which is assumed to be mostly water, was given by the water vapor isotherm reported by Freeman and Reucroft.[11] Because water vapor isotherms exhibit hysteresis when the adsorption isotherm is compared with the desorption isotherm, more discussion on the evaluation of V_c is required. According to the data of Okazaki et al,[9] hydrophobic compounds do not affect the hysteresis of the water vapor isotherm. Therefore, if RH is controlled and remains constant, the amount of condensed volume is given by the adsorption isotherm. On the other hand, if the adsorber has been exposed to high humidity and then lower humidity, the condensed volume is given by the water vapor desorption curve. This is very important for the operation of the adsorber because it implies that if the adsorber has been exposed to high humidities, it will be necessary to dry out the bed at much lower humidities in order to remove the adsorbed water. The required RH for removing water from these pores would be given by the water desorption isotherm.

Another contribution to the GAC loading in the condensed phase is aqueous-phase adsorption onto the pore walls, Q^o_{o3}. An aqueous phase isotherm was used to estimate the amount of TCE adsorbed onto the wet pore surface in the condensed phase:

$$Q^o_{o3} = K C^{1/n} \quad (7)$$

The Freundlich parameters for TCE adsorption onto carbon A, K and $1/n$, are 893 μg/g (L/μg)$^{1/n}$ and 0.3985, respectively, and are valid for a concentration range of 15–102 μg/L.

To calculate the aqueous-phase capacity at other temperatures, the aqueous-phase TCE isotherm was fit to Eq 4. Itaya et al[12] showed that the correlation given by Eq 4 was independent of temperature for several adsorbate-adsorbent systems. Thus, Eq 4 was considered accurate enough to estimate the effect of temperature.

The remaining variables that must be estimated are the fraction of wet surface

†F-400, Calgon Corp., Pittsburgh, Pa.

area, S_w/S_t, and the fraction of dry surface area, S_d/S_t. These fractions were estimated from the pore size distribution, which was taken from the manufacturer's bulletin,[13] and the amount of condensed volume, V_c.

The total VOC loading on the GAC is then given by

$$Q_o = Q^o_{o1}(S_d/S_t) + Q_{o2} + Q^o_{o1}(S_w/S_t) \quad (8)$$

Competitive interactions between VOCs. For relative humidities of less than approximately 45 percent, capillary condensation of water vapor is insignificant and has little impact on the capacity of carbon A. Thus, only competitive interactions between VOCs need to be considered when RH is controlled before GAC treatment. Tang et al[2] demonstrated experimentally that competitive interactions between VOCs could be predicted using ideal adsorbed solution theory (IAST) and Polanyi potential theory. These thermodynamic models are very useful because competitive interactions are predicted from single-solute isotherms.

Mass transfer models. Four mass transfer models were compared in this study in order to determine the necessary degree of complexity that is required to predict fixed-bed behavior: (1) the dispersed-flow pore-surface diffusion model (DFPSDM), (2) the dispersed-flow homogeneous surface diffusion model (DFHSDM), (3) the plug-flow homogeneous surface diffusion model (PFHSDM), and (4) the film transfer constant pattern model (FTCPM).

The most complex model, DFPSDM, incorporates mathematic descriptions of axial transport by advective and dispersive flow, diffusion resistance in the gas phase surrounding the adsorbent particle, local equilibrium adjacent to the exterior of the adsorbent surface and within the pores, pore and surface diffusion resistance within the adsorbent, and competitive equilibrium of solutes on the carbon surface. Crittenden et al[14] and Friedman[15] have presented the equations and their solutions.

The three simpler models can be compared with the DFPSDM in order to describe their essential assumptions. The DFHSDM contains mechanisms identical to those of the DFPSDM except that the contribution of the pore diffusion is dropped. The PFHSDM ignores the contribution of axial dispersion and pore diffusion. The simplest model, FTCPM, includes only film transfer resistance. Friedman[15] demonstrated that the pore diffusion contribution was only necessary when multicomponents were present and the mass transfer zones overlapped. In this study, pore diffusion and axial dispersion were not needed to predict the effluent concentration history profiles of a binary mixture of tetrachloroethene (PCE) and TCE.[1] Furthermore, the FTCPM was found to be adequate for calculating breakthrough profiles for single components with constant influent concentrations, because this is the major mass transfer resistant as long as the pores of the GAC are not filled with condensed water vapor.[1] (This occurs for carbon A at RH values <45 percent.)

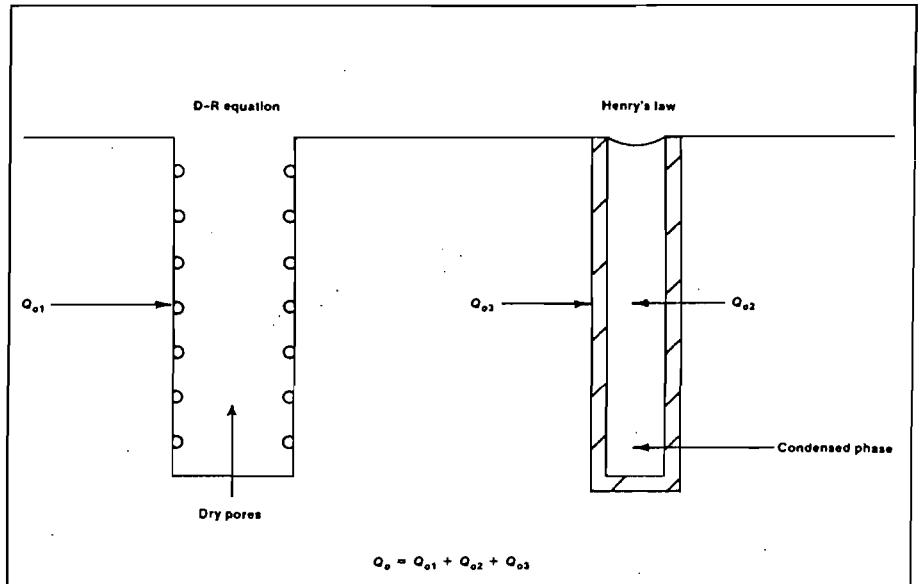

Figure 3. Model for predicting the impact of relative humidity on VOC adsorption

The analytical solution to the FTCPM by Fleck et al[16], for the case in which $1/n$ is less than 1.0, is reported here because it is not complicated to use:

$$T = \frac{t}{\tau D_g} = \frac{1}{3St}\left[1 + \ln\left(\frac{C}{C_o}\right) - \left\{\left(\frac{1}{n-1}\right)\ln\left[1-\left[\left(\frac{C}{C_o}\right)^{(n-1)}\right]\right\} + \gamma + 1\right] \quad (9)$$

in which γ is defined by the following series:

$$\gamma = \frac{1/n}{[(1/n)-1]} \sum_{k=1}^{\infty} \frac{1/n}{k\{k[1-(1/n)]+(1/n)\}} \quad (10)$$

In order for Eqs 9 and 10 to be used, the bed must be long to establish a mass transfer zone that remains constant in shape, and the D-R equation must be fit to the Freundlich equation. The Freundlich isotherm parameters can be determined by fitting the D-R equation over a limited concentration range.[1] The condition for a constant shape of the mass transfer zone is known as constant pattern and is discussed by Hand et al.[17]

Mass transfer parameter estimation

In order for the mass transfer models to be used, estimates of the following parameters are needed: the molecular diffusion coefficient, D_m; axial dispersion coefficient, D_e; film transfer coefficient, k_f; pore diffusion coefficient, D_p; and surface diffusion coefficient, D_s. The Wilke-Lee[18] modification of the Hirschfelder-Bird-Spotz correlation was used to estimate gas diffusion coefficients. The axial dispersion coefficient was calculated using the following correlation proposed by Miyauchi and Kikuchi:[19]

$$D_e/V_i d_h = 1/Pe_z = 1/1.4\,Pe_m + [1-(1-e^{-2x})/2x]/x\,Pe_h \quad (11)$$

$$x = 22/Pe_m^{2/3} \quad (12)$$

The gas-phase film transfer coefficient was estimated using the following correlation, which was proposed by Wakao and Funazukri:[20]

$$Sh = 2 + 1.1\,Re^{0.6}\,Sc^{0.33} \quad (13)$$

This correlation is valid for Reynolds numbers between 3 and 10,000. Because film transfer was the most important diffusion resistance, short fixed-bed tests were conducted in order to compare film transfers coefficients with Eq 13.[1] In this study, it was found that Eq 13 was within 15 percent of the observed values for Reynolds numbers between 50 and 200 for both TCE and PCE. This Reynolds number regime is within the normal operating limits of gas-phase adsorbers. For the liquid-phase mass transfer coefficient, the correlation proposed by Williamson et al[21] was used.

The pore diffusion flux was found to be negligible in gas-phase adsorption. Consequently, the methods used to estimate it are not discussed here but

have been previously reported by Cortright et al.[1]

The surface diffusion coefficient was found by fitting effluent breakthrough data from several gas-phase pilot-plant studies. To make the results more general, this coefficient was compared to a correlation proposed by Dobrezelewski.[22] The correlation is based on the observation that the surface flux is approximately a constant factor times the pore flux for a number of VOCs in the aqueous phase. The factor, known as the surface-to-pore-diffusion flux ratio (SPDFR), was used as the fitting parameter:

$$D_s = |(D_m \epsilon_p C_u / (\rho_a K C_u^{1/n})| \times (\text{SPDFR}) \quad (14)$$

A good description of the gas-phase data was obtained with an SPDFR of 16, but the upper boundary of the 95 percent confidence limit could not be determined because the mass transfer rate was limited by film diffusion. For aqueous-phase calculations, an SPDFR of 3.72 was used because it was found by Dobrezelewski[22] and Crittenden et al[23] to describe the data for several VOCs.

Results and discussion

Air-stripping process design. The design of the gas-phase adsorber depends on the design of the air stripper. The volumetric flow rate and gas-phase concentrations will depend on the air-to-water ratio, the groundwater VOC concentration, the treatment objective, and the Henry's constant of the VOC. Hand et al[24] discussed a design procedure for packed-tower air strippers that minimizes tower volume and energy consumption. In that and other work, Hand et al found that for most compounds an air-to-water ratio of approximately 3.5 times the reciprocal of the Henry's constant gave the smallest tower volume and energy consumption. In that work, a range of Henry's constants from 0.093 to 265 was examined. Consequently, this factor was used to determine the volumetric air flow rate and gas-phase concentrations. Table 2 reports the Henry's constants and the heat of dissolution that was used to account for the impact of temperature on the Henry's constant. In this study, it was assumed that the groundwater temperature was 50°F (10°C) and that the off-gas was heated to 75°F (24°C) to eliminate the effect of humidity. Table 3 reports optimum designs for air-stripping towers that remove some common groundwater contaminants at a flow rate of 2.16 mgd (8.17 ML/d) and an influent concentration of 100 μg/L.

Gaseous-phase adsorptive capacity. The adsorption capacities of different adsorbents for VOCs were compared by using their D-R parameters, obtained from the vendors or from isotherms in the literature.[2] No significant differences in GAC capacity for VOCs were expected for the commercially available GACs with the highest VOC capacity. Only one carbon could be tested, however, given the resource requirements of bench- and pilot-scale tests and of detailed modeling. Consequently, carbon A was used in this study because it is widely used for gas-phase treatment. It must be emphasized, however, that significant differences between GACs are expected in terms of hardness and the success of steam regeneration.

Gaseous-phase GAC usage rates. Figures 4 and 5 show the expected GAC usage rates for VOCs commonly occurring in groundwater. These were calculated assuming a treatment objective of 1 μg/L in water and essentially no discharge from the off-gas and that the GAC was totally exhausted. With the appropriate air-to-water ratio, the usage rates as grams of GAC per litre of water treated are reported as a function of the aqueous-phase concentration. With respect to the impact of RH, the usage rates in Figures 4 and 5 are for 75°F (24°C) and RH less than about 45 percent.

For RH values <45 percent, competitive interactions between VOCs can be very

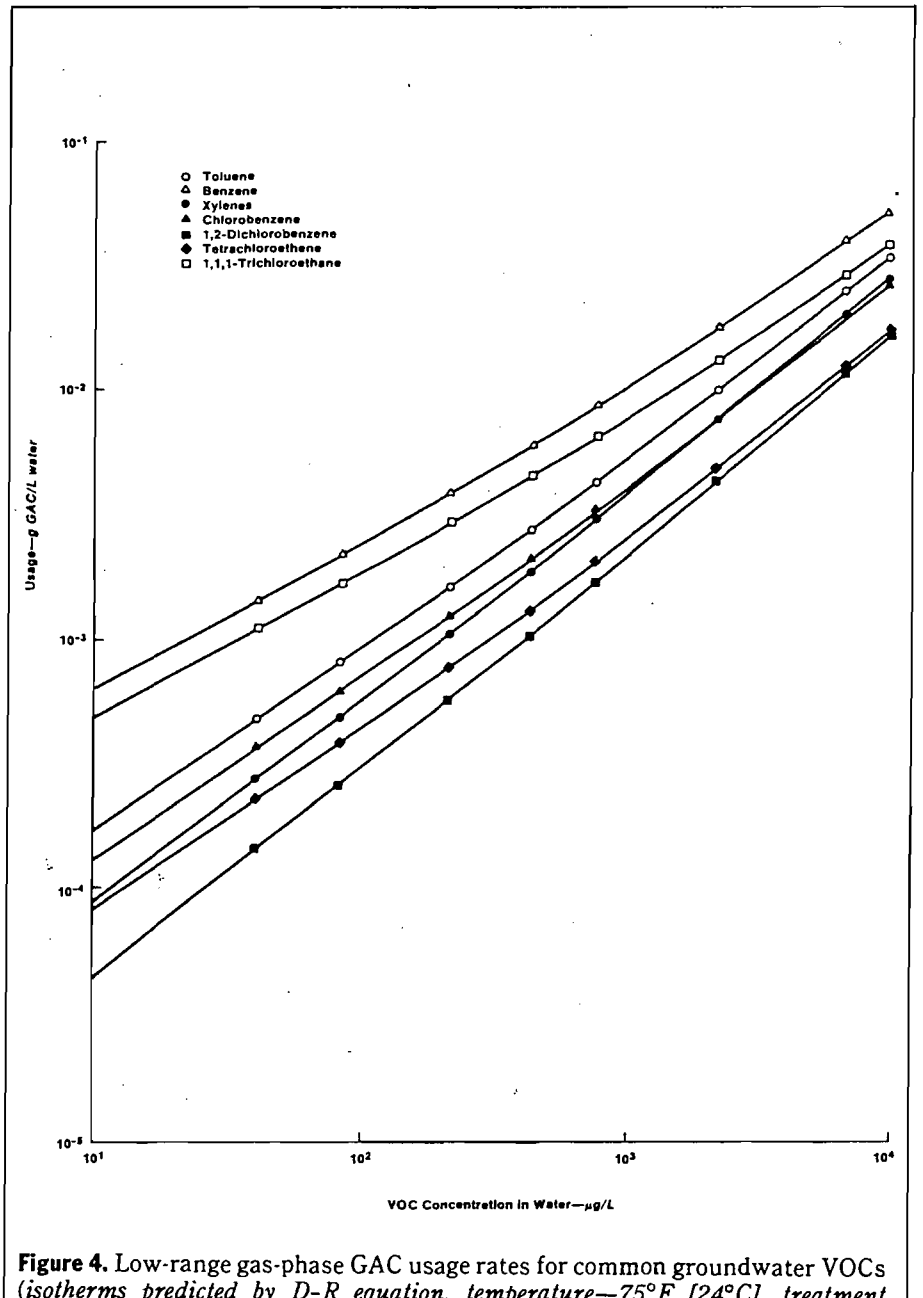

Figure 4. Low-range gas-phase GAC usage rates for common groundwater VOCs (*isotherms predicted by D-R equation, temperature—75°F [24°C], treatment objective—1.0 μg/L in the treated water*)

significant and can greatly increase the GAC usage rate. For example, with PCE gas-phase concentrations that were about 10 times lower than those for TCE, Tang et al[2] found that the solid-phase concentrations of both PCE and TCE were lower by about 20–40 percent. From this it can be concluded that small concentrations of PCE can lower the GAC capacity for TCE and that the PCE loadings can be lowered significantly if the TCE concentration is much higher than the PCE concentration. In general, however, the solid-phase loadings for PCE and TCE depend on the specific gas-phase concentrations, and the gas-phase usage rate can be calculated using IAST and the equilibrium column model (ECM).[27] For example, according to the ECM, the usage rates for PCE and TCE are 0.615 and 2.19 mg GAC/L water treated, respectively, when they are both present in the water at a concentration of 100 μg/L for an air-to-water ratio of 30.0. For comparison, carbon usage rates of 0.603 and 1.89 mg/L are needed when the VOCs are present as single solutes.

Air- and aqueous-phase GAC usage rates. Table 4 compares the GAC usage rates for aqueous- and gaseous-phase adsorption. To determine the gas-phase concentration, the treatment objective was set at 1 μg/L in water, the air-to-water ratios in Table 4 were used, and the GAC was assumed to be in equilibrium with the inlet concentration in the air or water. The aqueous- and gaseous-phase isotherm parameters for the VOCs were calculated using Eq 4 and 1, respectively. The temperature of the water was assumed to be 50°F (10°C), and the air was heated to 75°F (24°C) to lower the RH to 40 percent. According to Table 4, the aqueous-phase usage rate is about two to four times greater than that observed in the gaseous phase.

The aqueous-phase calculations presented in Table 4, however, were calculated from isotherms for organic-free water. When usage rates with organic-free water were compared with pilot- and full-scale data, it was seen that much more carbon is required in the latter cases because of competitive interactions between VOCs and natural organic matter.[28,29] For example, for influent concentrations of 25–50 μg TCE/L, usage rates of 10–20 mg carbon/L water were observed. This contrasts with the 4.5 mg/L shown in Table 4 (for an influent concentration of 100 μ/L); the different influent concentrations would not explain this difference in usage rates.[29] Thus, the aqueous-phase usage rates given in Table 4 can be considered the lowest possible values.

The gas-phase usage rates for TCE reported in Table 4, however, were comparable to pilot data. Thus, aqueous-phase usage rates may be more than four times greater than gas-phase usage rates.

