P 408 530 296

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. Robert C. Haven	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 9/18/84	

PS Form 3800, Feb. 1982

PS Form 3811, Jan. 1979

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

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

1. The following service is requested (check one.)
   - [x] Show to whom and date delivered. .... ____¢
   - [ ] Show to whom, date and address of delivery.... ____¢
   - [ ] RESTRICTED DELIVERY
     Show to whom and date delivered. .... ____¢
   - [ ] RESTRICTED DELIVERY.
     Show to whom, date, and address of delivery.$ ____

   (CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
Mr. Robert C. Haven
400 South Orange Ave.
Orlando, FL 32801

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	P408530296	

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE ☐Addressee ☒Authorized agent

Frank V. [illegible]

4. DATE OF DELIVERY
9-20-84

POSTMARK
USPO SEP 20 1984 ... FL ... STA.

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE:

CLERK'S INITIALS

☆GPO : 1979-300-459

ITEM 1 PROCESS WEIGHT DERIVATION

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

September 14, 1984

Mr. Robert C. Haven, P.E.
Director of Public Works
City of Orlando
400 South Orange Avenue
Orlando, Florida 32801

Dear Mr. Haven:

The department acknowledges receipt of your August 21, 1984, letter requesting a twelve month extension of the Iron Bridge Regional WPCF construction permit No. AC 59-76662 for the west sludge drying facility. Your letter stated the testing program for this facility was not successful. The city is investigating an alternate means of disposal of the sludge but may need to operate the equipment as an emergency backup to comply with your annual sludge disposal contract.

It is not clear to us whether the unsuccessful test was related to the process or the air emissions.

We cannot process your request until additional information is submitted. The information needed, and the department's probable reaction, are discussed below.

Did the testing program show the emissions from the facility complied with the state regulations? If so, you will need to obtain a permit to operate from the St. Johns River District by submitting a complete application for permit to operate to that office. If you need information on the procedure to obtain a permit to operate, contact Charles Collins at (305) 894-7555.

If the testing program showed the emissions were not in compliance with department's regulations, we will need a detail plan and schedule showing how the city proposes to modify the facility to bring it into compliance with the state regulations. With an acceptable plan and schedule, the department will be able to extend the construction permit. We caution you that an extended construction permit will not allow operation of the facility, except for testing purposes, prior to the modifications. If you need clarification on the plan and schedule required, contact Willard Hanks at (904) 488-1344.

Operation of the facility with the emissions in excess of the standards is a violation of state regulations and is subject to enforcement action by the department. If the city is forced to operate the facility out of compliance with the regulations, you should contact the St. Johns River District and negotiate a Consent Order. The city may have to pay a penalty if they operate the facility under these circumstances. If a Consent Order is needed, we recommend you contact George Gionis at (305) 894-7555.

This summarizes three possibilities available to the city for this facility. The same possibilities exist for the east sludge drying facilities, permit No. AC 59-76663. The city needs to act on this matter before the October 31, 1984, expiration date of the construction permits.

Sincerely,

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

CHF/WH/agh

cc: Charles Collins
George Gionis

No. 0157499

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL

(See Reverse)

SENT TO ~~Mr. Robert C. Haven~~			
STREET AND NO.			
P.O., STATE AND ZIP CODE			
POSTAGE			$
CONSULT POSTMASTER FOR FEES	CERTIFIED FEE		¢
	OPTIONAL SERVICES	SPECIAL DELIVERY	¢
		RESTRICTED DELIVERY	¢
	RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED	¢
		SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
		SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
		SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
TOTAL POSTAGE AND FEES			$
POSTMARK OR DATE 5/1/84			

PS Form 3800, Apr. 1976

PS Form 3811, Jan. 1978

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

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

1. The following service is requested (check one.)
   - ☒ Show to whom and date delivered............ ¢
   - ☐ Show to whom, date and address of delivery... ¢
   - ☐ RESTRICTED DELIVERY
     Show to whom and date delivered............ ¢
   - ☐ RESTRICTED DELIVERY.
     Show to whom, date, and address of delivery.$____

   (CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
   Mr. Robert C. Haven
   P. O. Box 1418
   Oviedo, FL 32765

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	0157499	

(Always obtain signature of addressee or agent)

I have received the article described above.