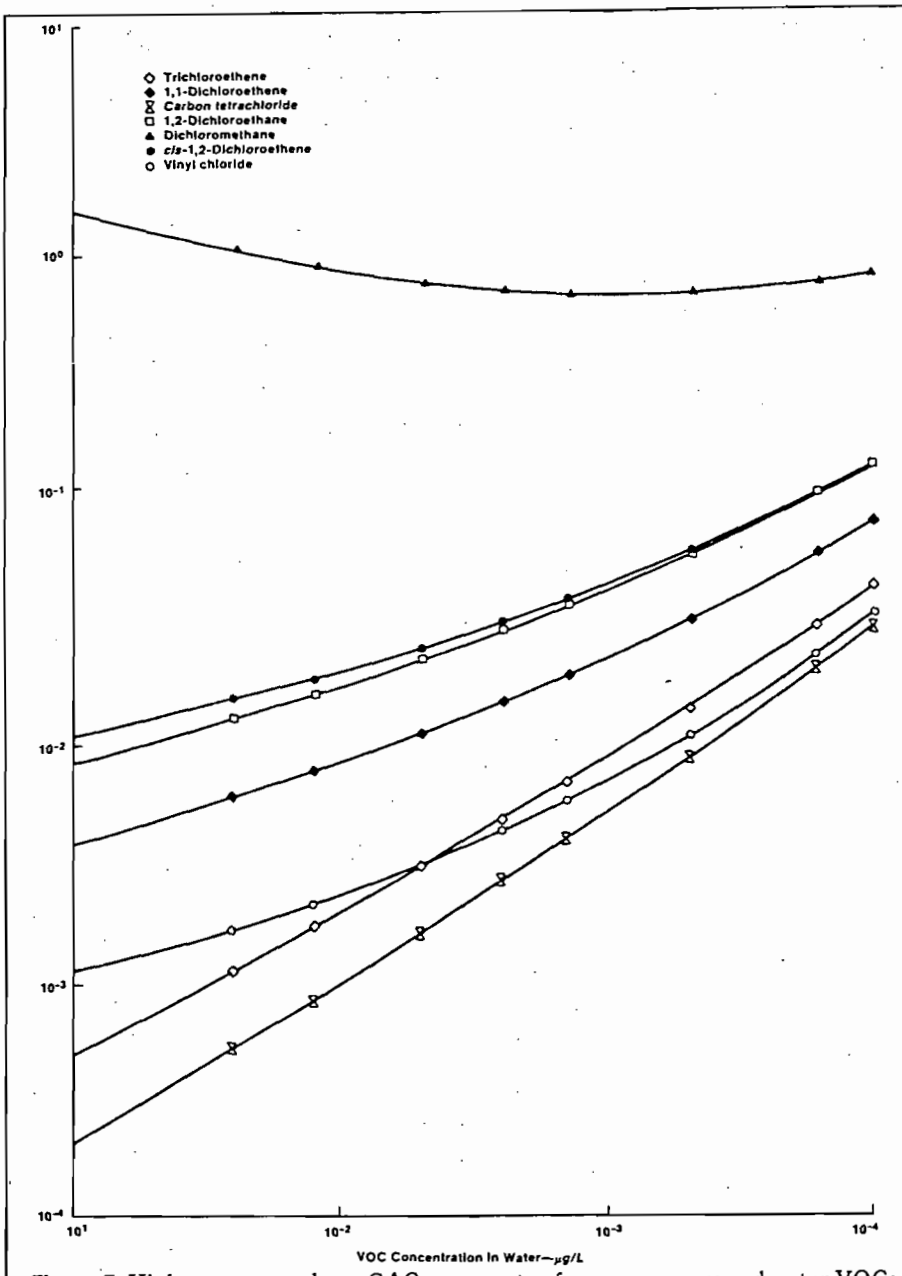

Figure 5. High-range gas-phase GAC usage rates for common groundwater VOCs *(isotherms predicted by D-R equation, temperature—75°F [24°C], treatment objective—1.0 μg/L in the treated water)*

TABLE 3

*Typical air stripping designs for removal of commonly occurring volatile organic chemicals**

Compound	Henry's Constant	Air-to-Water Ratio	Air Stripper Length *ft (m)*	Diameter of Packed Column *ft (m)*
Trichloroethylene	0.116	29.9	38.03 (11.59)	8.10 (2.47)
Tetrachloroethene	0.295	11.8	43.77 (13.34)	5.97 (1.82)
Carbon tetrachloride	0.556	6.2	44.88 (13.68)	4.95 (1.51)
1,1,1-Trichloroethane	0.172	20.1	40.06 (12.21)	7.09 (2.16)
1,2-Dichloroethane	0.023	150.6	33.47 (10.20)	14.89 (4.54)
Dichloromethane	0.048	71.59	28.61 (8.72)	11.12 (3.39)
cis-1,2-Dichloroethene	0.093	37.10	34.88 (10.63)	8.73 (2.66)
Vinyl chloride	265.0	0.013†	59.58 (18.16)	1.90 (0.58)
Benzene	0.106	32.69	36.25 (11.05)	8.37 (2.55)
Toluene	0.117	29.62	39.04 (11.90)	8.07 (2.46)
m-Xylene	0.093	37.26	40.49 (12.34)	18.34 (5.59)
Chlorobenzene	0.069	50.29	37.60 (11.46)	22.74 (6.93)
1,2-Dichlorobenzene	0.090	38.67	40.45 (12.33)	8.86 (2.70)

*Water flow rate—2.16 mgd (8.17 ML/d), inlet water concentration—100.0 μg/L, water treatment objective—1.0 μg/L, air stripper temperature—50°F (10°C), air stripper packing pressure drop—50.0 (N/m²) / m packing, air stripper packing—3-in. plastic saddles

†Theoretical calculation based on the extremely high Henry's constant

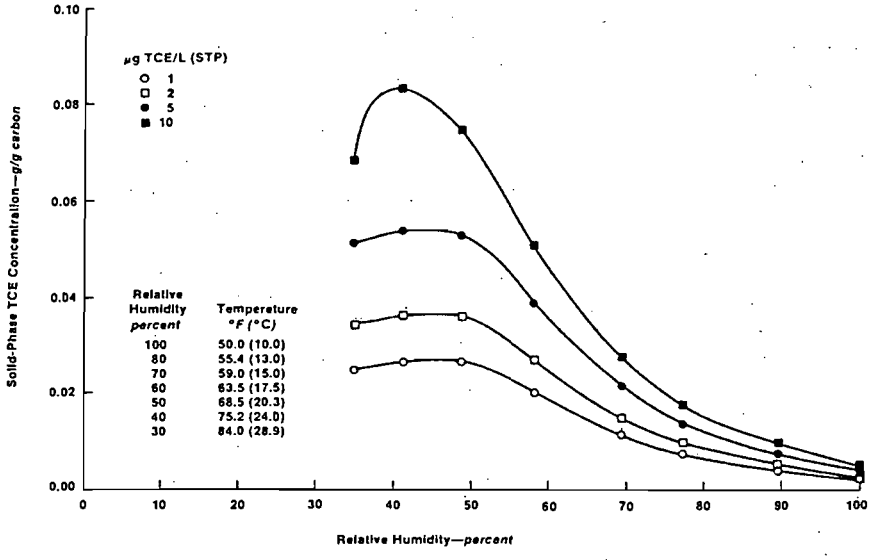

Figure 6. Impact of relative humidity on GAC capacity for TCE

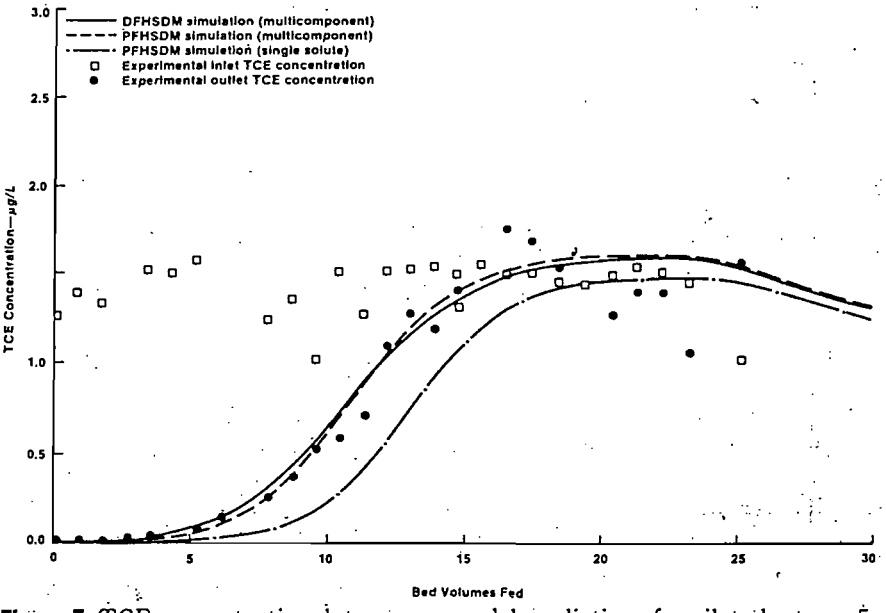

Figure 7. TCE concentration data versus model predictions for pilot-plant run 5 *(gas concentrations are reported at STP, VOCs—TCE and PCE, bed depth—2.7 in. [7.0 cm], velocity—70.2 cm/s, temperature—75.6°F [24.2°C], relative humidity—41.5 percent)*

TABLE 4

*Comparison of GAC usage rates for gaseous- and aqueous-phase adsorption**

Compound	Aqueous Phase *mg/L H_2O*	Gas-Phase Ratio	Air-to-Water Ratio
TCE	4.47	1.89	29.8
PCE	1.68	0.459	11.8
CCl_4	2.69	0.980	6.2
1,1,1-TCA	13.3	1.93	20.1
1,2-DCE	19.6	15.5	150.6
CH_2Cl_2	33.2	838.0	71.6
1,1-DCE	17.6	7.61	3.7
cis-1,2-DCE	21.6	17.8	37.1
Vinyl chloride	212.0	2.20	0.0130†
Benzene	9.94	2.53	32.7
Toluene	2.22	0.968	29.6
m-Xylene	0.916	0.593	37.3
Chlorobenzene	2.23	0.729	50.3
1,2-Dichlorobenzene	0.683	0.316	38.7

*Influent aqueous phase concentration—100μg/L
†Theoretical calculation based on the extremely high Henry's constant

Impact of relative humidity. The impact of RH was investigated by heating the off-gas from the air-stripping tower and by assuming that the RH is 100 percent at 50°F (10°C). Figure 6 shows the effects of controlling the RH on the adsorption of TCE. These results were calculated using the Okazaki model which was verified by Tang et al.[2] The RH and corresponding temperatures are given in Figure 6. At high RH values, a majority of the pores are filled with water and the GAC capacity is substantially reduced. As the temperature increases, the RH is reduced, drying more of the pores and increasing the capacity. As soon as the pores are mostly dry, however, further heating reduces the capacity. At RHs between 40 and 50 percent, the effects of RH and temperature balance out and a maximum loading is obtained. Although the results in Figure 6 are just for TCE, it is expected that similar results would be obtained for other VOCs, except for those that have a lower gaseous-phase capacity than aqueous-phase capacity.

Verification of mass transfer models. To verify the mass transfer models used to size the GAC contactors, data from three pilot-plant runs were compared with the mass transfer models. Velocities ranging from 25 to 75 cm/s and two beds in series with depths of 2-4 in. (5-11 cm) were used (Figure 2). In spite of the fact that these beds were very thin, two to six weeks were required to saturate the beds, and the mass transfer zones were shorter than the bed depth. For example, in Figure 7, 10 million bed volumes fed corresponds to 11.5 days for a bed depth of only 2.7 in. (7 cm) with a velocity of 70.2 cm/s.

Figure 7 compares the pilot-plant TCE data for a velocity of 70.2 cm/s with the mass transfer models. Because no kinetic studies were conducted, the SPDFR (16.0) used to calculate the surface diffusivity was determined by comparing the DFHSDM with the pilot-plant data, which were obtained at a velocity of 25.1 cm/s. In Figure 7, the average influent concentration for PCE was 0.35 μg/L (STP). For the pilot-plant run shown in Figure 7, IAST was used to describe competitive interactions between PCE and TCE in the mass transfer models.[1] According to Figure 7, the two-component DFHSDM and PFHSDM predict the impact of PCE on the TCE effluent profile, and the competitive interactions from PCE must be considered. Furthermore, dispersion is negligible. Comparisons between PFHSDM and other pilot data were as good as the results shown in Figure 7. Thus, PFHSDM can be used for the design of gas-phase adsorbers when multiple components are present.

Sensitivity analyses and other comparisons demonstrated that the FTCPM (Eqs 9 and 10) is adequate to predict breakthrough of single components when

RH is <45 percent.[1] The only mass transfer parameter that is required, k_f, can be calculated from Eq 13. Thus, the mass transfer zone lengths can be calculated using Eqs 9, 10, and 13.

GAC contactor sizes. Table 5 compares the mass transfer zone (MTZ) lengths and bed cross-sectional areas of the gaseous- and aqueous-phase treatment systems. Table 4 lists the air-to-water ratios used to size the gaseous-phase GAC contactors and to yield the variable cross-sectional areas reported in Table 5. Equation 14 was used to estimate the surface diffusion coefficient, and the HSDM solutions given by Hand et al[17] were used to estimated the MTZ lengths. The assumptions that were built into these calculations are (1) the SPDFR for the aqueous phase was 3.72, (2) the SPDFR for the gaseous phase was 16.0, (3) the water temperature was 50°F (10°C), (4) the RH was lowered to 45 percent by heating the off-gas to 75°F (24°C), (5) the MTZ length contained the C/C_o range 0.95–0.05, (6) the GAC was in a fixed position, and (7) single-solute adsorption was taking place.

For the aqueous-phase calculations, the assumptions of fixed-bed, single-solute adsorption, and a liquid-phase SPDFR of 3.72 need further discussion. With respect to the fixed bed, backwashing of the liquid phase GAC can destroy the MTZ, and a deeper bed or multiple beds in series may be required.[29] There was evidence of this in a field-scale unit that treated 0.1415 mgd (0.5356 ML/d) after each backwashing. (This unit was 7 ft [2.13 m] in diameter, and the GAC depth was 4.33 ft [1.32 m].) In that study, a hydraulic loading of 2.55 gpm/sq ft (6.25 m/h) was used to treat an anaerobic groundwater, and a gentle backwashing between 2.8 and 3.6 gpm/sq ft (6.85 and 8.80 m/h) was required only every two to four months.

The assumptions of a SPDFR of 3.72 and single-solute adsorption in the aqueous phase are optimistic. The value of 3.72 for the SPDFR was determined in organic-free water, and it was found that an SPDFR of 0.4 was needed to describe the effluent concentration history profile of *cis*-dichloroethene (DCE) when 8 mg TOC/L of natural organic matter (NOM) was present.[29] If an SPDFR of 0.4 was used to calculate the aqueous MTZ lengths, they would be about 10 times longer than those given in Table 5. Moreover, Crittenden et al[29] and Zimmer et al[28] found that as the empty bed contact time (EBCT) or adsorbability increased, smaller SPDFRs were required to describe VOC effluent concentration history profiles in the field when NOM was present. It was speculated that as the time of bed operation increased, NOM impeded the intraparticle mass transfer rate. Furthermore, Hand et al[30] found that the MTZ for DCE increased from 2.3 to 14.6 min of EBCT as the EBCT of the column increased from 1.01 to 10.4 min. In the study by Hand et al,[30] the influent DCE concentration was 70.9 μg/L, and about 8 mg TOC/L of NOM was present. These MTZs are considerably longer than the EBCTs of MTZs given in Table 5, which range from 2.4 to 3.6 min. Thus, the results for the aqueous-phase MTZ calculations must be considered the smallest possible, whereas the gas-phase results should be viewed as fairly accurate.

The MTZs reported in Table 5 should be compared with the following considerations in mind. The best two-beds-in-series design for saturating the GAC would use an individual bed length equal to the MTZ. For gas-phase adsorption, the MTZs are very short; consequently, a more economical design would involve a single adsorber that is more than three to five times longer than the MTZ.