SIGNATURE ☐Addressee ☐Authorized agent

x Linda Lackey

4. DATE OF DELIVERY — POSTMARK: USPO MAY 4 1984 OVIEDO, FL

5. ADDRESS (Complete only if requested)

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

☆GPO : 1979-300-459

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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

DEPARTMENT OF ENVIRONMENTAL REGULATION
STATE OF FLORIDA

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

April 26, 1984

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. Robert C. Haven
Director of Public Works
City of Orlando
Post Office Box 1418
Oviedo, Florida 32765

Dear Mr. Haven:

Enclosed are Permit Numbers AC 59-76662 and AC 59-76663, dated April 20, 1984, to the City of Orlando, issued pursuant to Section 403, Florida Statutes.

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

Sincerely,

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

CHF/pa

Enclosure

cc: Joseph L. Tessitore, P.E., Cross/Tessitore & Associates
Charles Collins, DER St. Johns River District

Final Determination

City of Orlando

Sludge Drying Facility

Seminole County, Florida

Permit Numbers: AC 59-76662
AC 59-76663

Florida Department of Environmental Regulation
Bureau of Air Quality Management

Central Air Permitting

April 12, 1984

Final Determination

The City of Orlando's Construction Permit applications for installation and operation of a sludge recovery system (east and west lines), at the Iron Bridge Regional Water Pollution Control Plant, in Seminole County, Florida, have been reviewed by the Bureau of Air Quality Management. Public notice of the department's Intent to Issue the construction permits was published in The Orlando Sentinel on March 4, 1984.

Copies of the preliminary determination have been available for public inspection at the department's St. Johns River District office and The Bureau of Air Quality Management.

Comments on the proposed construction permits were received from the City of Orlando.

The City of Orlando's comments were in reference to the proposed expiration date of the permits.

The department has considered their request and made the changes described below to the specific conditions of the permits.

The expiration date of the permits was changed from June 30, 1984 to October 31, 1984.

The final action of the department will be to issue the permits with the changes noted above.

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

PERMITTEE:

City of Orlando
P. O. Box 1418
Oviedo, Florida
32765

Permit Number: AC 59-76662
Date of Issue:
Expiration Date: October 31, 1984
County: Seminole
Latitude/Longitude: 28° 37' 20" N
81° 13' 10" W
Project: Sludge Drying Facility.
West Line

This permit is issued under the provisions of Chapter(s) 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 installation of a cyclone followed by a Venturi scrubber and packed column using a hypoclorite solution for odor removal to be located at the Iron Bridge Regional Water Pollution Control Plant, in Seminole County, Florida. The UTM coordinates are 478.250 East and 3,166.50 North.

The construction shall be in accordance with the attached permit application, plans and documents except as otherwise noted on pages 1 through 7, Specific Conditions.

Attachments:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16) received on September 26, 1983.

2. Clair Fancy's letters of October 26, 1983 and November 22, 1983.

3. City of Orlando's letters of October 27, 1983 and December 23, 1983 (Responses to technical discrepancies).

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76662
Date of Issue:
Expiration Date: October 31, 1984

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.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76662
Date of Issue:
Expiration Date: October 31, 1984

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.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76662
Date of Issue:
Expiration Date: October 31, 1984

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. Emissions from this source shall not exceed the following allowable emissions.