For liquid-phase adsorption, a general bed operation based on the MTZ lengths in Table 5 cannot be made. However, some observations from the field are instructive. Hand et al[30] showed that the GAC usage rate for a single contactor decreased until the EBCT was greater than about 10 min for a velocity of 1.93 gpm/sq ft (4.72 m/h) for a DCE concentration of 70.9 μg/L. Furthermore, these researchers showed that two beds in series with an EBCT of 5 min gave usage rates that were >76 and 43 percent lower than those of single contactors with 10

TABLE 5

*Comparison of GAC mass transfer zone lengths and cross-sectional areas for gaseous and aqueous phase systems**

Compound	Aqueous-Phase MTZ *ft (m)*	Gas-Phase MTZ *ft (m)*	Cross-sectional Area *sq ft (m^2)*
TCE	1.899 (0.5787)	0.142 (0.0433)	121 (11.3)
PCE	1.653 (0.5039)	0.099 (0.0301)	47.9 (4.45)
CCl_4	1.803 (0.5497)	0.117 (0.0358)	25.4 (2.36)
1,1,1-TCA	1.728 (0.5266)	0.141 (0.0431)	82.0 (7.62)
1,2-DCA	1.807 (0.5507)	0.323 (0.0985)	613 (57.0)
CH_2Cl_2	1.560 (0.4754)		291.5 (27.09)
1,1-DCE	2.411 (0.7350)	0.265 (0.0807)	15.11 (1.404)
cis-1,2-DCE	1.965 (0.5990)	0.344 (0.105)	150.6 (14.00)
Vinyl chloride	2.026 (0.6176)	0.250 (0.0762)	0.0527 (0.0049)
Benzene	1.649 (0.5026)	0.127 (0.0388)	133 (12.4)
Toluene	1.623 (0.4946)	0.093 (0.0283)	120 (11.2)
m-Xylene	1.589 (0.4843)	0.085 (0.0258)	152 (14.1)
Chlorobenzene	1.745 (0.5318)	0.094 (0.0287)	204 (19.0)
1,2-Dichlorobenzene	1.696 (0.5168)	0.086 (0.0261)	157 (14.6)

*Aqueous phase concentration—100 μg/L, treatment objective—1 μg/L, flow rate—2.16 mgd (8.17 ML/d), aqueous phase velocity—5.0 gpm/sq ft (12.2 m/h), gaseous phase velocity—49 fpm (25 cm/s), required cross-sectional area for aqueous GAC—300.2 sq ft (27.9 m^2)

TABLE 6

Regeneration conditions and capacity of steam-regenerated pilot-plant bed

Parameter	Virgin GAC	GAC Regenerated Once	GAC Regenerated Twice	GAC Regenerated Three Times
Mass of carbon—*g*	2,012.7	2,012.7	2,012.7	2,012.7
Bed height—*in. (cm)*	2.7 (7.0)	2.7 (7.0)	2.7 (7.0)	2.7 (7.0)
TCE loading after bed exhaustion—*g*	52.9	50.6	50.1	40.3
Expected TCE loading for virgin GAC—*g*	52.9	63.4	71.4	67.8
Weighted inlet concentration of TCE—*μg/L*	1.4	1.6	2.2	2.2
Weighted inlet concentration of PCE—*μg/L*	0.35	0.29	0.26	0.23
Steam superficial velocity—*cm/s*		3.52	3.52	3.52
Condenser temperature—*°F (°C)*		71.6 (22)	71.6 (22)	71.6 (22)
Steam quantity—*kg steam/kg GAC*		17.5	17.5	17.5
Steam temperature				
Top of column—*°F (°C)*		230 (110)	230 (110)	230 (110)
Bottom of column—*°F (°C)*		212 (100)	212 (100)	212 (100)
Steam pressure—*atm*		1	1	1
Percent of virgin capacity*	100	80	70	60

*Based on DFHSDM simulation

TABLE 7
*Raw water characteristics of Wausau's well 4**

Parameter	Air Stripper Influent	GAC Pilot-Plant Influent	GAC Full-Scale Plant Influent
Flow rate—*mgd (ML/d)*	1.656 (6.268)	61.3 gpd (231.9 L/d)	0.1415 (0.5356)
cis-1,2-Dichloroethene—*μg/L*	82.3	70.9	71.5
Trichloroethene—*μg/L*	72.0	47.9	17.1
Tetrachloroethene—*μg/L*	59.6	37.6	27.9
Toluene—*μg/L*	30.9	19.3	7.2
Vinyl chloride—*μg/L*	8.4	8.2	4.1
1,1,1-Trichloroethane—*μg/L*	1.3	0.9	0.61
Ethyl benzene—*μg/L*	5.1	4.5	3.6
Xylenes†—*μg/L*	16.6	14.5	15.0
Dissolved oxygen—*mg/L*	<1.0	<1.0	2.2
pH	6.8	6.8	7.0
TOC—*mg/L*	8.34	8.35	9.13
TOX—*μg/L*	173.0	141.0	88.9
Influent temperature—*°F (°C)*	52 (11)	55 (13)	50.9 (10.5)
Effluent temperature—*°F (°C)*	52 (11)	63 (17)	51.8 (11.0)

*The concentrations reported represent the time-weighted averages for each phase of the project. Air stripper values are based on the first four months of operation (Aug.-Nov. 1984). Pilot plant values are based on 12 months of operation beginning Aug. 28, 1984. Full-scale plant values are based on 12 months of operation beginning Nov. 26, 1985.
†Sum of *m*, *o*, and *p* isomers

TABLE 8
Design parameters for the full-scale air-stripping tower at Wausau, Wis.

Parameter	Value
Air-to-water ratio	30
Pressure drop	0.06 in. H_2O/ft (52 N/m²/m)
VOC removal (based on TCE)	95 percent
Henry's constant	0.116
Packing type	3-in. (76.2-mm) plastic saddles
Water flow rate	2.16 mgd (8.17 ML/d)
Air flow rate	6,000 cfm (2.84 m³/s)
Water loading rate	29.8 gpm/sq ft (72.7 m/h)
Air loading rate	119 cfm/sq ft (0.755 kg/m²-s)
Temperature	50°F (10°C)
Tower diameter	8 ft (2.44 m)
Tower height	24.5 ft (7.47 m)

and 20 min of EBCT, respectively (Table 10). Thus, the best design for two beds in series and for a single contactor would be larger than indicated by the MTZs reported in Table 5.

Consequently, the GAC bed sizes for gas phase adsorption are considerably smaller in most cases than for aqueous-phase treatment because, according to Table 5, both the required cross-sectional area and the bed depth are smaller for the gas-phase adsorber than for the aqueous-phase adsorber.

Steam and liquid carbon dioxide regeneration. Rick et al[3] have reported the details of steam and liquid carbon dioxide regeneration for this study. With respect to liquid carbon dioxide regeneration, Rick et al demonstrated that 83-96 percent recovery of TCE could be obtained using a laboratory liquid carbon dioxide soxhlet extractor. Granular activated carbon loadings of 1.5-4.5 percent by weight, which are typical for TCE gas phase concentrations of 1-3 μg/L (STP), were used. Although liquid carbon dioxide was effective in removing TCE at low loadings, the capital investment of making GAC vessels to withstand the critical pressure of carbon dioxide makes the process too expensive.

Table 6 summarizes the steam regeneration results for a pilot column that was regenerated three times. The virgin column results correspond to the data displayed in Figure 8. Because the influent concentrations were variable over the course of the study, the DFHSDM was run to assess the GAC's virgin capacity by comparing it with column data for the regenerated GAC.

Table 6, which summarizes the steam regeneration results, shows that the fraction of original capacity decreased with each successive regeneration. Based on analysis of the steam condensate and on a model for regeneration, the cause of the loss in capacity is a buildup of PCE on the GAC that 212°F (100°C) steam could not drive off. Based on model calculations, however, it appears that if 338°F (170°C), 115-psia steam were used, then a 70 percent recovery of the PCE loading, which corresponds to the pilot plant, would require approximately 50 kg steam/kg GAC. Because steam costs were only 2 percent of the total cost for a steam usage rate of 20 kg/kg, this usage rate could still be economically viable.

Two additional factors must be considered when steam regeneration is used: the VOC concentration in the condensate and the amount and concentration in the drying gas. With respect to the condensate, TCE was present at or near its solubility limit, with traces of a separate organic phase appearing. The condensate was acidic with a pH range of 4-5, which indicates some dechlorination. One important consideration for this regeneration system was the presence of TCE in the noncondensable gases. In an actual plant, care would have to be taken to ensure that a significant amount of the VOCs did not leave the process with the noncondensable gases.

As far as drying gas is concerned, initial concentrations of 1.7 mg TCE/L (STP) were noted. In this study, because excess drying gas was used, the temperature and quantity of drying gas need further examination. Another consideration in drying the GAC is that an explosive environment can be created if the VOC concentration is above the lower explosion limit and the GAC is very dry.

Liquid- and gaseous-phase GAC costs. Pilot- and full-scale aqueous-phase GAC units and a full-scale air-stripping tower were used to treat the water described in Table 7. Based on field and gas-phase pilot-plant data, the costs of liquid-phase GAC, air stripping, and air stripping with off-gas treatment with GAC were compared. The treatment costs were based on a flow rate of 2.16 mgd (8.17 ML/d) and on a treatment objective of 5 μg/L for DCE and TCE. Details of the design and the estimated cost of treatment have been presented by Hand et al.[31]

Table 8 summarizes the design parameters for the full-scale air-stripping tower that was used to treat the water described in Table 7. This design would produce effluent DCE and TCE concentrations of 4.2 and 3.6 μ/L, respectively.

Table 9 summarizes the design pa-

rameters of the GAC system used to treat the off-gas from the air stripper detailed in Table 8. The usage rates reported in Table 9 were calculated from the multicomponent PFHSDM, which considered all the components listed in Table 7 and assumed an air-to-water ratio of 30. The competitive interactions of the other components do not have much impact on the carbon usage rate for DCE or TCE. In this design, two adsorbers were operated in parallel, and the carbon was essentially exhausted when TCE or DCE appeared in the effluent because the MTZ is much smaller than the bed. No additional adsorbers were included for on-site storage of GAC because the GAC can be changed during periods of low flow.

TABLE 9

Design parameters for the GAC system used to treat the air-stripping off-gas at Wausau, Wis.

Parameter	Value
Air flow rate to each GAC bed	3,000 cfm (1.42 m^3/s)
Type of carbon	BPL (4 × 6 mesh size)
Gas velocity to GAC bed	37.5 fpm (0.195 m/s)
Cross-sectional area of each GAC bed	80.0 sq ft (7.43 m^2)
GAC bed depth	4.0 ft (1.22 m)
Mass of GAC in each adsorber	10,000 lb (4,525 kg)
Number of GAC adsorbers	2
Concentration of TCE in off-gas	2.50 μg/L
Concentration of DCE in off-gas	2.74 μg/L
GAC usage rate for TCE	6.80×10^{-5} g GAC/L air
GAC usage rate for DCE	5.03×10^{-4} g GAC/L air
EBCT of the GAC bed	6.4 s
$EBCT_{mtz}$ for TCE	0.195 s
$EBCT_{mtz}$ for DCE	0.459 s
Off-gas heating required to lower relative humidity to 40 percent	54.1 kw

Using information gathered from the pilot- and full-scale aqueous-phase GAC units that treated the water described in Table 7, a 2.16-mgd (8.17-ML/d) treatment system was designed (Table 10). The design involves the use of various combinations of 5- and 10-min-EBCT contactors, depending on the number of beds in series or parallel. Configurations 1 and 3 use five beds in parallel, and each bed has 10 and 20 min of EBCT, respectively. Configurations 2 and 4 use five parallel trains of two beds in series, and each bed has 5 and 10 min of EBCT, respectively. Thus, configuration 1 can be compared with 2 to evaluate the advantage of using two beds in series over a single contactor for a total EBCT of 10 min. The GAC usage rates for DCE and TCE were determined from the pilot data for the various configurations shown in Table 10.

Table 11 summarizes the capital costs associated with the various treatment systems. The costs for air stripping are actual costs, and details have been discussed by Hand et al.[24] The costs for the other treatment systems were obtained from manufacturers' price quotations for an installation in Wausau, Wis. Operational costs included off-site regeneration of the GAC with 10 percent replacement with virgin GAC. On-site regeneration with steam was not considered feasible because of the loss in capacity after each regeneration. The energy costs were based on the utility rate in Wausau, which was $0.055/kW · h. The heating of the off-gas represents about $0.03/1,000 gal; consequently, variations in the power costs can have a large impact on the unit costs. The original purchase prices for carbons A and B were $2.11/lb and $1.17/lb, respectively. The regeneration cost for the gas-phase BPL carbon was $0.67/lb plus freight and for the aqueous-phase carbon B was $0.50/lb plus freight. The yearly maintenance costs for the GAC adsorption units were estimated at between 10 and 15 percent of the total equipment costs. Peters and Timmerhaus[32] recommended a value between 2 percent (if the demands are light) and 20 percent (if the demands are severe). As shown in Table 11, air stripping with off-gas GAC treatment was less expensive than liquid-phase GAC treatment for the low concentrations given in Table 7. But given the added protection that aqueous-phase GAC offers, it would probably be the process of choice.

Rick et al[3] demonstrated that as the liquid-phase concentration increased from 100 μg TCE/L, the air-stripping process with gas-phase GAC treatment became more economical compared with liquid-phase GAC treatment. Consequently, at higher VOC concentrations, air stripping with off-gas GAC treatment may be more economical.

With respect to the aqueous-phase GAC treatment system, the two beds in series appeared to be the least expensive operation compared with single adsorbers with 10 and 20 min EBCTs.

Conclusions

- Tang et al[2] demonstrated that Eq 1, the D-R equation, can predict single-solute adsorption equilibria for VOCs found in air stripping off-gas from the molar volume, the vapor pressure, the polarizability, and the isotherm of a reference compound. They also found that IAST and the Polanyi potential theory could predict the competitive interactions between VOCs.
- Water vapor adsorption provides little competition for gas-phase VOC adsorption onto BPL GAC at relative humidities <45 percent. Tang et al[2] demonstrated that the impact of RH on gas-phase capacity can be predicted from aqueous- and gaseous-phase VOC isotherms, the water vapor isotherm, and the pore size distribution. Furthermore, heating the off-gas stream to reduce the RH to 40-50 percent should give the highest VOC surface loading.
- Axial dispersion, intraparticle diffusion, and film transfer can affect the MTZ length in a gas-phase adsorber. Dispersion and intraparticle diffusion had no impact on the MTZ for RH values < 45 percent. Cortright et al[1] showed that Eq 13 can be used to estimate the gas-phase film transfer coefficient. Accordingly, the simple analytical model FTCPM (Eqs 9, 10, and 13) can be used to design single-solute gas-phase adsorbers.
- The PFHSDM, which included IAST to account for competitive interactions, was shown to predict the effluent concentration history profiles of a binary

TABLE 10

*Design parameters for aqueous-phase GAC treatment system**

Configuration	Total EBCT *min*	Number of Parallel Trains	Number of Beds in Series	Sidewall Depth *ft (m)*	Bed Depth *ft (m)*	Mass of GAC per Bed *lb (kg)*	Usage Rate for DCE *mg/L*	Usage Rate for TCE *mg/L*
1	10	5	1	10 (3)	5.11 (1.56)	10,560 (4,790)	45.0	16.6
2	10	5	2	5 (1.5)	2.55 (0.78)	5,280 (2,395)	25.5	9.51
3	20	5	1	15 (4.5)	10.22 (3.11)	21,120 (9,580)	36.6	16.7
4	20	5	2	10 (3)	5.11 (1.56)	10,560 (4,790)	26.0	NA†

*Flow rate—2.16 mgd (8.17 ML/d), hydraulic loading—3.82 gpm/sq ft (9.44 m/h), adsorber diameter—10 ft (3 m)
†NA—not available

mixture of PCE and TCE for a pilot plant that was installed in the field.

- The GAC usage rates for gas-phase adsorption were less than half those for aqueous-phase adsorption. This assumes no competitive interactions between the VOCs and natural organic matter in the water. Such interactions have been shown to increase the liquid-phase GAC usage rate by three to four times, depending on the compound. Because gas-phase adsorption kinetics are much faster than aqueous-phase adsorption kinetics, the required bed depth and diameter are much smaller for gas-phase beds than for aqueous-phase beds.
- Much higher steam-to-carbon ratios than those recommended for the solvent recovery field are required for good VOC recovery for GAC adsorption systems treating vapors with low VOC concentrations. Approximately 15–20 kg steam/kg GAC (212 °F [100°C], 1 atm) was needed to desorb TCE from the carbon A GAC. The high capacity of the virgin GAC and the small isotherm slope cause this problem, which may be remedied by using other GACs. Another important

TABLE 11
Summary of the costs of removing DCE and TCE from the water described in Table 7

Treatment System	Capital Cost $	O&M Cost $/year	Unit Treatment Cost* $/1,000 gal (3,800 L)
Air stripping for DCE and TCE	120,000	19,700	0.043
Air stripping for DCE with off-gas treatment	296,000	126,000	0.204
Air stripping for TCE with off-gas treatment	296,000	66,000	0.128
Liquid-phase GAC treatment for DCE: single adsorbers, 10-min EBCT (configuration 1)	493,000	232,000	0.367
Liquid-phase GAC treatment for DCE: single adsorbers, 20-min EBCT (configuration 3)	707,000	192,000	0.349
Liquid-phase GAC treatment for DCE: parallel trains of two beds in series, 10-min total EBCT (configuration 2)	752,000	147,000	0.298
Liquid-phase GAC treatment for DCE: parallel trains of two beds in series, 20-min total EBCT (configuration 4)	974,000	144,000	0.328
Least expensive GAC treatment for TCE: parallel trains of two beds in series, 10-min total EBCT	752,000	70,000	0.200

*Capital costs amortized for 20 years at 10 percent bond rate

Glossary

B	microporosity constant (cm^6/cal^2) or $(cm^3/cal)^{1.208}$
BVF	bed volumes of feed (dimensionless)
C_i or C	fluid-phase concentration of component i (M/L^3)
C_o	inlet bulk-phase concentration (M/L^3)
C_s	solubility of the adsorbate (M/L^3)
d_h	hydrodynamic diameter; $2\epsilon\, dp/[3(1-\epsilon)]$, ($L$)
d_p	particle diameter (L)
D_e	axial dispersivity based on adsorber length and interstitial velocity (L^2/t)
D_g	solute distribution parameter (dimensionless); $\rho_a q_e (1-\epsilon)/\epsilon C_o$
D_m	molecular diffusivity (L^2/t)
D_p	pore diffusivity based on pore void fraction (L^2/t)
D_s	surface diffusivity (L^2/t)
EBCT	τ/ϵ, V_B/Q, or L/V_s, fluid residence time in bed devoid of adsorbent or empty bed contact time (t)
H	Henry's constant (dimensionless)
K or K_i	Freundlich isotherm capacity constant of component i $(M/M)(L^3/M)^{1/n}$
k_f or $k_{f,i}$	film transfer coefficient (L/t)
L	length of fixed bed (L)
M	molecular weight (amu)
$1/n$ or $1/n_i$	Freundlich isotherm intensity constant of component i (dimensionless)
n	refractive index (dimensionless)
P_i or P	partial pressure of solute i in gas (M/L^2)
Pe_h	Peclet number for hydrodynamic mixing; $V_i d_h / D_g$ (dimensionless)
Pe_m	Peclet number based on interstitial velocity, adsorber length, and molecular diffusion; LV_i / D_m (dimensionless)
Pe_z	Peclet number based on interstitial velocity and adsorber length (dimensionless); LV_i/D_e
P_s	saturation vapor pressure of solute at temperature T (M/L^2)
q	solid-phase concentration in equilibrium with C_o (M/M)
Q	flow rate of gas or water
Q_o	Okazaki model total surface loading (M/M)
Q^o_{o1}	Okazaki model dry pore surface loading (M/M)
Q_{o2}	Okazaki model wet pore condensed-phase loading (M/M)
Q^o_{o3}	Okazaki model wet pore surface loading (M/M)
R	gas constant (cal/mol °K)
Re	$dp\, V_i\rho/\mu$, Reynolds number (dimensionless)
RH	relative humidity in percent (dimensionless)
S_d	dry surface area of the adsorbent (L^2/M)
S_w	wet surface area of the adsorbent (L^2/M)
S_t	total surface area of the adsorbent (L^2/M)
Sc	$\mu/D_m\,\rho$, Schmidt number (dimensionless)
Sh_i	$k_{fi}\, 2R/D_L$, Sherwood number (dimensionless)
St_i	modified Stanton number (dimensionless); $k_{f,i}\,\tau(1-\epsilon)/R\epsilon$
t	elapsed time (t)
T	mass throughput (dimensionless); $t/\tau\,(Dg+1)$
V_B	volume of bed (L^3)
V_c	condensed volume in the pore (L^3/M)
V_i	interstitial velocity (L/t); V_s/ϵ
V_s	superficial velocity (L/t)
V_{mi}	molal volume of component i (cm^3/g mol)
V_{H2O}	molal volume of water (L^3/M)
W	adsorption space occupied by adsorbate (cm^3/g)
W_o	maximum adsorption space (cm^3/g)
α	polarizability (cm^3/g mol)
ϵ	fraction of volumetric space in reactor unoccupied by adsorbent, or void fraction (dimensionless)
ϵ_p	fraction of volumetric space in adsorbent phase unoccupied by adsorbent, or the pore volume fraction (dimensionless)
ϵ_D	adsorption potential in D-R equation; $RT \ln P_s/P$ (cal/mol)
γ	aqueous-phase Polanyi isotherm parameter
ρ	fluid density
ρ_a	adsorbent density that includes pore volume (M/L^3)
ρ_b	adsorbent bulk density (M/L^3)
ρ_L	solid or liquid density of the adsorbate (M/L^3)
τ	packed-bed contact time (t); $\epsilon V_B/Q$

consideration in the solvent recovery process is the hardness of the carbon. Consequently, extruded carbons and GACs should be compared for long-term abrasion resistance.

- A pilot-plant GAC that treated a mixture of TCE and PCE was steam-regenerated three times, and the capacity for TCE decreased from 80 percent for the virgin GAC to 60 percent over the three cycles. The reduction in capacity for TCE with successive adsorption-regeneration cycles was due to the buildup of a PCE heel on the GAC, because PCE was not removed well under the conditions used (212°F [100°C], 1 atm). Model calculations demonstrated that this problem may be remedied by using saturated steam that is 122°F (50°C) above the boiling point of PCE (338°F [170°C]), but 50 kg steam/kg GAC would be required.
- Bench-scale experiments demonstrated that liquid carbon dioxide extraction appears to be a technically feasible means of GAC regeneration, although no conclusions can be made about the economic viability of this method of regeneration without further study.
- In summary, for DCE and TCE, air stripping with off-gas GAC treatment was shown to be very effective and economical compared with aqueous-phase GAC treatment.

Acknowledgment

This research was based on work supported by the AWWA Research Foundation (AWWARF) under contract 83-84, the city of Wausau, Wis., and the Water and Waste Management Programs at Michigan Technological University. The help from the city of Wausau, particularly from Joe Gehin and Dick Boers, in conducting the field studies is appreciated. Opinions, findings, conclusions, and recommendations expressed in this article are those of the authors and do not necessarily reflect the views of AWWARF, the city of Wausau, or the Water and Waste Management Programs.

References

1. CORTRIGHT, R.C. ET AL. Removal of Volatile Organic Chemicals From Air Stripping Tower Off-Gas Using Granular Activated Carbon. AWWARF Rept., Denver, Colo. (1987).
2. TANG, S.R. ET AL. Description of Adsorption Equilibria for Volatile Organic Chemicals in Air Stripping Tower Off-Gas. AWWARF Rept., Denver, Colo. (1987).
3. RICK, B.G. ET AL. The Regeneration of Granular Activated Carbon With Steam and Liquid Carbon Dioxide. AWWARF Rept., Denver, Colo. (1987).
4. Scott Environmental Technology Inc. Field Validation of EPA Reference Method 23, Method for Determination of Halogenated Organics From Stationary Sources. EPA-600/4-83-024. NTIS, Springfield, Va. (1983).
5. REUCROFT, P.J.; SIMPSON, W.H.; & JONAS, L.A. Sorption Properties of Activated Carbon. *Jour. Phys. Chem.*, 75:23:3526 (1971).
6. RASMUSON, A.C. Adsorption Equilibria on Activated Carbon of Mixtures of Solvent Vapours. *Fundamentals of Adsorption, Proceedings of the Engineering Foundation Conference* (A. Meyers and G. Belfort, editors). Engrg. Fdns., New York (1984).
7. PERRY, R.H. & CHILTON, C.H. *Chemical Engineers Handbook*. McGraw-Hill Co., New York (6th ed., 1986).
8. SPETH, T.F. Predicting Equilibria for Single and Multicomponent Aqueous Phase Adsorption Onto Activated Carbon. Master's thesis. Civil Engrg. Dept., Mich. Technol. Univ., Houghton (1986).
9. OKAZAKI, M.; TAMON, H.; & TOEI, R. Prediction of Binary Adsorption Equilibria of Solvent and Water Vapor Activated Carbon. *Jour. Chem. Engrg. Japan*, 11:3:29 (Mar. 1978).
10. GOSSETT, J.M. ET AL. Mass Transfer Coefficients and Henry's Constants for Packed-Tower Air Stripping of Volatile Organics Measurement and Correlation. Final Rept. AFESC, Tyndal Air Force Base, Panama City, Fla. (1985).
11. FREEMAN, G.B. & REUCROFT, P.J. Adsorption of HCN and H_2O Vapor Mixtures by Activated and Impregnated Carbons. *Carbon*, 17:2:313 (Feb. 1979).
12. ITAYA, A. ET AL. Liquid Phase Adsorption Equilibrium of Phenol and Its Derivatives on Macroreticular Adsorbents. *Jour. Chem. Engrg. Japan*, 17:4:389 (Apr. 1984).
13. Calgon Corporation. Type BPL Granular Carbon. Manufacturer's Bull. Pittsburgh, Pa. (1984).
14. CRITTENDEN, J.C. ET AL. Transport of Organic Compounds With Saturated Groundwater Flow: Model Development and Parameter Sensitivity. *Water Resources Res.*, 22:3:271 (Mar. 1986).
15. FRIEDMAN, G. Mathematical Modeling of Multicomponent Adsorption in Batch and Fixed-Bed Reactors. Master's thesis. Chem. Engrg. Dept., Mich. Technol. Univ., Houghton (1984).
16. FLECK, R.D. JR.; KIRWAN, D.J.; & HALL, K.R. Mixed-Resistance Diffusion Kinetics in Fixed Beds Under Constant Pattern Conditions. *Indus. & Engrg. Chem. Jour.*, 12:1:95 (Jan. 1973).
17. HAND, D.W.; CRITTENDEN, J.C.; & THACKER, W.E. Simplified Models for Design of Fixed-Bed Adsorption Systems. *Jour. Envir. Engrg.*, 110:2:440 (Apr. 1984).
18. WILKE, C.R. & LEE, C.Y. Estimation of Diffusion Coefficients for Gases and Vapors. *Indus. Engrg. Chem.*, 47:10:1253 (Oct. 1955).
19. MIYAUCHI, T. & KIKUCHI, T. Axial Dispersion in Packed Beds. *Chem. Engrg. Sci.*, 30:3:343 (Mar. 1975).
20. WAKAO, N. & FUNAZUKRI, T. Effect of Fluid Dispersion Coefficient on Particle to Fluid Mass Transfer Coefficient. *Chem. Engrg. Sci.*, 33:10:1375 (Oct. 1973).
21. WILLIAMSON, J.; BAZAIRE, K.; & GEANKOPLIS, C. Liquid Phase Mass Transfer at Low Reynolds Number. *Indus. Engrg. Chem. Fund.*, 2:2:126 (May 1963).
22. DOBREZELEWSKI, M. Determination and Prediction of Surface Diffusivities of Volatile Organic Compounds Found in Drinking Water. Master's thesis. Chem. Engrg. Dept., Mich. Technol. Univ., Houghton (1985).
23. CRITTENDEN, J.C. ET AL. Design Considerations for GAC Treatment of Organic Chemicals. *Jour. AWWA*, 79:1:74 (Jan. 1987).
24. HAND, D.W.; CRITTENDEN, J.C.; & GEHIN, J.L. Design and Economic Evaluation of a Full Scale Air Stripping Tower for Treatment of VOCs From a Contaminated Groundwater. *Jour. AWWA*, 78:9:87 (Sept. 1986).
25. KAVANAUGH, M.C. & TRUSSELL, R.R. Design of Aeration Towers to Strip Volatile Contaminants for Drinking Water. *Jour. AWWA*, 72:12:684 (Dec. 1980).
26. SINGLEY, J.E. ET AL. Trace Organics Removal by Air Stripping. Supplementary Rept. to AWWARF, Denver, Colo. (Apr. 1981).
27. CRITTENDEN, J.C. ET AL. Evaluating Multicomponent Competition in Fixed Beds. *Jour. Envir. Engrg.—ASCE*, 113:6:1363 (1987).
28. ZIMMER, G.; BRAUCH, H.J.; & SONTHEIMER, H. Activated Carbon Adsorption of Organic Pollutants in the Presence of Humic Substances. ACS Sym. on the Influence of Aquatic Humic Substances on the Fate and Transport of Pollutants, Washington, D.C. (Apr. 5-10, 1987).
29. CRITTENDEN, J.C. ET AL. Adequacy of Mathematical Models for Designing Full-Scale Adsorption Facilities Which Remove Synthetic Organic Chemicals. Proc. AWWA Seminar on Treatment Processes for the Removal of Synthetic Organic Chemicals. Kansas City, Mo., June 14-17, 1987.
30. HAND, D.W. ET AL. Design of Fixed-Bed Adsorbers to Remove Multicomponent Mixtures of Volatile and Synthetic Organic Chemicals. *Jour. AWWA* (accepted for publication).
31. HAND, D.W.; CRITTENDEN, J.C.; & GEHIN, J.L. An Evaluation of the Performance of Air Stripping and GAC for Removing SOCs and VOCs From Groundwater. USEPA Rept. CR811150-01-0 (1988).
32. PETERS, M.S. & TIMMERHAUS, K.D. *Plant Design and Economics for Chemical Engineers*. McGraw-Hill Co., New York (1980).

About the authors: *John C. Crittenden is professor of civil engineering at Michigan Technological University, Houghton, MI 49931, where he was involved for two years with the project described in this article. A graduate of the University of Michigan, Ann Arbor (BSE, MSE, and PhD), Crittenden has received AWWA awards for academic achievement and for best paper published in the* JOURNAL. *Randy D. Cortright is a process engineer with Universal Oil Products, Chicago, Ill. Brad Rick is a process engineer with Amway Corporation, Grand Rapids, Mich. Shin-Ru Tang is a graduate student and David Perram a research chemist at Michigan Technological University.*

METROPOLITAN **DADE** COUNTY, FLORIDA

METRO-DADE

METRO-DADE CENTER

ENVIRONMENTAL RESOURCES MANAGEMENT
SUITE 1310
111 N.W. 1st STREET
MIAMI, FLORIDA 33128-1971
(305) 375-3376

May 5, 1988

Ms. Theresa Heron
State of Florida, D.E.R.
2600 Blair Stone Road
Tallahassee, Fl 32399

RE: Air Stripping systems for the WASA Hialeah/Preston Water Treatment Plants.

Dear Ms. Heron:

This Department has reviewed the application for construction of a total of sixty-three (63) air stripping units for the Miami-Dade Water and Sewer Authority Department. Twenty (20) of the units are located at the Hialeah Water Treatment Plant and forty three (43) units are located at the John E. Preston Water Treatment Plant. We offer the following comments:

1- The two field locations have to be considered as two separate area emission sources, with the height of the emissions considered equal to that of the stripper with the lowest height.

2- The downwash effect should be negligible for each of the area sources due to the distance to the neighboring structures.

3- Because there is more than one hazardous substance in the water, their combined effect was considered by calculating the TLV for mixtures, which did not exceed unity. The criteria of the American Conference of Govermental Industrial Hygienists shown below was followed:

$$C1/T1 + C2/T2 + \ldots + Cn/Tn =< 1.0$$

where C= Measured atmospheric concentration for non-controlled emissions for a particular pollutant.
T= Corresponding threshold limit value for a particular pollutant.

METROPOLITAN DADE COUNTY
ENVIRONMENTAL RESOURCES MANAGEMENT
111 NW 1ST STREET, SUITE 1310
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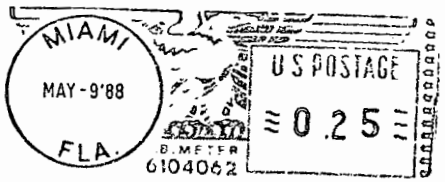

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In this case, it can be safely assumed that the combined effect of the contaminants reviewed, namely trihalomethanes (THM), would result in no synergistic action or potentiation.Potentiation is characteristically exhibited at high concentrations, less probably at low levels.
The calculated TLV for the mixture was 0.15.

4- The calculated concentration per stripper for Vinyl Chloride was 0.2 ppm, resulting in a total overall concentration for the Hialeah plant of 4 ppm, and 8.6 ppm for the Preston plant.
Neither value exceeds the 10 ppm (39 mg/cu.meter) limit in the Code of Federal Regulations 40 CFR 61.

5- If the two projects are considered as one area source, then the 10 ppm limit would be exceeded and controls would then be required (i.e.: Granulated Activated Carbon, etc.)

6- Although this office did not run any computer modeling regarding this project, the results from the Air Quality study done by Stone & Webster Engineering Corp. shows exceedances for Vinyl Chloride when the maximum offsite 8-hour average concentrations are calculated for the proposed Preston Air Stripper field.

7- The matter of the potential for high air concentrations of Vinyl Chloride should be addressed in view of the preliminary study results and the relative short distance between the two treatment plants.

If you have any questions about any of the above mentioned points, please call me at (305)858-0601

Sincerely,

Frank Echanique

Frank Echanique
Air Toxics Engineer
Environmental Monitoring Division

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3. Article Addressed to:

Mr. Garrett Sloan Director
Miami Dade Water and Sewer
Authority Department

3575 S. LeJeune Road
Maimi, FL 33133

4. Article Number
P 794 947 072

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

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P 794 947 072

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PS Form 3800, June 1985

Florida Department of Environmental Regulation
Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400
Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

May 5, 1988

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Garrett Sloan, Director
Miami Dade Water and Sewer Authority
Department
3575 S. LeJeune Road
Miami, Florida 33133

Dear Mr. Sloan:

Re: Stripping Project - Application Numbers: AC 13-147823
AC 13-147824

The Bureau of Air Quality Management (BAQM) has received your applications for permits to construct 64 air stripping towers at your facilities located at Hialeah and John E. Preston Water Treatment Plant Wellfields in Dade County, Florida.

Based on our initial review of your proposal, it has been determined that the following additional information is needed to complete your application.

Your project is subject to Rule 17-2.510, FAC, New Source Review for Nonattainment Areas. Please refer to this section of our rules. Recommend a Lowest Achievable Emission Rate (LAER) determination for this project as required by the rules.

The section which describes the estimated ambient levels of potential air toxics warrants further clarification. As you know, vinyl chloride is a NESHAPs pollutant and a recognized human carcinogen. The annual operation of the proposed 64 air strippers may release up to 32 tons of vinyl chloride into an area of high population density. In addition, the other eight contaminants to be air-stripped amount to over 150 tons per year of potential air toxics emitted to the neighborhoods. Section IIA of this application reads "based on existing air quality standards, no air pollution control equipment is necessary." Chapter 403 of the Florida Statutes notes "the legislature further declares that the citizens of this state should be afforded reasonable protection from the dangers inherent in the release of toxic or otherwise hazardous vapors, gases or highly volatile liquids into the environment."

Presently, there are no promulgated ambient air standards for controlling the proposed emissions. However, there are control methods available which have been used sucessfully by other large air stripping facilities. Please provide an evaluation of control measures which would insure that an ample margin of public safety is addressed.

If you have any questions about the information requested, please call Teresa Heron, Review Engineer, Tom Rogers, Meterologist, or John Glunn, Air Toxics Specialist at (904) 488-1344 or write to me at the above address.

Sincerely,

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

CF/TH/ss

cc: Anthony Clemente, DERM
Stephanie Brooks, SE District
John Gentry

Item Subject: ELEC. MAIL

TO: Teresa Heron

FROM: Stephanie Brooks

DATE: May 03, 1988

SUBJECT: M.D.W. & S.A. - Air Strippers

---

(1) Section II.F - The permittee should provide clarification of the answers in that section.

(2) Data used for the Air Quality Modeling was from 1974 - is this the most recent data available?

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P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

Federal Express

April 4, 1988

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Mr. Clair A. Fancy, Deputy Chief
Central Air Permitting
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL

Subject: Air Permit Applications for the Hialeah and Preston Air Stripping Projects

Dear Mr. Fancy:

As required in the interoffice memorandum from you to District Managers, John Ruddell and John Gentry of October 20, 1987, enclosed are two applications for construction permits for the permanent air stripping installations at the Hialeah and Preston Water Treatment Plants. We received a copy of the memorandum about March 1, 1988 and were not previously aware of the air permit requirements. Also enclosed are two checks payable to DER in the amount of $1,000 each for the required permit application fees.

The proposed projects consist of an air stripping process, which is designed to remove the contaminating volatile organic compounds (VOCs) from the treated potable water at the Hialeah and Preston Water Treatment Plants. The air stripping process is based on the physical characteristics of these compounds to outgas from the water into the air. The typical air stripper consists of a tower with the contaminated water introduced and distributed at the top. The water cascades downward over and through an inert packing material while a much larger countercurrent volume of process air rises through the packing. The turbulent flows of the air and water optimize the outgassing process.

As required in the above mentioned position paper, an "Air Stripping Evaluation Worksheet", is enclosed as Table I of the permit application. This worksheet was completed according to

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Mr. Clair A. Fancy, Deputy Chief

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Company Central Air Permitting State of Florida DER

Department/Floor No.

Exact Street Address (Use of P.O. Boxes or P.O. Zip Codes Will Delay Delivery And Result in Extra Charge.)

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7 ☐ **OTHER SPECIAL SERVICE** _____

8 ☐

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the procedures presented in the position paper. The maximum concentrations of the VOC's in the influent water are the maximum concentrations of each compound detected in the contaminated wellfield area. The group of compounds known as the trihalomethanes are formed as disinfection by-products. The trihalomethane group includes trichloromethane, dichloromomethane, chlorodibromomethane and tribromomethane. The maximum concentrations of the THMs typically occur following a particular mode of disinfection known as breakpoint chlorination. The THM concentrations presented on Table I represent the experience of a two week period of breakpoint chlorination during November 1987. All of the calculated maximum ambient impact concentrations of the VOC's and the THM's are below the acceptable ambient concentrations. Because the interoffice memorandum states: "If the maximum ambient concentration is less than the Acceptable Ambient Level, the air stripper is approved." We anticipate that the proposed projects will be approved.