Opacity	PM lb/hr	SO_2 lb/hr	NO_2 lb/hr	HC lb/hr	Hg
10%	7.0	4.7	2.0	0.1	3200 grams per 24-hour period

2. This source shall be allowed to operate 5824 hours per year.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76662
Date of Issue:
Expiration Date: October 31, 1984

SPECIFIC CONDITIONS:

3. The fuel used to fire the dryer will be No. 2 fuel oil. Sulfur content in the oil shall not exceed 0.36 percent. Maximum heat input shall not exceed 18.72 MMBTU/hr.

4. Before this construction permit expires and thereafter on an annual basis, this source shall be tested for particulate matter, sulfur dioxide, visible emissions, objectionable odor and mercury emissions. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR or other State approved methods.

   a. Method 1. Sample and Velocity Traverses
   b. Method 2. Volumetric Flow Rate.
   c. Method 3. Gas Analysis
   d. Method 5. Determination of Particulate Emissions for Stationary Sources
   g. Method 9. Determination of the Opacity of Emissions from Stationary Sources

   A compliance test shall consist of the average of three consecutive runs. The test will be conducted at 90 to 100 percent maximum capacity while burning No. 2 fuel oil. The Department shall be notified 30 days in advance of the compliance test.

5. No objectionable odor shall be allowed from this facility. Test method shall be the American Society for Testing Materials Method D 1391-78 (Standard Method for Measurement of Odor in Atmospheres [(Dilution Method)].

6. Compliance with the SO_2 emission limit will be based upon the sulfur content of the fuel fired. Applicable test methods by the American Society for Testing Material (A.S.T.M.) will be used.

7. Compliance with the mercury emission shall be determined as specified in the 40 CFR 61, Subpart E, National Emission Standard for Mercury.

8. Reasonable precautions to prevent unconfined and fugitive emissions of particulate matter shall be taken by the

permittee. Reasonable controls shall mean an enclosed loading building or other forms of controls as approved by the St. Johns River District office. During material handling operations, visible emissions shall not exceed 5% opacity.

9. The applicant will demonstrate compliance with the conditions of the construction permit, and submit a complete application for an operating permit to the Department's St. Johns River District office prior to 90 days of the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date or issuance of an operating permit.

10. Upon obtaining an operating permit, the applicant will be required to submit annual test reports on the actual operation and emissions of the facility. Reports will give emission test data, emission test results, hours of operation, fuel oil usage, average and maximum percent sulfur in oil, pressure drop across the scrubber, pressure on scrubber header, and flow of water through scrubber.

11. Stack sampling facilities will include the eyebolt and angle described in Chapter 17-2.700, Florida Administrative Code.

12. The source shall comply with the provisions and requirements of the attached general conditions.

Issued this 20 day of April, 1984.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Victoria J. Tschinkel

Victoria J. Tschinkel, Secretary

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

PERMITTEE:

City of Orlando
P. O. Box 1418
Oviedo, Florida
32765

Permit Number: AC 59-76663
Date of Issue:
Expiration Date: October 31, 1984
County: Seminole
Latitude/Longitude: 28° 37' 20" N
81° 13' 10" W
Project: Sludge Drying Facility.
East Line

This permit is issued under the provisions of Chapter(s) 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 installation of a cyclone followed by a Venturi scrubber and packed column using a hypoclorite solution for odor removal to be located at the Iron Bridge Regional Water Pollution Control Plant, in Seminole County, Florida. The UTM coordinates are 478.250 East and 3,166.50 North.

The construction shall be in accordance with the attached permit application, plans and documents except as otherwise noted on pages 1 through 7, Specific Conditions.

Attachments:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16) received on September 26, 1983.

2. Clair Fancy's letters of October 26, 1983 and November 22, 1983.

3. City of Orlando's letters of October 27, 1983 and December 23, 1983 (Responses to technical discrepancies).

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76663
Date of Issue:
Expiration Date: October 31, 1984

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.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76663
Date of Issue:
Expiration Date: October 31, 1984

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: City of Orlando

I. D. Number:
Permit Number: AC 59-76663
Date of Issue:
Expiration Date: October 31, 1984

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.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76663
Date of Issue:
Expiration Date: October 31, 1984

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. Emissions from this source shall not exceed the following allowable emissions.