The air quality impact of the proposed projects was examined in the enclosed report "Air Quality Study, Final Report" August 26, 1987 prepared by Stone and Webster Engineering Corporation. This report assumed the worst case conditions of very high levels of groundwater contamination and THM formations, low air to water ratios and treated water flows for the year 2000. Applying these conservative assumptions and one year of representative hourly meteorological data, the air quality was predicted using the most advanced model available, Industrial Source Complex-Short Term (ISCST) atmospheric dispersion model which was developed by the United States Environmental Protection Agency (EPA).

The ISCST model predicts the concentration of the VOCs in an array around the individual treatment plants and also combines the VOC input from each plant. The resulting concentrations of VOCs in the air were then compared with the acceptable ambient concentrations as established by the State of Florida DER, and EPA. All projected VOC air concentrations are again within the established limits.

The November 1987 THM concentrations of the finished water were somewhat higher than the THM concentrations evaluated in the "Air Quality Report". Therefore these higher concentrations of THM's were correlated with the ISCST model predictions. The calculated maximum ambient impact concentrations of the VOC's and THM's are presented on Table II. Again the maximum ambient impact concentrations for all compounds are below the acceptable ambient concentrations for that compound. Because the proposed facilities will be the largest in Florida, and the conservative assumptions of the "Air Quality Study" are truly worst case conditions, the validity of the DER air stripping evaluation is confirmed.

For your information the Environmental Protection Agency assessments indicate that the VOC outputs from air stripping units are not significant. The following statement from the Federal Register (Vol. 52 No. 130, July 8, 1987, Rules and Regulations) presents the Federal position concerning air emissions resulting from air stripping:

> "Some commenters stated that the Agency should consider the cost of air pollution control for VOC emissions from packed tower aeration. EPA does not believe that it is appropriate to factor the cost of air pollution control into the treatment costs since assessments show air emissions to be negligible from aeration treatment of drinking water to remove VOCs (See Ref. 5, Peters and Clark, 1985). For further information on air emissions of VOCs, see the November 1985 notice (50 FR 46911, November 13, 1985)."

We anticipate the air quality impact of the proposed projects will be acceptable. These projects are partially being funded under the Superfund Program of EPA, and your timely review of the applications is vital to our maintaining funding eligibility. Therefore a prompt response will be greatly appreciated. If you have any questions please call me or Robert Fergen at 305-665-7471.

Very truly yours,

Garrett Sloan
Director

GS/REF/fb

cc: Mr. Dale Twachtman, Secretary, FDER
Mr. J. Scott Benyon, District Manager, FDER, WPB
Mr. Anthony Clemente, MDDERM

Table I

AIR STRIPPING EVALUATION WORKSHEET

Calculated according to DER procedures

Source Identification		Maximum Influent Flow Rate (GPM)	2,915
Source Location	Hialeah and Preston W.T.P.s	Maximum Air Flow Rate (CFM)	33,150
Manufacturer	Customed Designed	Emission Point Height (Ft)	47.5
Model Number	Not Applicable	Maximum Hours of Operation (Hrs/Wk)	168

Contaminant Name	Max. Conc. (ppb)	Max. Emission Rate (lb/hr)(1)	Max. Ambient Impact (mg/m^3)(2)	TLV (mg/m^3)	Category (A or B)	AAC (mg/m^3)
1. 1,1,2,2 Tetrachloroethane	3	0.00441	0.000231	7	A	0.017
2. 1,1, Dichloroethane	51	0.0802	0.004205	10	A	1.93
3. Vinyl Chloride	74.7	0.10887	0.005709	12.8	A	0.030
4. 1,1, Dichlorethylene	20.7	0.03053	0.001601	20	A	0.048
5. Methylene Chlorine	6	0.008745	0.000459	105	A	0.250
6. Trichloromethane	300	0.431	0.0230	50	A	0.119
7. Dichlorobromomethane	59	0.0860	0.004509	*	A	0.2174
8. Chlorodibromomethane	26.3	0.0383	0.002010	*	A	0.1223
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NA (2) Calculated on reverse side of this worksheet (Equation (2)).

* See Attached letter to John Glenn

Table II

AIR STRIPPING EVALUATION WORKSHEET

Based on "Air Quality Study" modelling of the proposed projects

Source Identification		Maximum Influent Flow Rate (GPM)	2,915
Source Location	Hialeah and Preston W.T.P.s	Maximum Air Flow Rate (CFM)	33,150
Manufacturer	Customed Designed	Emission Point Height (Ft)	47.5
Model Number	Not Applicable	Maximum Hours of Operation (Hrs/Wk)	168

Contaminant Name	Max. Conc. (ppb)	Per Tower Max. Emission Rate (lb/hr)(1)	Entire System Max. Ambient Impact (mg/m^3)(2)	TLV (mg/m^3)	Category (A or B)	AAC (mg/m^3)
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* See Attached letter to John Glenn

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

September 22, 1987

Mr. Robert E. Fergen
Special Projects Engineer
Miami-Dade Water and Sewer
Authority Department
P.O. Box 330316
Miami, Florida 33233-0316

Dear Mr. Fergen:

The Bureau of Air Quality Management has reviewed your letter concerning VOC emissions from the proposed operations by your department. As we discussed previously, the proper procedure for estimating the acceptable ambient concentrations for chemicals which have no published TLV values is the approach which you have described in your letter. Because each of the VOC emission calculations and modeling projections results in an estimated ambient level below our acceptable ambient concentration guidelines, we can foresee no difficulty in processing your department's request for the air stripping operation.

Please forward a copy of your final report to Barry Andrews, CAPs Permit Engineer, and myself upon its completion. We will notify you if any further comments are necessary. We appreciate your cooperation and desire to minimize any air quality impacts by your facility's operation. Please contact me at (904) 488-1344 if you have any questions.

Sincerely,

F. John Glunn

F. John Glunn
Air Toxics Program
Coordinator

FJG:jw

cc: Barry Andrews

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

July 30, 1987

Mr. John Glunn
Department of Environmental Regulation
Bureau of Air Quality Management
Compliance and Air Monitoring Section
2600 Blair Stone Road
Tallahassee, FL 32301-8241

Dear Mr. Glunn:

I enjoyed our recent conversations and appreciate the information you shared with me. This Department is designing air stripping facilities for two large regional water treatment plants. Because the plants are located in a populated area, we initiated an air quality study to examine the potential impact of the exhausted air on the surrounding environment. The consulting engineering firm of Stone and Webster has been retained to technically evaluate the air quality impact of the air stripping projects. We provided Stone and Webster's staff with the maximum potential concentrations of the volatile organic compounds (VOC's) in the raw water based on the highest concentrations detected in the wellfields. We also provided the maximum concentration of a group of chemicals, known as the trihalomethanes, which are formed as a side reaction of the disinfection process known as breakpoint chlorination.

The input VOC concentrations given to Stone and Webster are higher than could be reasonably expected from the actual operation as a conserative assumption. Another assumption is the transfer of 100 percent of the influent VOC's into the air. Because the VOC's with a lower Henry's constant could not be entirely removed at the low air/water ratio of the critical operating point, this assumption is also conservative.

Based on the methodology presented in the draft State of Florida DER document entitled "The Florida Toxic Air Contaminants Program Guidelines for Assessment and Control," the acceptable ambient concentrations are calculated for the VOCs with established Threshold Limit Values (TLV) as developed by the American Conference of Governmental and Industrial Hygienists. The air quality study shows all VOC concentrations are within the acceptable ambient concentration (AAC) limits.

There are two compounds, which are chlorination byproducts, that do not have established TLV concentrations. However these

compounds, chlorodibromomethane and dichlorobromomethane, do have LD_{50} concentrations as established by the Hazardous Materials Listing service for two test species, mouse and rat. A methodology for calculating AAC from LD_{50} data is also presented in the above referenced DER document. The following equation is presented on page 10:

$$AAC\ (LD_{50}) = \frac{LD_{50} \times (1{,}000\ l/m^3) \times D}{A \times B \times C \times E \times 240}$$

where LD_{50} = Oral LD_{50} for the most sensitive test organism

A = Safety factor for the estimation of the lifetime no effect level, for 90 days A=5

B = Standard safety factor = 100

C = Safety factor for differences in route of exposure =40

D = Average body weight of the test animal species, kg (mouse = 0.03 kg).

E = Inhalation volume of test animal species (mouse = 0.023 l/min.)

The LD_{50} data for both compounds and species is presented below:

	LD_{50} (mg/kg)	
	Species	
Compound	Mouse	Rat
Dichlorobromomethane (Cl_2 Br CH)	450	916
Chlorodibromomethane (Cl Br_2 CH)	800	848

Because the mouse is the more sensitive species for both compounds, the data of this species is used for the AAC determination. The AACs for the compounds are calculated as 0.1223 mg/m^3 for dichlorobromomethane and 0.2174 mg/m^3 for chlorodibromomethane. Comparing the calculated AAC for these compounds with the projected maximum concentrations indicates that the offsite concentrations are also below the AAC levels.

Please advise me if the above approach is acceptable to your office. We will finalize the report after receiving your comments and a copy will be forwarded to you. If you have any questions, please call me at 305-665-7471 ext. 281.

Sincerely,

Robert E. Fergen

Robert E. Fergen
Special Projects Engineer

REF/fb

Non-Qualifying Check# 44523 & PRESTON 44524 Receipt # 117538 $1000.00 each
Subcode 11 =

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

AC 13-147823
AC 13-147824

SOUTHEAST FLORIDA DISTRICT
1900 SOUTH CONGRESS AVENUE
WEST PALM BEACH, FLORIDA 33406

RECEIVED
APR 06 1988
DER - BAQM

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Air Stripping Potable Water [ ] New[1] [ ] Existing[1]

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

COMPANY NAME: Miami Dade Water and Sewer Authority Department COUNTY: Dade

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) 43 Air Stripping Units

SOURCE LOCATION: Street Preston Water Treatment Plant 1100 West 2nd Ave City Hialeah

UTM: East 71,440 ME North 57,000

Latitude 25 ° 49 ' 50 "N Longitude 80 ° 17 ' 14 "W

APPLICANT NAME AND TITLE: Garrett Sloan, Director

APPLICANT ADDRESS: 3575 S. LeJeune Road Miami, FL 33146

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Metropolitan Dade County

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

*Attach letter of authorization

Signed: Garrett Sloan

Garrett Sloan, Director
Name and Title (Please Type)

Date: Mar. 22, 1988 Telephone No. 305 665-7471

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

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

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

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

Signed Robert A. Cuevas

Robert Cuevas
Name (Please Type)

Miami Dade Water and Sewer Authority Department
Company Name (Please Type)

3575 S. LeJeune Road, Miami FL 33146
Mailing Address (Please Type)

Florida Registration No. 6285 Date: April 4, 1988 Telephone No. 305 665-7471

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.

This project consists of 44 air stripping towers to remove volatile organic compounds from potable water. Based on existing air quality standards, no air pollution control equipment is necessary.

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

Start of Construction August 1988 Completion of Construction February 1990

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.)

Not Applicable

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

Not Applicable

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

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

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

1. Is this source in a non-attainment area for a particular pollutant? Yes

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

   b. If yes, has "Lowest Achievable Emission Rate" been applied? No

   c. If yes, list non-attainment pollutants. No

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

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

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

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? Yes

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

   a. If yes, for what pollutants?_____

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

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

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

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): N.A.

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

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	

[1]See Section V, Item 2.

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

[3]Calculated from operating rate and applicable standard.

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

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
N.A.				

E. Fuels N.A.

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

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

Fuel Analysis: Not Applicable

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

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

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

Annual Average _____ Maximum _____

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

N.A.

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

Stack Height: Not applicable ft. Stack Diameter: _____ ft.

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

Water Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION

Not Applicable

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

Description of Waste _____

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

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

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 Diamter: _____ 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: Not applicable

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

Not Applicable

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

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

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

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

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

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

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

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

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

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

9. The appropriate application fee in accordance with Rule 17-4.05. 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

Not Applicable

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
N.A.	

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:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: N.A. ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

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

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

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

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected: N.A.

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

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

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

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

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION Not Applicable

A. Company Monitored Data N.A.

1. _____no. sites _____ TSP _____( ) SO^2* _____ Wind spd/dir

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

Other data recorded _____

Attach all data or statistical summaries to this application.

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

2. Instrumentation, Field and Laboratory

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

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

1. 1 Year(s) of data from 1 / 1 / 74 to 12 / 31 / 74
month day year month day year

2. Surface data obtained from (location) Miami International Airport

3. Upper air (mixing height) data obtained from (location) Not Applicable

4. Stability wind rose (STAR) data obtained from (location) Miami International Airport

C. Computer Models Used

1. Industrial Source Complex-Shor Term (ISCST) 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	N/A	grams/sec
SO^2	N/A	grama/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time. See Engineering Report "Air Quality Study, Final Report" Stone & Webster, August 26, 1987

F. Attach all other information supportive to the PSD review. Engineering Report "Air Quality Study, Final Report" Stone & Webster, August 26, 1987

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. N/A

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. N/A

Table I

AIR STRIPPING EVALUATION WORKSHEET

Calculated according to DER procedures

Source Identification		Maximum Influent Flow Rate (GPM)	2,915
Source Location	Hialeah and Preston W.T.P.s	Maximum Air Flow Rate (CFM)	33,150
Manufacturer	Customed Designed	Emission Point Height (Ft)	47.5
Model Number	Not Applicable	Maximum Hours of Operation (Hrs/Wk)	168

Contaminant Name	Max. Conc. (ppb)	Max. Emission Rate (lb/hr)(1)	Max. Ambient Impact (mg/m^3)(2)	TLV (mg/m^3)	Category (A or B)	AAC (mg/m^3)
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* See Attached letter to John Glenn

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

September 22, 1987

Mr. Robert E. Fergen
Special Projects Engineer
Miami-Dade Water and Sewer
Authority Department
P.O. Box 330316
Miami, Florida 33233-0316

Dear Mr. Fergen:

The Bureau of Air Quality Management has reviewed your letter concerning VOC emissions from the proposed operations by your department. As we discussed previously, the proper procedure for estimating the acceptable ambient concentrations for chemicals which have no published TLV values is the approach which you have described in your letter. Because each of the VOC emission calculations and modeling projections results in an estimated ambient level below our acceptable ambient concentration guidelines, we can foresee no difficulty in processing your department's request for the air stripping operation.

Please forward a copy of your final report to Barry Andrews, CAPs Permit Engineer, and myself upon its completion. We will notify you if any further comments are necessary. We appreciate your cooperation and desire to minimize any air quality impacts by your facility's operation. Please contact me at (904) 488-1344 if you have any questions.

Sincerely,

F. John Glunn

F. John Glunn
Air Toxics Program
Coordinator

FJG:jw

cc: Barry Andrews

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

July 30, 1987

Mr. John Glunn
Department of Environmental Regulation
Bureau of Air Quality Management
Compliance and Air Monitoring Section
2600 Blair Stone Road
Tallahassee, FL 32301-8241

Dear Mr. Glunn:

I enjoyed our recent conversations and appreciate the information you shared with me. This Department is designing air stripping facilities for two large regional water treatment plants. Because the plants are located in a populated area, we initiated an air quality study to examine the potential impact of the exhausted air on the surrounding environment. The consulting engineering firm of Stone and Webster has been retained to technically evaluate the air quality impact of the air stripping projects. We provided Stone and Webster's staff with the maximum potential concentrations of the volatile organic compounds (VOC's) in the raw water based on the highest concentrations detected in the wellfields. We also provided the maximum concentration of a group of chemicals, known as the trihalomethanes, which are formed as a side reaction of the disinfection process known as breakpoint chlorination.

The input VOC concentrations given to Stone and Webster are higher than could be reasonably expected from the actual operation as a conserative assumption. Another assumption is the transfer of 100 percent of the influent VOC's into the air. Because the VOC's with a lower Henry's constant could not be entirely removed at the low air/water ratio of the critical operating point, this assumption is also conservative.

Based on the methodology presented in the draft State of Florida DER document entitled "The Florida Toxic Air Contaminants Program Guidelines for Assessment and Control," the acceptable ambient concentrations are calculated for the VOCs with established Threshold Limit Values (TLV) as developed by the American Conference of Governmental and Industrial Hygienists. The air quality study shows all VOC concentrations are within the acceptable ambient concentration (AAC) limits.

There are two compounds, which are chlorination byproducts, that do not have established TLV concentrations. However these

compounds, chlorodibromomethane and dichlorobromomethane, do have LD_{50} concentrations as established by the Hazardous Materials Listing service for two test species, mouse and rat. A methodology for calculating AAC from LD_{50} data is also presented in the above referenced DER document. The following equation is presented on page 10:

$$AAC\ (LD_{50}) = \frac{LD_{50} \times (1{,}000\ l/m^3) \times D}{A \times B \times C \times E \times 240}$$

where LD_{50} = Oral LD_{50} for the most sensitive test organism

A = Safety factor for the estimation of the lifetime no effect level, for 90 days A=5

B = Standard safety factor = 100

C = Safety factor for differences in route of exposure =40

D = Average body weight of the test animal species, kg (mouse = 0.03 kg).

E = Inhalation volume of test animal species (mouse = 0.023 l/min.)

The LD_{50} data for both compounds and species is presented below:

	LD_{50} (mg/kg)	
	Species	
Compound	Mouse	Rat
Dichlorobromomethane (Cl_2 Br CH)	450	916
Chlorodibromomethane (Cl Br_2 CH)	800	848

Because the mouse is the more sensitive species for both compounds, the data of this species is used for the AAC determination. The AACs for the compounds are calculated as 0.1223 mg/m^3 for dichlorobromomethane and 0.2174 mg/m^3 for chlorodibromomethane. Comparing the calculated AAC for these compounds with the projected maximum concentrations indicates that the offsite concentrations are also below the AAC levels.

Please advise me if the above approach is acceptable to your office. We will finalize the report after receiving your comments and a copy will be forwarded to you. If you have any questions, please call me at 305-665-7471 ext. 281.

Sincerely,

Robert E. Fergen

Robert E. Fergen
Special Projects Engineer

REF/fb

AIR QUALITY STUDY

FINAL REPORT

Submitted to

MIAMI-DADE WATER & SEWER AUTHORITY DEPARTMENT

August 26, 1987

Prepared by

STONE & WEBSTER ENGINEERING CORPORATION
Fort Lauderdale, Florida

STONE & WEBSTER

Transmittal letter

STONE & WEBSTER ENGINEERING CORPORATION

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Mr. James T. Cowgill
Assistant Director
Miami-Dade Water & Sewer Authority Department
3575 South LeJuene Road
Miami, Florida 33146-2221

August 26, 1987

Job No. 16963

Dear Mr. Cowgill:

AIR QUALITY STUDY FINAL REPORT

Presented is the final report for the Air Quality Study. This study was conducted to evaluate the effect of the proposed air stripping process on the ambient atmosphere around the Hialeah and Preston Water Treatment Plants to assure that the environment will not be significantly altered.

The report is presented in two sections as attachments to this letter. Attachment 1 addresses the impact of releasing VOC's, including THM's, on the air quality of the adjacent treatment plant environments. Attachment 2 addresses the potential for ground-level fogging resulting from operation of the proposed air stripping facility. As requested, we have incorporated a paragraph in Attachment 2 describing the possible effect of the air stripper plume in the viscinity of the Miami International Airport.

If you have any questions, please call me or Mr. Ed Good at (305) 791-3226, and we will promptly respond.

Yours very truly,

Robert G. James, Manager
Fort Lauderdale Office

EFG/jks
Enclosures

cc: E.F. Good (FTL)
T.J. Burda (245/13)
File 16963/4.1

ATTACHMENT 1

ATTACHMENT 1

EVALUATION OF THE AIR QUALITY IMPACT FROM THE PROPOSED AIR STRIPPING OPERATION AT THE HIALEAH AND JOHN E. PRESTON WATER TREATMENT PLANTS

OVERVIEW

The Miami Springs, Hialeah and John E. Preston Water Treatment Plant Wellfields have provided a water supply for northern Dade County for many years. During the 1970's, the wellfields became contaminated with volatile organic compounds (VOC's) resulting from industrial activity within the area.

An air stripping process was selected to remove the VOC's from the potable water supply. Air stripping is a physical process which exposes a large surface area of the water to a much larger volume of turbulent process air. It allows the release of the VOC compounds from the water into the process air, which is exhausted into the atmosphere. Some 64 air stripping units are proposed for the Hialeah (20 units) and Preston (44 units) water treatment plants.

The objective of the air quality study was to evaluate the maximum impact of releasing VOC's, including trihalomethanes (THM's), on the air quality of the adjacent treatment plant environment from the proposed air stripping operations. These maximum concentrations were evaluated relative to acceptable ambient concentrations as defined in the guideline drafted by the Florida Department of Environmental Regulation for air stripping review.

Maximum impact concentrations were estimated using the latest version of the Industrial Source Complex-Short Term (ISCST) atmospheric dispersion model developed by the United States Environmental Protection Agency (EPA), and one year of representative hourly meteorological data as input.

MODELING ANALYSIS AND ASSUMPTIONS

Figure 1 shows the spatial relationship between the proposed Hialeah and Preston air stripper fields. Relative to the center points of these fields, the proposed Preston stripper field is located approximately 400 meters to the north of the proposed Hialeah field. Figures 2 and 3 show the proposed Preston and Hialeah plant stripper source configurations that were considered in this analysis. The Hialeah and Preston source configurations consisted of 20 and 44 point sources (air strippers), respectively. The source characteristics used in this analysis are presented in Table 1.

The EPA ISCST dispersion model was chosen for this analysis because of its ability to handle point and area emission sources, a large number of receptors, and a year of representative hourly meteorological data. Descriptions for the technical basis and use of ISCST may be found in the Industrial Source Complex (ISC) Dispersion Model User's Guide - Second Edition, Volume 1 (EPA-450/4-86-005a, June 1986).

Each field of strippers was represented as an area emission source with the emission height assumed to equal the height of the stripper (ISCST does not calculate plume rise for area sources). Preliminary modelling (which considered each stripper as a point source) indicated that this approach was representative for the low flow condition and that this condition resulted in higher maximum concentrations than the high flow condition. The dimensions of the area sources are delineated by the dashed lines in Figures 2 and 3. Each area was determined by taking the total sum of the exit areas of the air strippers from each proposed field.

The receptor grids used for the Preston and Hialeah plant computer runs consisted of 112 and 96 receptors, respectively (see Figures 4 and 5).

The Preston receptor grid consisted of 7 concentric rings of receptors (centered on the center point of the area source) for radii of 50, 75, 100, 125, 150, 250, and 400 m. Each ring contained 16 receptors spaced 22.5° apart. The Hialeah receptor configuration was similar except that the 50 meter ring of receptors was not considered. It was assumed that public access was not less than radii of 50 and 75 meters to the center points of proposed Preston and Hialeah stripper fields, respectively.

Since the source characteristics of each stripper do not change by chemical type (thus the transport and dispersion characteristics do not change), concentration estimates were first made by using a unit emission rate for each area source. The unit emission rate per field was defined as 1 g/s times the number of strippers of the field divided by the area of the area source. Subsequent chemical specific concentration estimates were made by multiplying these normalized values by the emission rates specified in Table 1.

Using one year (1974) of representative hourly Miami International meteorological data, ISCST was run separately for the Preston (Figure 4) and Hialeah (Figure 5) receptor grids.

When considering an area source in ISCST, the effects of building downwash cannot be considered. Downwash is a condition where a plume is brought rapidly down to the ground in the turbulent mixing region directly downwind of a building, resulting in relatively high concentrations close to the source. Downwash occurring as a result of the plant buildings near the proposed air stripper fields is not significant because the low exit velocity range and height of the proposed air strippers are such that ISCST would consider these releases near the ground anyway.

ACCEPTABLE AMBIENT CONCENTRATIONS

In the State's draft guideline to evaluate proposed air stripping facilities, acceptable air concentrations are presented which are based on workplace threshold limit values (TLV). These TLV's are exposure recommendations issued by the American Conference of Governmental Industrial Hygienists and represent time-weighted average concentrations for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. The TLV's for the chemicals addressed in this analysis are presented in Table 2. The State reduces these TLV values with safety factors which are a function of the frequency of release and the toxic

nature of the chemical. Relative to the proposed air stripping operation, the applicable TLV's are reduced by a factor of 420 (based on a continuous release and the highly toxic nature of the chemicals). These reduced TLV's are presented in Table 2.

Since vinyl chloride is an EPA-regulated noncriteria pollutant and is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP), an acceptable ambient concentration is not considered in the State's proposed guidelines. The intent of NESHAP is to provide a nationally uniform control requirement through specific emission limitations, work practices, and/or equipment standards. The hazardous air pollutants that are regulated under the NESHAP program include those "to which no ambient air quality standard is applicable and which, in the judgement of the Administrator, causes or contributes to air pollution, which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible or incapacitating reversible illness (Clean Air Act, Sec. 112(a)(1)). Consequently, the NESHAP control requirements are set at a level that provides an ample margin of safety to protect the public health.

According to the Code of Federal Regulations (40CFR61), "the concentration of vinyl chloride in all exhaust gases discharged to the atmosphere from any equipment used in vinyl chloride formation and/or purification is not to exceed 10 ppm (i.e., 26 mg/m^3). Even though the vinyl chloride exhaust concentration per tower is less than the emission standard, further analysis is warranted, since the total exhaust concentration per proposed field is greater than the standard.

Dichlorobromomethane and chlorodibromomethane do not have established TLV values since available toxicological information is limited. The State's proposed guideline does provide a means to determine an acceptable ambient concentration based on lethal concentration, 50% kill (LC_{50}) and lethal dose, 50% kill (LD_{50}) data. This determination was beyond the scope of work of this analysis.

In this analysis, maximum offsite 8-hour and annual average concentrations are compared to the TLV's and RTLV's presented in Table 2.

RESULTS

The maximum offsite 8-hour average concentration resulting from the proposed Preston air stripping operation was estimated to occur at approximately 125 meters (from the center point of the proposed field) towards the west-northwest. The estimated maximum offsite 8-hour average concentrations per chemical are presented in Table 3. The total maximum offsite 8-hour value, which includes the contribution from the proposed Hialeah stripping operation, was determined by adding the maximum 8-hour average concentration (resulting from Hialeah operation) estimated at the receptor which is 400 meters to the north of the proposed Hialeah field, to the estimated maximum value resulting from the proposed Preston operation. This was conservative, since Hialeah's contribution did not occur on the same day as the maximum contribution for the Preston facility alone. The estimated maximum offsite 8-hour average concentrations per chemical, is presented in Table 3. The ratios of these two types of concentrations to the 8-hour TLV (see Table 2) are presented in Table 3. All the resultant ratios were significantly lower than one.

The ratios of estimated maximum offsite 8-hour concentrations to the reduced TLV (see Table 2) are presented in Table 3. Ratio values of 8 to 9 for vinyl chloride, 5 to 6 for trichloromethane, and approximately 1.5 for 1,1 dichloroethylene were noted. This comparison was very conservative since the estimated concentrations are based on an 8-hour average, and the RTLV's reflect continuous exposure. A more realistic comparison to the RTLV's was made by considering estimated maximum annual (continuous) average concentrations.

The maximum offsite annual average concentration resulting from the proposed Preston air stripping operation was estimated to occur approximately 75 meters (from the center point of the proposed field) towards the north-northwest. The maximum annual values, plus the values including Hialeah's contribution, are presented in Table 4. The ratios of these estimated concentrations to the RTLV's (see Table 2) are presented in Table 4. All the estimated maximum offsite annual concentrations are less than the RTLV's.

The maximum offsite 8-hour average concentration resulting from the proposed Hialeah air stripping operation was estimated to occur approximately 125 meters (from the center point of the proposed Hialeah field) towards the southeast. The estimated maximum offsite 8-hour average concentration and concentration including Preston's contribution are presented in Table 5. The ratios of these two types of concentrations to the 8-hour TLV (see Table 2) are presented in Table 5. All the ratio values were significantly lower than one.

The ratios of the estimated maximum 8-hour concentrations to the RTLV's (see Table 2) are presented in Table 5. Estimated concentrations were 5 to 8 times greater than the RTLV's for vinyl chloride, 3 to 5 times greater for trichloromethane, and 1.4 times greater (Hialeah plus Preston contribution) for 1, 1 dichloroethylene. As with the Preston results, this comparison was very conservative, since the estimated concentrations are based on an 8-hour average, and the RTLV's reflect continuous exposure. A more realistic comparison to the RTLV's was made by considering estimated maximum annual (continuous) average concentrations.

The maximum offsite annual average concentration resulting from the proposed Hialeah air stripping operation was estimated to occur approximately 75 meters (from the center point of the proposed field) toward the north-northwest. The maximum annual concentration, the concentration including Preston's contribution and the ratios of these estimated concentrations to the RTLV's (see Table 2) are presented in Table 6. All the estimated maximum offsite annual concentrations are less than the RTLV's.

CONCLUSION

The State of Florida and Metro-Dade County's review of proposed air stripping operation are based on a draft guideline which utilized acceptable workplace exposure concentrations which are reduced by factors which reflect frequency of operation and toxicity characteristic of the chemical released. This modeling analysis has demonstrated that the conservatively estimated maximum offsite annual (continuous) average concentration, based on one year of hourly representative meteorological data, was less than the reduced threshold limit value (reflecting continuous exposure) for each chemical analyzed.

TABLE 1

SOURCE CHARACTERISTICS

Source Height	14.4 m
Source Diameter	4.27 m
Exit Temperature	299K
Exit Velocity	
High	1.29 m/s
Low	0.196 m/s
Emission Rate/Tower	
1,1,2,2-Tetrachloroethane	5.56×10^{-4} g/s
1,1-Dichloroethane	1.01×10^{-2} g/s
Vinyl Chloride	1.456×10^{-2} g/s
1,1-Dichloroethylene	4.05×10^{-3} g/s
Methylene Chloride	1.18×10^{-3} g/s
Trichloromethane	3.68×10^{-2} g/s
Dichlorobromomethane	6.48×10^{-3} g/s
Chlorodibromomethane	2.20×10^{-3} g/s
Tribromomethane	5.79×10^{-4} g/s

TABLE 2

ACCEPTABLE AMBIENT CONCENTRATIONS

	8-Hour Time Weighted Average Threshold Limit Values* (mg/m^3)	TLV Reduced with Safety Factors (mg/m^3)
1,1,2,2-Tetrachloroethane	7	0.017
1,1-Dichloroethane	810	1.93
Vinyl Chloride	12.8	0.030
1,1-Dichloroethylene	20	0.048
Methylene Chloride	105	0.250
Trichloromethane	50	0.119
Dichlorobromomethane	NA	NA
Chlorodibromomethane	NA	NA
Tribromomethane	5	0.012

NA = Not Available
* = Obtained from Florida Department of Environmental Regulation

TABLE 3

MAXIMUM OFFSITE 8-HOUR AVERAGE IMPACT
FROM PROPOSED PRESTON AIR STRIPPER FIELD

	Maximum 8-Hour Average Concentrations (mg/m^3)		Ratio of Max. 8-Hour Average Concentration to TLV		Ratio of Max. 8-Hour Average Concentration to RTLV	
	Preston	Preston Plus Hialeah Contribution	Preston	Preston Plus Hialeah Contribution	Preston	Preston Plus Hialeah Contribution
1,1,2,2-Tetrachloroethane	9.14E-3	1.02E-2	1.31E-3	1.47E-3	5.50E-1	6.17E-1
1,1-Dichloroethane	1.66E-1	1.86E-1	2.05E-4	2.30E-4	8.61E-2	9.66E-2
Vinyl Chloride	2.39E-1	2.68E-1	1.87E-2	2.09E-2	7.85	8.78
1,1-Dichloroethylene	6.66E-2	7.46E-2	3.33E-3	3.73E-3	1.40	1.57
Methylene Chloride	1.94E-2	2.17E-2	1.85E-4	2.07E-4	7.77E-2	8.69E-2
Trichloromethane	6.05E-1	6.78E-1	1.21E-2	1.36E-2	5.08	5.71
Dichlorobromomethane	1.07E-1	1.19E-1	NA	NA	NA	NA
Chlorodibromomethane	3.62E-2	4.05E-2	NA	NA	NA	NA
Tribromomethane	9.52E-3	1.07E-2	1.90E-3	2.13E-3	7.98E-1	8.95E-1

NA = Not Available

TABLE 4

MAXIMUM OFFSITE ANNUAL AVERAGE IMPACT
FROM PROPOSED PRESTON AIR STRIPPER FIELD

	Maximum Annual Average Concentration (mg/m^3)		Ratio of Max. Annual Average Concentration to RTLV	
	Preston	Preston Plus Hialeah Contribution	Preston	Preston Plus Hialeah Contribution
1,1,2,2-Tetrachloroethane	6.89E-4	7.14E-4	4.05E-2	4.20E-2
1,1-Dichloroethane	1.25E-2	1.30E-2	6.48E-3	6.71E-3
Vinyl Chloride	1.80E-2	1.87E-2	6.00E-1	6.22E-1
1,1-Dichloroethylene	5.02E-3	5.20E-3	1.05E-1	1.08E-1
Methylene Chloride	1.46E-3	1.52E-3	5.84E-3	6.05E-3
Trichloromethane	4.56E-2	4.73E-2	3.83E-1	3.97E-1
Dichlorobromomethane	8.03E-3	8.32E-3	NA	NA
Chlorodibromomethane	2.73E-3	2.82E-3	NA	NA
Tribromomethane	7.17E-4	7.43E-4	5.98E-2	6.19E-2

NA = Not Available

TABLE 5

MAXIMUM OFFSITE 8-HOUR AVERAGE IMPACT
FROM PROPOSED HIALEAH AIR STRIPPER FIELD

	Maximum 8-Hour Average Concentrations (mg/m^3)		Ratio of Max. 8-Hour Average Concentration to TLV		Ratio of Max. 8-Hour Average Concentration to RTLV	
	Hialeah	Hialeah Plus Preston Contribution	Hialeah	Hialeah Plus Preston Contribution	Hialeah	Hialeah Plus Preston Contribution
1,1,2,2-Tetrachloroethane	5.59E-3	9.25E-3	7.98E-4	1.32E-3	3.35E-1	5.54E-1
1,1-Dichloroethane	1.02E-1	1.68E-1	1.26E-4	2.08E-4	5.29E-2	8.75E-2
Vinyl Chloride	1.46E-1	2.42E-1	1.14E-2	1.89E-2	4.79	7.92
1,1-Dichloroethylene	4.07E-2	6.73E-2	2.04E-3	3.36E-3	8.57E-1	1.42
Methylene Chloride	1.19E-2	1.96E-2	1.13E-4	1.87E-2	4.75E-2	7.85E-2
Trichloromethane	3.07E-1	6.12E-1	7.40E-3	1.22E-2	3.11	5.14
Dichlorobromomethane	6.52E-2	1.08E-1	NA	NA	NA	NA
Chlorodibromomethane	2.21E-2	3.66E-2	NA	NA	NA	NA
Tribromomethane	5.82E-3	9.63E-3	1.16E-3	1.92E-3	4.87E-1	8.06E-1

NA = Not Available

TABLE 6

MAXIMUM OFFSITE ANNUAL AVERAGE IMPACT
FROM PROPOSED HIALEAH AIR STRIPPER FIELD

	Maximum Annual Average Concentration (mg/m^3)		Ratio of Max. Annual Average Concentration to RTLV	
	Hialeah	Hialeah Plus Preston Contribution	Hialeah	Hialeah Plus Preston Contribution
1,1,2,2-Tetrachloroethane	3.05E-4	3.72E-4	1.79E-2	2.19E-2
1,1-Dichloroethane	5.54E-3	6.77E-3	2.87E-3	3.50E-3
Vinyl Chloride	7.99E-3	9.76E-3	2.66E-1	3.25E-1
1,1-Dichloroethylene	2.22E-3	2.71E-3	4.62E-2	5.64E-2
Methylene Chloride	6.48E-4	7.91E-4	2.59E-3	3.16E-3
Trichloromethane	2.02E-2	2.47E-2	1.70E-1	2.07E-1
Dichlorobromomethane	3.56E-3	4.34E-3	NA	NA
Chlorodibromomethane	2.68E-3	3.28E-3	NA	NA
Tribromomethane	3.18E-4	3.88E-4	2.65E-2	3.23E-2