Opacity	PM lb/hr	SO_2 lb/hr	NO_2 lb/hr	HC lb/hr	Hg
10%	7.0	4.7	2.0	0.1	3200 grams per 24-hour period

2. This source shall be allowed to operate 5824 hours per year.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76663
Date of Issue:
Expiration Date: October 31, 1984

SPECIFIC CONDITIONS:

3. The fuel used to fire the dryer will be No. 2 fuel oil. Sulfur content in the oil shall not exceed 0.36 percent. Maximum heat input shall not exceed 18.72 MMBTU/hr.

4. Before this construction permit expires and thereafter on an annual basis, this source shall be tested for particulate matter, sulfur dioxide, visible emissions, objectionable odor and mercury emissions. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR or other State approved methods.

   a. Method 1. Sample and Velocity Traverses
   b. Method 2. Volumetric Flow Rate.
   c. Method 3. Gas Analysis
   d. Method 5. Determination of Particulate Emissions for Stationary Sources
   g. Method 9. Determination of the Opacity of Emissions from Stationary Sources

   A compliance test shall consist of the average of three consecutive runs. The test will be conducted at 90 to 100 percent maximum capacity while burning No. 2 fuel oil. The Department shall be notified 30 days in advance of the compliance test.

5. No objectionable odor shall be allowed from this facility. Test method shall be the American Society for Testing Materials Method D 1391-78 (Standard Method for Measurement of Odor in Atmospheres [(Dilution Method)].

6. Compliance with the SO_2 emission limit will be based upon the sulfur content of the fuel fired. Applicable test methods by the American Society for Testing Material (A.S.T.M.) will be used.

7. Compliance with the mercury emission shall be determined as specified in the 40 CFR 61, Subpart E, National Emission Standard for Mercury.

8. Reasonable precautions to prevent unconfined and fugitive emissions of particulate matter shall be taken by the

permittee. Reasonable controls shall mean an enclosed loading building or other forms of controls as approved by the St. Johns River District office. During material handling operations, visible emissions shall not exceed 5% opacity.

9. The applicant will demonstrate compliance with the conditions of the construction permit, and submit a complete application for an operating permit to the Department's St. Johns River District office prior to 90 days of the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date or issuance of an operating permit.

10. Upon obtaining an operating permit, the applicant will be required to submit annual test reports on the actual operation and emissions of the facility. Reports will give emission test data, emission test results, hours of operation, fuel oil usage, average and maximum percent sulfur in oil, pressure drop across the scrubber, pressure on scrubber header, and flow of water through scrubber.

11. Stack sampling facilities will include the eyebolt and angle described in Chapter 17-2.700, Florida Administrative Code.

12. The source shall comply with the provisions and requirements of the attached general conditions.

Issued this 20 day of April, 1984.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Victoria Tschinkel

Victoria J. Tschinkel, Secretary

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

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

RECEIVED
APR 20 1984
Office of the Secretary

TO: Victoria J. Tschinkel

FROM: Clair Fancy *Clair Fancy*

DATE: April 19, 1984

SUBJ: Approval of Attached Air Construction Permits

Attached for your signature are two Air Construction Permits for which the applicant is the City of Orlando. The proposed project is the installation and operation of a sludge recovery system at the Iron Bridge Regional Waste Pollution Control Plant in Seminole County, Florida.

Day 90, after which the permits would be issued by default, is April 29, 1984.

The Bureau recommends your approval and signature.

CF/pa

Attachment

PM
3-28-84
Orlando, FL

City of Orlando

PUBLIC WORKS
DEPARTMENT

400 S. ORANGE AVENUE
ORLANDO, FLORIDA
32801

TELEPHONE
(305) 849-2266

March 27, 1984

DER
MAR 30 1984
BAQM

Mr. C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Subject: Iron Bridge Regional WPCF
Sludge Recovery System

Dear Mr. Feeney:

In accordance with your letter dated February 14, 1984, which we received on February 28, 1984, we have advertised the Notice of Proposed Agency Action in the Orlando Sentinel on March 4, 1984. I have enclosed a copy of the ad and a certification from the Orlando Sentinel. Please contact me if you have any questions.