NA = Not Available

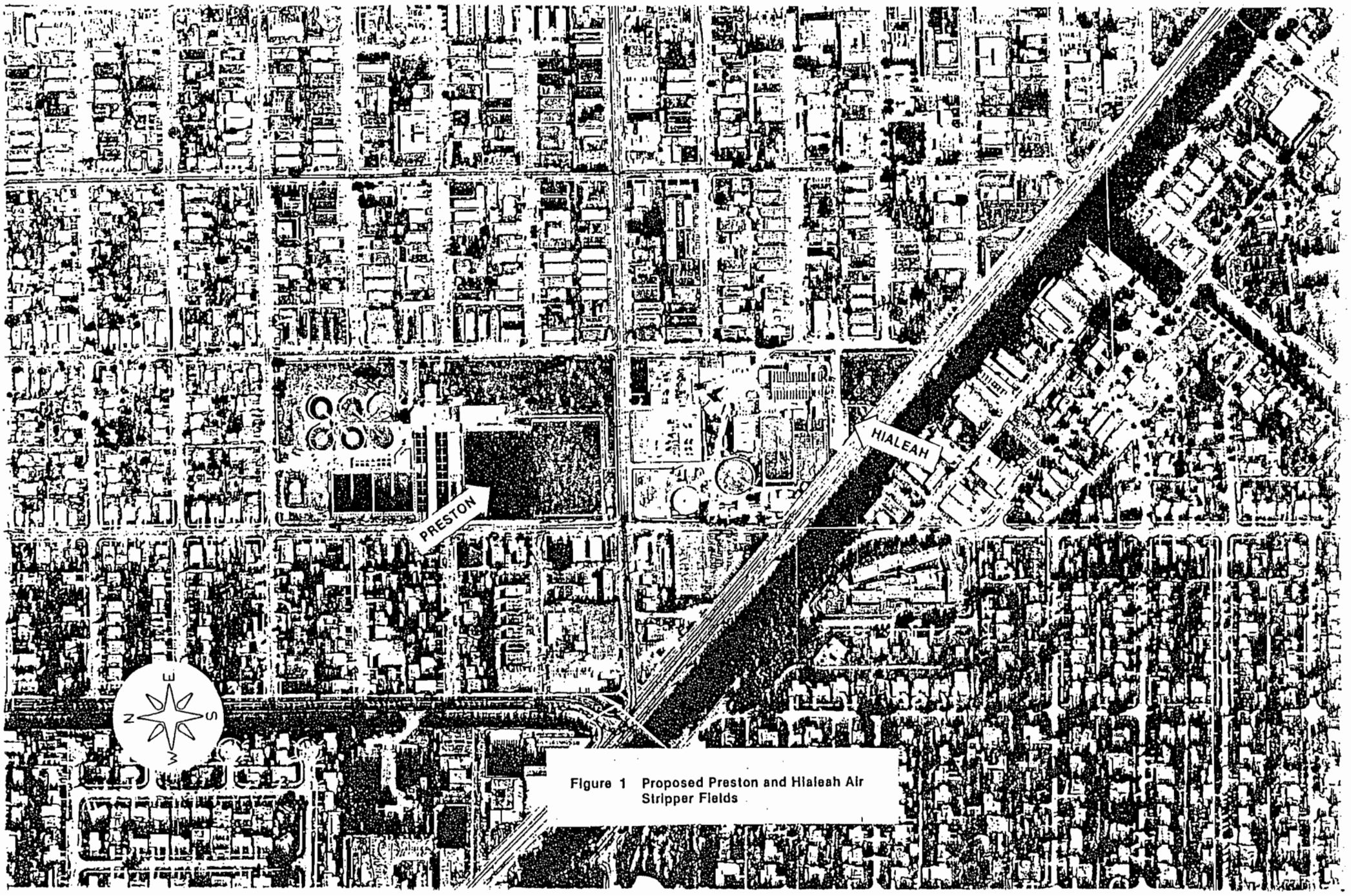


Figure 1 Proposed Preston and Hialeah Air Stripper Fields

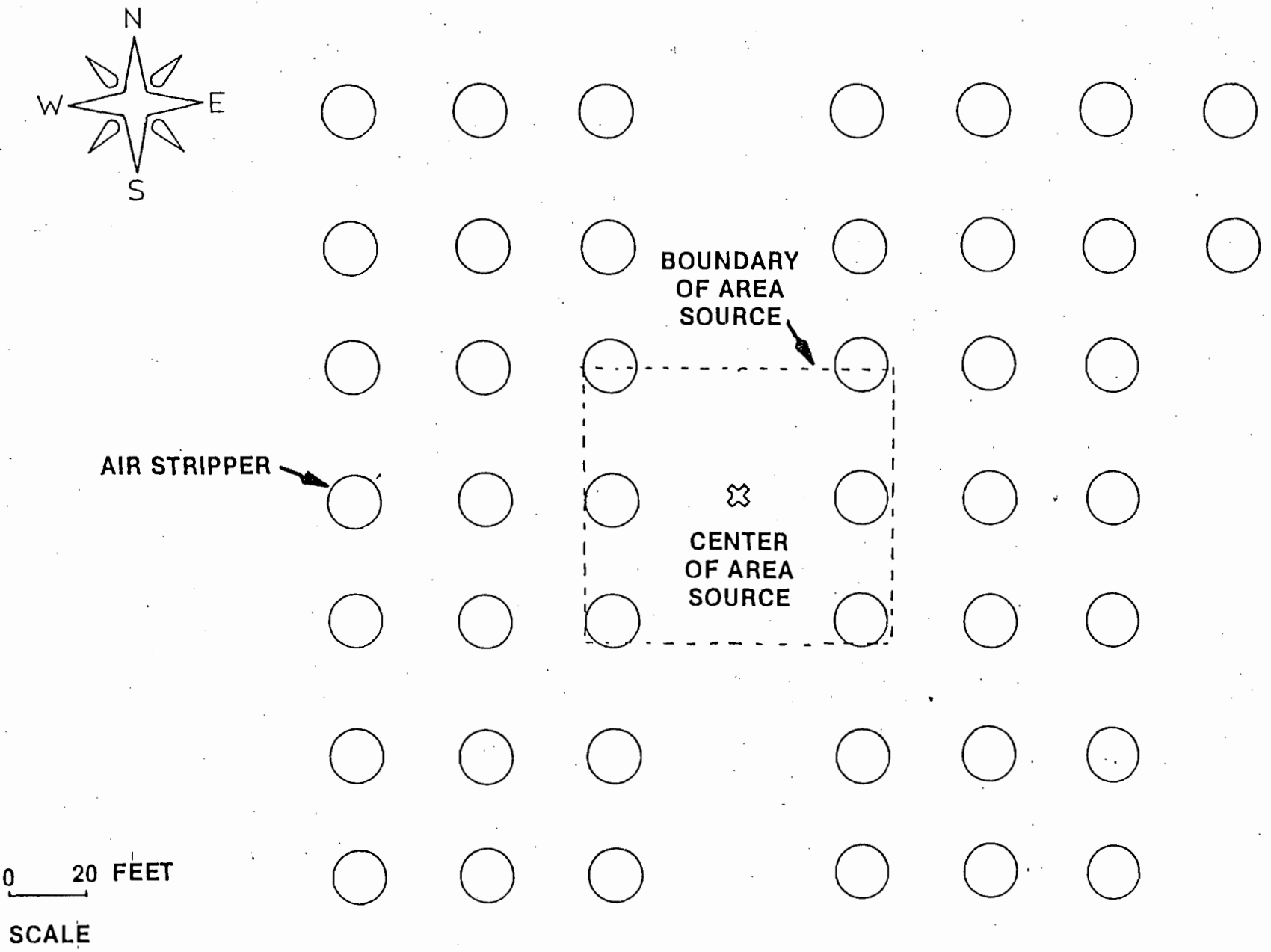


Figure 2 Proposed Preston Air Stripper Configuration

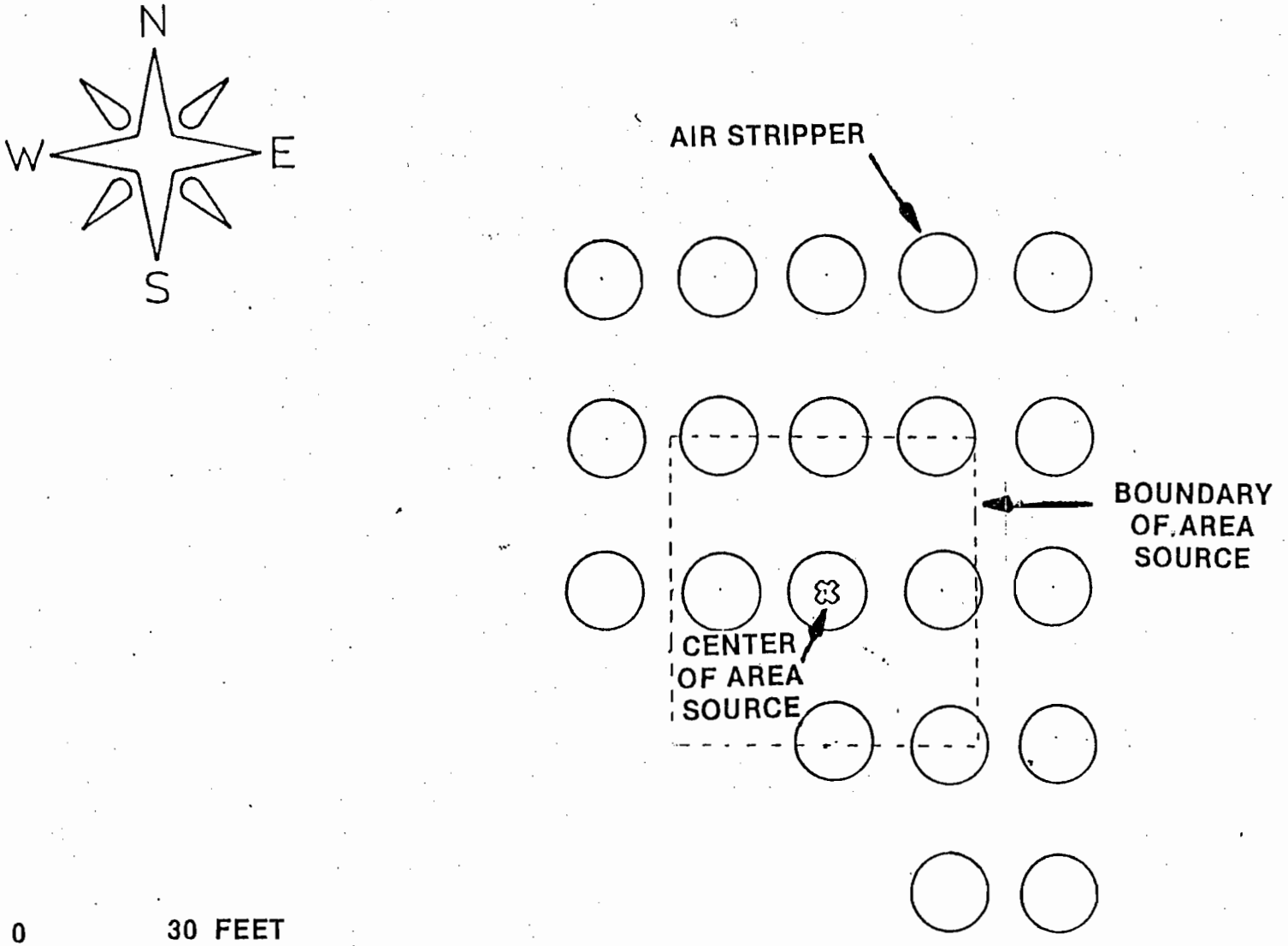


Figure 3 Proposed Hialeah Air Stripper Configuration

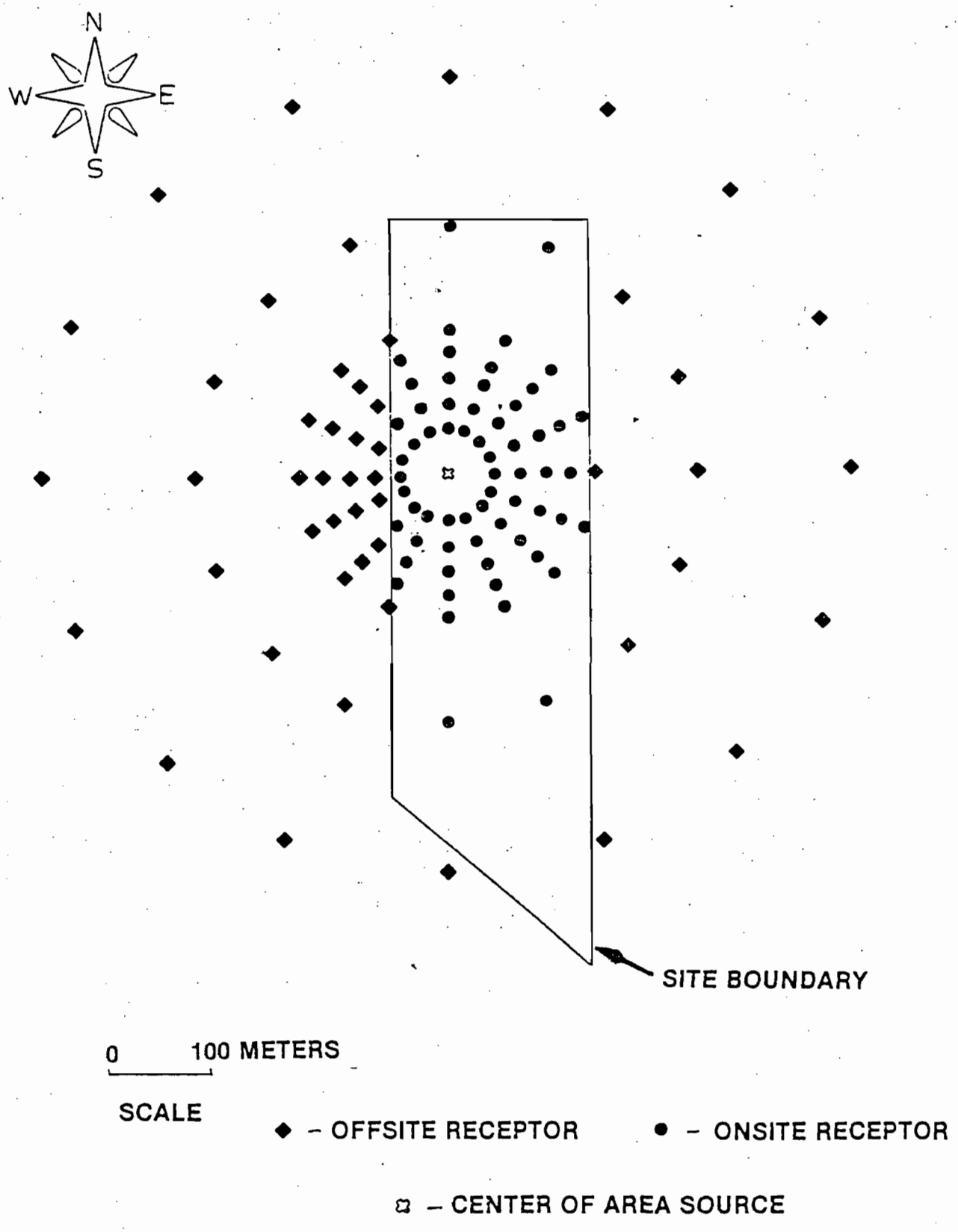


Figure 4 Preston Receptor Layout

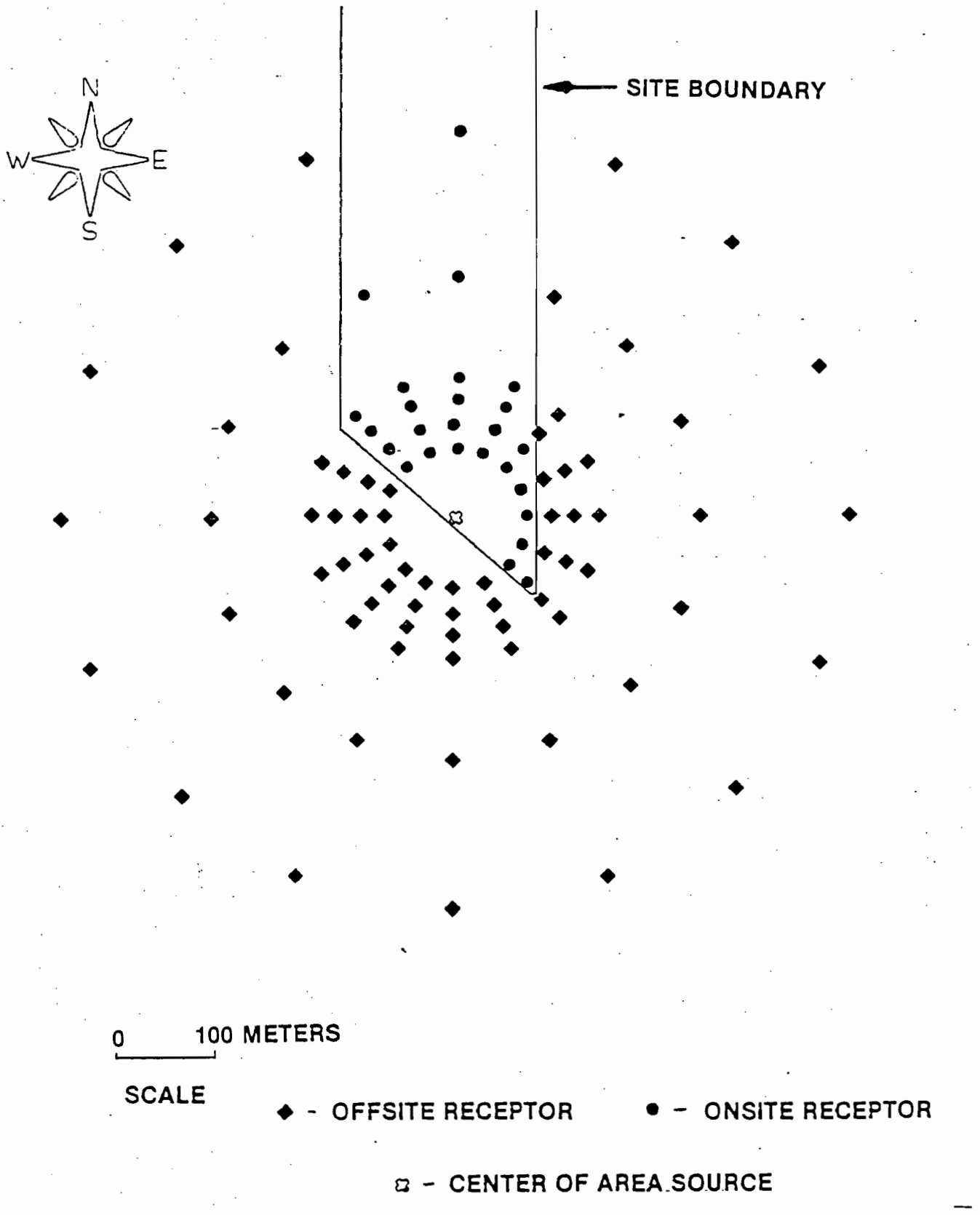


Figure 5 Hialeah Receptor Layout

Attachment 2

ATTACHMENT 2

ASSESSMENT OF POTENTIAL GROUND-LEVEL FOGGING FROM THE PROPOSED AIR STRIPPING OPERATION AT THE HIALEAH AND JOHN E. PRESTON WATER TREATMENT PLANTS

AIR STRIPPER FOGGING IMPACT ANALYSIS

In order to assess the potential fogging impacts of air stripper operation, the EPRI (Electric Power Research Institute) plume and drift analysis system was utilized in conjunction with one year (1986) of hourly representative Miami International Airport meteorological data. The EPRI plume and drift analysis system is a computer code that quantifies drift deposition amounts and visible plume dimensions, including hours of fogging due to visible plume impingement on the ground, for both natural and mechanical draft cooling towers on a seasonal and annual basis. This computer code uses cooling tower dimensions and exit conditions along with one year of representative meteorological data as input to its calculations. Given that an air stripper contains essentially the same mechanical features as a mechanical draft cooling tower, the EPRI computer code is the best available tool for this kind of assessment.