Sincerely,

Michael J. Hanlon, P.E.
Project Manager

MJH/ws

cc: Phil Feeney, Post, Buckley, Schuh & Jernigan

Best Available Copy

The Orlando Sentinel

Published Daily
Orlando, Orange County, Florida

$22.30
ADVERTISING CHARGE

State of Florida } ss.
COUNTY OF ORANGE

RECEIVED
PUBLIC WORKS

Before the undersigned authority personally appeared Catherine Deering, who on oath says that she is the Legal Advertising Representative of the Orlando Sentinel, a Daily newspaper published at Orlando, in Orange County, Florida; that the attached copy of advertisement, being a Notice of Proposed Agency Action in the matter of Issue Permit to the City of Orlando in the ______ Court, was published in said newspaper in the issues of March 4, 1984

Affiant further says that the said Orlando Sentinel is a newspaper published at Orlando, in said Orange County, Florida, and that the said newspaper has heretofore been continuously published in said Orange County, Florida, each Week Day and has been entered as second-class mail matter at the post office in Orlando, in said Orange 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/she 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.

Catherine Deering

Sworn to and subscribed before me this 6th day of March A.D., 1984

Virginia W. Hollingsworth
Notary Public

Notary Public, State of Florida at Large
My Commission Expires July 13, 1985
Bonded by American Fire & Casualty Co.

Seal

FORM NO. AD-262

NOTICE OF PROPOSED AGENCY ACTION - The Department of Environmental Regulation gives notice of its intent to issue a permit to the City of Orlando for the construction of a sludge drying facility located in the city of Oviedo, Seminole County, Florida. A determination of Best Available Control Technology (BACT) was not required. A person who is substantially affected by the Department's proposed permitting decision may request a hearing in accordance with Section 120.57, Florida Statutes, and Chapters 17-1 and 28-5, Florida Administrative Code. The request for hearing must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period shall constitute a waiver of any right such person may have to request a hearing under Section 120.57, Florida Statutes. The application, technical evaluation, and departmental intent are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the following locations: DER, Bureau of Air Quality Mgmt., 2600 Blair Stone Road, Tallahassee, Florida 32301; DER St. Johns River District, 3319 Maguire Blvd., Suite 232, Orlando, Florida 32803. Comments on this action shall be submitted in writing to Bill Thomas of the Tallahassee office within thirty (30) days of this notice.
LS-933(10) Mar.4,1984

PM
3-13-84
Orlando, FL

City of Orlando

PUBLIC WORKS
DEPARTMENT

400 S. ORANGE AVENUE
ORLANDO, FLORIDA
32801

TELEPHONE
(305) 849-2266

RECEIVED
MAR 15 1984
WATER RESOURCE
MANAGEMENT

March 8, 1984

DER
MAR 15 1984
BAQM

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

RE: Iron Bridge Regional WPCF
Permit #AC59-76662

ATTN: Mr. Bill Thomas

Gentlemen:

The City of Orlando received your letter dated February 14, 1984 on February 28, 1984, in regards to the subject permit application. The required Notice of Proposed Agency Action was advertised on March 4, 1984 and a confirmation of publication will be forthcoming.

Your attention is directed to specific conditions 4 and 9 on the proposed permit. The combination of these two conditions requires a minimum statutory time requirement of 120 days. An expiration date of June 30, 1984 is also included as part of the proposed permit while the earliest date possible for issuing the permit would be 14 days beyond advertisement, or March 19, 1984. From March 19 to June 30, 1984, is only 104 days; consequently, the proposed expiration date should be adjusted.

The City has recently entered into an agreement with the manufacturer of the Sludge Recovery System to conduct thirty days of equipment and performance tests. It is most desirable to begin these tests on March 19, 1984. With the Departments concurrance of the March 19th start date the earliest schedule for processing an operating permit application is as follows:

Performance/equipment check	3/19-4/19
Notice to FDER of anticipated compliance testing	4/1
Compliance testing/submittal	5/1-5/15
FDER review/approval (90 days)	8/15

This schedule is based on our best estimate of the time involved, and is contingent upon starting the performance test on March 19, and upon the successful completion of the testing. If, for whatever reason, the manufacturer is not successful in demonstrating the performance of the Sludge Recovery System, the City will once again shut the system down until such time as the system can be repaired or modified, as necessary, to meet the performance criteria, and all FDER rules and regulations.

If the manufacturer successfully demonstrates performance we will proceed in accordance with the aforementioned schedule. We, therefore, respectfully request that the construction permit be modified to include an August 15, 1984 expiration date. Please contact me if you have any questions, or need additional information.

Sincerely,

Michael J. Hanlon, P.E.
Project Manager

MJH/ws

cc: Robert C. Haven
Phil Feeney
Jon Wilson
Alex Alexander
C. Collins

DEPARTMENT OF ENVIRONMENTAL REGULATION

ROUTING AND TRANSMITTAL SLIP

CENTRAL AIR PERMITTING

ACTION NO

ACTION DUE DATE

TO: (NAME, OFFICE, LOCATION)	
1. ADAMS AMODIO FANCY GEORGE	INITIAL / DATE
2. HANKS HERON HOLLADAY KING	INITIAL / DATE
3. MITCHELL, Becky MITCHELL, Bruce	INITIAL / DATE
4. PALAGYI POWELL ROGERS SVEC THOMAS	INITIAL / DATE

REMARKS:

Please return to me for file

Bill + Teresa have copy

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 & REPT
- INITIAL & FORWARD
- DISTRIBUTE
- CONCURRENCE
- FOR PROCESSING
- INITIAL & RETURN

FROM:

DATE

PHONE

PS Form 3811, Jan. 1979

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

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

1. The following service is requested (check one.)
- ☒ Show to whom and date delivered............ ¢
- ☐ Show to whom, date and address of delivery... ¢
- ☐ RESTRICTED DELIVERY
  Show to whom and date delivered............ ¢
- ☐ RESTRICTED DELIVERY.
  Show to whom, date, and address of delivery.$

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
Mr. Robert C. Haven
P. O. Box 1418
Oviedo, FL 32229

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	0158255	

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE ☐Addressee ☐Authorized agent

Linda K. Lackey

4. DATE OF DELIVERY POSTMARK

OVIEDO, FL FEB 1984

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: CLERK'S INITIALS

☆GPO : 1979-300-459

No. 0158255

RECEIPT FOR CERTIFIED MAIL

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

SENT TO Mr. Robert C. Haven	
STREET AND NO.	
P.O., STATE AND ZIP CODE	
POSTAGE	$
CONSULT POSTMASTER FOR FEES — CERTIFIED FEE	¢
OPTIONAL SERVICES — SPECIAL DELIVERY	¢
RESTRICTED DELIVERY	¢
RETURN RECEIPT SERVICE — SHOW TO WHOM AND DATE DELIVERED	¢
SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
TOTAL POSTAGE AND FEES	$
POSTMARK OR DATE 2/21/84	

PS Form 3800, Apr. 1976

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

February 14, 1984

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. Robert C. Haven
Works Manager
Director of Public Works
City of Orlando
P. O. Box 1418
Oviedo, Florida 32229

Dear Mr. Haven:

Attached is one copy of the Technical Evaluation and Preliminary Determination, and proposed permits for the construction of sludge drying facility in the City of Oviedo, Seminole County, Florida.