Since the EPRI model distinguishes between circular and linear mechanical draft towers in its treatment of downwash and plume fogging, the circular tower was chosen as being more representative of an air stripper in shape than a linear tower. In addition, since an air stripper is not designed to reject waste heat as a cooling tower does, the EPRI code had to be slightly modified to accept a constant exit temperature and velocity in place of heat rejection and mass of air flow.

For the purpose of the fogging analysis, the exit air temperature was assumed to be the same as the water temperature in the air stripper (80°F). This assumption was made only with ambient air temperatures less than 80°F. When ambient temperatures exceeded 80°F, the air stripper exhaust temperature was set equal to the ambient air temperature. Combined with the assumption that the air stripper exhaust is saturated with water vapor, this treatment of exit temperature is conservative in terms of visible plume and fog formation since the exhaust temperature most likely is cooler than what is assumed in this analysis.

The exit velocity from the air stripper (1.3 m/sec) was calculated from the maximum air flow rate of 38,990 cfm. The actual exit velocity chosen from within the operational range of air flows (5,950 cfm-38,990 cfm) for the air strippers is not important to this analysis since the range of exit velocity (0.2-1.3 m/sec) is very small compared to most wind speeds. Any exit velocity within this range results in a large wind speed to exit velocity ratio which is conducive to plume downwash.

The EPRI model was executed using hourly 1986 Miami International Airport meteorological data on an individual air stripper basis. The air strippers were not analyzed collectively in one model run due to their separation distance of 2-3 exit diameters. In this circumstance, the most realistic

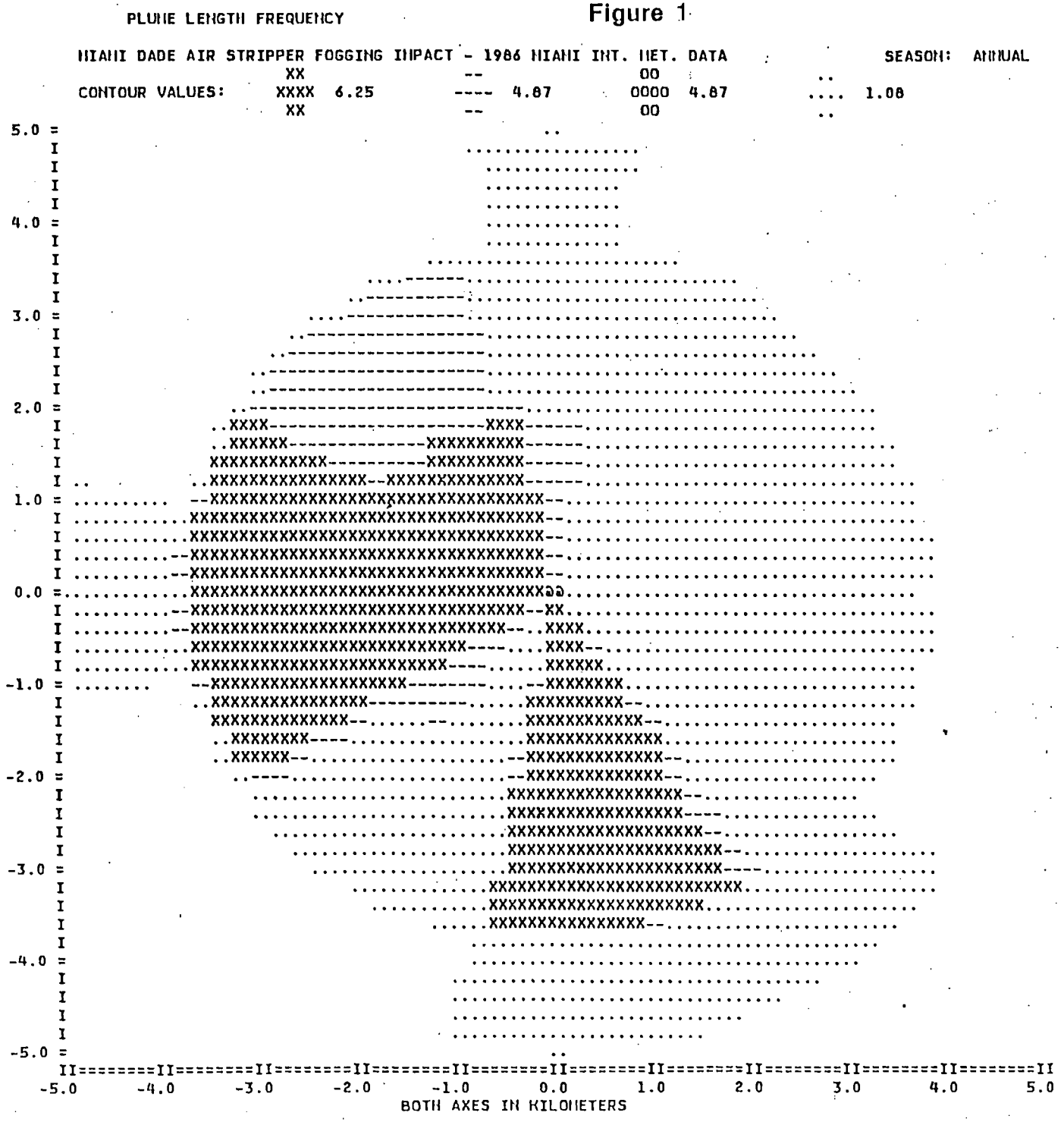
approach to modeling near-field ground-fogging effects is to examine each air stripper individually and then combine ground fogging patterns for all of the air strippers.

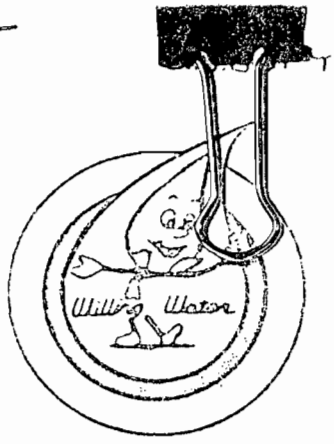
Despite the use of conservative assumptions, no ground-level fogging was predicted to occur by the EPRI model for an individual air stripper. Thus, it is unlikely that the proposed air stripper arrays will cause any noticeable fogging due to air stripper visible plume impingement on the ground. However, this does not mean that there will be no visible plumes generated by the air strippers. Figure 1 shows a computer-generated plot of visible plume length frequency for a single air stripper. Keeping in mind that this analysis was performed in a conservative manner, this figure shows that visible plumes could reach distances of 3.5 kilometers approximately 6% of the time with generally easterly or northerly winds. Most other wind directions produce plumes of this length only 1 percent of the time. The figure also shows that some plumes may surpass 5 kilometers in length with easterly winds. However, the model also shows that these plumes do not grow past 10 meters in width.

Since Miami International Airport lies approximately 2.5 kilometers south of the air stripper facility, the EPRI model indicates that some air stripper plumes may reach the airport considering the south-southwest, south, and south-southeast downwind directions from the water treatment plants. The EPRI model estimates that visible plumes will reach the airport approximately 16% of the time. Of this 16%, 11% is estimated to comprise plumes with heights of about 7,000 meters, 4.5% with plume heights of about 400 meters, and 0.5% with plume heights of approximately 100 meters. However, as mentioned earlier, each air stripper plume is less than 10 meters in width at its widest point. It should also be emphasized that since these are predictions from a mathematical model that contains inherent inaccuracies, this information should be substantiated, if possible, with observations from the operation of similar facilities.

The primary reason that the air stripper visible plumes remain elevated, precluding ground-fogging, can be traced to the climatology of Miami. The EPRI computer code incorporates the knowledge gained by researching the conditions that lead to visible plume downwash and subsequent ground fogging from circular and linear mechanical draft cooling towers. This research found that the higher the air temperature, the stronger the wind speed needed to downwash a plume in the wake of a cooling tower. For circular towers, which most resemble an air stripper, a wind speed of greater than 15 m/sec (34 mph) is needed to downwash a plume for the range of temperatures experienced at Miami. Since the hourly Miami meteorological data for 1986 did not indicate any wind speeds greater than 15 m/sec (34 mph), the model did not allow downwash, and thus ground fogging, to occur. It would seem that conditions approaching those of a tropical depression would be needed to produce ground fogging from an air stripper which would be generally infrequent.

Figure 1


PLUME LENGTH FREQUENCY
MIAMI DADE AIR STRIPPER FOGGING IMPACT - 1986 MIAMI INT. MET. DATA
SEASON: ANNUAL
CONTOUR VALUES: XX 6.25 -- 4.87 00 4.87 .. 1.08
XXXX ---- 0000 ....
XX -- 00 ..
NORTH
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
-4.0
-5.0
-5.0 -4.0 -3.0 -2.0 -1.0 0.0 1.0 2.0 3.0 4.0 5.0
BOTH AXES IN KILOMETERS



4-11-88

Larry.
Please assign
module and let me
know who it is.
Thanks,
M

2306

IRITY DEPARTMENT

ess

8

Mr. Clair A. Fancy, Deputy Chief
Central Air Permitting
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL

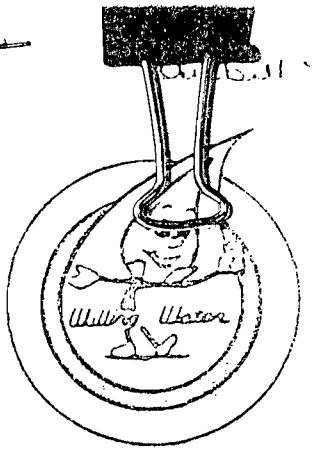
Subject: Air Permit Applications for the Hialeah and Preston Air Stripping Projects

Dear Mr. Fancy:

As required in the interoffice memorandum from you to District Managers, John Ruddell and John Gentry of October 20, 1987, enclosed are two applications for construction permits for the permanent air stripping installations at the Hialeah and Preston Water Treatment Plants. We received a copy of the memorandum about March 1, 1988 and were not previously aware of the air permit requirements. Also enclosed are two checks payable to DER in the amount of $1,000 each for the required permit application fees.

The proposed projects consist of an air stripping process, which is designed to remove the contaminating volatile organic compounds (VOCs) from the treated potable water at the Hialeah and Preston Water Treatment Plants. The air stripping process is based on the physical characteristics of these compounds to outgas from the water into the air. The typical air stripper consists of a tower with the contaminated water introduced and distributed at the top. The water cascades downward over and through an inert packing material while a much larger countercurrent volume of process air rises through the packing. The turbulent flows of the air and water optimize the outgassing process.

As required in the above mentioned position paper, an "Air Stripping Evaluation Worksheet", is enclosed as Table I of the permit application. This worksheet was completed according to



4-11-88

Teresa:
According to the cc's on the cover, copies were sent to DERM & Palm Beach Dist. Office. Please verify that they received the entire pkg. & let me know. Larry has copy for mdaw Thanks. (ji)

2306

ORITY DEPARTMENT

ress

88

RECEIVED
APR 0 6 1988
DER - BAQM

Mr. Clair A. Fancy, Deputy Chief
Central Air Permitting
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL

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Steve Smallwood
pls handle.

MIAMI-DADE WATER AND SEWER AUTHORITY DEPARTMENT

P. O. BOX 330316
MIAMI, FLORIDA 33233-0316

Main Office
3575 S. LeJeune Road
Telephone 665-7471

October 30, 1987

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

DER
NOV 5 1987
BAQM

Mr. Dale Twachtmann, Secretary
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: DER Contract HW 72 Air Stripping Facilities

Dear Mr. Twachtmann:

We have made good progress with the above referenced project covering design of air stripping facilities at the Hialeah Water Treatment Plant and the John E. Preston Water Treatment Plant. The project is being funded by a U.S. Environmental Protection Agency (EPA) Cooperative Agreement between the State of Florida and EPA. It is the selected remedial action addressing the area wide contamination of the Biscayne Aquifer.

On October 27, 1987, Mr. John Willis of your Project Management Section and Ms. Mary Gail Scott, EPA Environmental Engineer, met in Miami with our staff to review the progress of our design and inspect the prototype air stripping unit presently under construction. During the course of the meeting it was suggested that the State of Florida Department of Environmental Regulation (FDER) might not wish to amend their Cooperative Agreement with EPA to cover the $30,000,000 construction phase of the project because FDER does not want to commit dollars to a project which Metropolitan Dade County may not complete.

We wish to give you every assurance that we intend to complete the project. The local share of funding is included as component 118 in the Series T Pollution Control Bonds we sold through your Department in 1986. A copy of a letter from Mr. James T. Earnest, FDER, to Mr. Robert E. Niro, Attorney for the Division of Bond Finance, dated July 11, 1986 describes the subject project as Item No. 9.

RECEIVED
NOV 4 1987
Office of the Secretary

DEPARTMENT OF ENVIRONMENTAL REGULATION

ROUTING AND TRANSMITTAL SLIP

ACTION NO

ACTION DUE DATE

1. TO: (NAME, OFFICE, LOCATION) Steve Smallwood	Initial	
	Date	
2. Barry A	Initial	
	Date	
3.	Initial	
	Date	
4.	Initial	
	Date	

DER

NOV 5 1987

REMARKS:

BAQM

P.H.

INFORMATION	
	Review & Return
	Review & File
	Initial & Forward

DISPOSITION	
	Review & Respond
	Prepare Response
	For My Signature
.	For Your Signature
	Let's Discuss
	Set Up Meeting
	Investigate & Report
	Initial & Forward
	Distribute
	Concurrence
	For Processing
	Initial & Return

FROM: Tom Lewis

DATE 11/4

PHONE

This letter is our formal request that you amend the Cooperative Agreement with EPA to include the monies in the budget necessary to construct the project and amend the scope of work to include construction. We will forward a schedule of tasks necessary to complete the project in the very near future. However, we would like you to proceed as expeditiously as possible with the request to EPA to amend the Cooperative Agreement.

Should you have any questions regarding this matter or require any additional information to process our request, please call me at (305) 665-7471.

Very truly yours,

Garrett Sloan
Director

GS/MLM/la

cc: Mr. Joaquin Avino, Assistant County Manager
Mr. James T. Cowgill, Assistant Director
Mr. Robert A. Cuevas, Chief Engineer
Ms. Mary L. McAtee, Grants Coordinator
Mr. John Renfrow, DERM
Mr. James Orban, EPA
Ms. Mary Gail Scott, EPA
Mr. John Willis, FDER

APPENDIX A

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 11, 1986

Mr. Robert E. Niro, Attorney
Division of Bond Finance
Department of General Services
Larson Building, Room 453
Tallahassee, Florida 32301

Dear Mr. Niro:

The Miami-Dade Water and Sewer Authority Department of Dade County has requested that the State of Florida sell pollution control bonds to provide financing for the design and construction of water supply and distribution facilities in Dade County. The proposed project consists of a number of component projects which are described as follows:

1. Component 82 - Development of new West Well Field to serve Alexander Orr, Jr. Water Treatment Plant. This well field will provide a capacity of 140 M.G.D. (80 M.G.D. for expansion and 60 M.G.D. to replace abandoned wells). This project includes a 96-inch raw water transmission main to the Orr plant.

2. Component 82 - Raw water mains from Southwest Well Field.

3. Component 91 - Expansion of Alexander Orr, Jr. Water Treatment Plant to 256 M.G.D. This will be done in stages and includes design and construction of five (5) emergency power generators, four (4) up-flow water softeners, an eight-story chemical building, two (2) treated water settling basins, and a 20 million gallon resevoir.

4. Component 98 - Treated water transmission mains south of N.E. 161 Street.

5. Component 111 - Treated water transmission mains - City of Miami, North of N.W. 53 Street.

6. Component 112 - Treated water transmission mains - City of Miami, South of N.W. 53 Street.

7. Component 115 - Treated water transmission mains - western service area.

8. Component 116 - Treated water transmission mains - southern service area.

9. Component 118 - Improvements to Hialeah-Preston Water Supply and Treatment Complex. The project includes designing and constructing air stripping facilities and providing improved recharge for Northwest Well Field through enlargement of an existing canal, construction of two new canals, and installation of a control structure in the Snapper Creek Canal.

If additional information is needed, please let me know.

Sincerely,

Larry R. Wright, Assistant Chief
Bureau of Accounting and Budgeting

James T. Earnest

James T. Earnest
State Bond Loan Accountant

JTE/dg