Before final action can be taken on your proposed permits, you are required by Florida Administrative Code Rule 17-1.62(3) to publish the attached Notice of Proposed Agency Action in the legal advertising section of a newspaper of general circulation in Seminole County no later than fourteen days after receipt of this letter. The department must be provided with proof of publication within seven days of the date the notice is published. Failure to publish the notice may be grounds for denial of the permits.

The Preliminary Determination and proposed permits constitute a proposed action of the department and are subject to administrative hearing under the provisions of Chapter 120, Florida Statutes, if requested within fourteen days from receipt of this letter. Any petition for hearing must comply with the requirements of Florida Administrative Code Rule 28-5.201 and be filed with the Office of General Counsel, Florida Department of Environmental Regulation, Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to file a request for hearing within fourteen days shall constitute a waiver of your right to a hearing. Filing is deemed complete upon receipt by the Office of General Counsel.

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/ks

Attachments

cc: Frank L. Cross, Jr., P.E.
Cross/Tessitore & Associates, P.A.

Mr. Charles Collins, P.E.
DER of St. Johns River District

Technical Evaluation

and

Preliminary Determination

CITY OF ORLANDO

Sludge Drying Facility

Seminole County, Florida

Permit Number: AC 59-76662
AC 59-76663

Florida Department of Environmental Regulation

Bureau of Air Quality Management

Central Air Permitting

February 9, 1984

TABLE OF CONTENTS

NOTICE OF PROPOSED AGENCY ACTION

The Department of Environmental Regulation gives notice of its intent to issue a permit to the City of Orlando for the construction of a sludge drying facility located in the city of Oviedo, Seminole County, Florida. A determination of Best Available Control Technology (BACT) was not required.

A person who is substantially affected by the Department's proposed permitting decision may request a hearing in accordance with Section 120.57, Florida Statutes, and Chapters 17-1 and 28-5, Florida Administrative Code. The request for hearing must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period shall constitute a waiver of any right such person may have to request a hearing under Section 120.57, Florida Statutes.

The application, technical evaluation, and departmental intent are available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the following locations:

DER, Bureau of Air Quality Mgmt.
2600 Blair Stone Road
Tallahassee, Florida 32301

DER St. Johns River District
3319 Maguire Blvd.
Suite 232
Orlando, Florida 32803

Comments on this action shall be submitted in writing to Bill Thomas of the Tallahassee office within thirty (30) days of this notice.

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.

INTRODUCTION

City of Orlando has reapplied (September 26, 1983) for a permit to construct a sludge drying facility. An original application for the same facility was submitted to the department on August 23, 1982. A state permit was issued on February 3, 1983. This permit expired on May 30, 1983.

A revised preliminary determination has been performed for the new permit application. This revised preliminary determination covers changes which have been made to the permit specific conditions. All sections have been revised to reflect the modifications requested in the new permit application.

The organization pattern of the original determination has not varied.

I. SYNOPSIS OF APPLICATION

A. Name and Address of Applicant

City of Orlando
P. O. Box 1418
Oviedo, Florida 32765

B. Source Location

The proposed source, Iron Bridge Regional Water Pollution Control Plant, is located at the city of Oviedo, in Seminole County, Florida. The UTM coordinates are 478.25 km East and 3,166.500 km North.

C. Project Description

The applicant proposes to install and operate a sludge recovery system, this includes furnishing and installing all material, equipment, labor and services necessary to provide a complete sludge drying process capable of producing a pasteurized, pelletized dry soil conditioner from the waste sludge produced by the wastewater treatment plant.

1. Control Technology

This sludge recovery system is designed to convert primary and secondary waste water sludge to a dry, pelletized product. The air pollution control system consists of three main components: the cyclones, a horizontal Venturi scrubber, and a vertical packed tower.

The cyclones are designed to remove larger dust particles from the air stream, while the horizontal Venturi scrubber removes the finer particles prior to entering the packed tower.

The packed tower is designed to remove odorous gases and any remaining particulate from the air stream, by use of a NaOCl scrubbing solution which flows concurrently to the gas stream and reacts chemically with the odorous compound. The packed tower also includes a mist eliminator (mesh packing) which prevents liquid droplets of scrubbing solution from exiting the stack.

II. RULE APPLICABILITY

A. State Regulations

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Chapter 17-2, Florida Administrative Code. Specifically, City of Orlando's sludge drying facility is a minor emitting facility as defined in Chapter 17-2.

The proposed source location, Seminole County, is in an area currently designated as attainment in accordance with Rule 17-2.420, for SO_2, NO_x, VOC, CO, and unclassifiable for PM in accordance with Rule 17-2.430.

The proposed source shall comply with provisions of the following rules: 17-2.610 (2) and (3) General Particulate Emission Limiting Standards; 17-2.620 (2) General Pollutant Emissions Limiting Standard and 17-2.700 Stationary Point Source Emissions Test Procedures

The proposed source is also subject to the provisions of the federal National Emission Standards for Hazardous Air Pollutants (NESHAP), 40 CFR 61, Subpart E, National Emission Standard for Mercury. This NESHAP has been adopted by reference in Rule 17-2.670.

The proposed project shall be permitted in accordance with Rule 17-2.520, Sources Not Subject to Prevention of Significant Deterioration or Nonattainment Requirements.

III. SOURCE IMPACT ANALYSIS

A. Emissions Limitations

The operation of the proposed sludge drying facility will produce emissions of particulate matter (PM), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), mercury (Hg), and volatile organic compounds (VOC).

Table 1 summarizes potential to emit all pollutants regulated under the Act which are affected by the proposed source. As the table shows, the proposed source is a minor emitting facility for all pollutants.

The emission limits selected as permitted emissions, which were made a condition of the permit, are listed in Table 2. The permitted emissions are in compliance with the department's applicable rules and regulations.

B. Air Quality Analysis

No ambient monitoring or modeling is required to provide reasonable assurance that ambient air standards will not be violated.

Table 1

Iron Bridge Sludge Drying Facility

Summary of Emissions

(tons per year)[1]

Pollutant	Uncontrolled	Controlled
PM	264.3	20.4[2]
SO_2	10.4	10.4
NO_x	4.42	4.42
HC	0.20	0.20
Hg	0.0035	0.0035

(1) Emission calculations based on 5824 hours per year. Fuel oil consumption is based on 92 gal/hr. These emission limits are from each source (East and West Lines).

(2) Controlled emissions based on 97% control efficiency.

Table II

Iron Bridge Sludge Drying Facility

Allowable Emissions[1]

SOURCE	POLLUTANT					
	Opacity	PM lb/hr	SO_2 lb/hr	NO_x lb/hr	HC lb/hr	Hg[2]
East Line	10%	7.0	4.7	2.0	0.1	3200 gr per 24-hour period
West Line	10%	7.0	4.7	2.0	0.1	3200 gr per 24-hour period

(1) Emissions as calculated by the applicant based on fuel oil consumption of 92 gal/hr, fuel analysis (0.36% S), AP-42 Emission Factors, and stack test results.

(2) National Emission Standard for Hazardous Air Pollutants, 40 CFR 61, Subpart E.

IV. CONCLUSION

Based on review of the data submitted by the City of Orlando for the operation of a sludge drying facility at the Iron Bridge Regional Water Pollution Control Plant, the FDER concludes that compliance with all applicable state air quality regulations will be achieved provided certain specific conditions are met.

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

PERMITTEE:

City of Orlando
P. O. Box 1418
Oviedo, Florida
32765

Permit Number: AC 59-76662
Date of Issue:
Expiration Date: June 30, 1984
County: Seminole
Latitude/Longitude: 28° 37' 20" N
81° 13' 10" W
Project: Sludge Drying Facility. West Line

This permit is issued under the provisions of Chapter(s) 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 installation of a cyclone followed by a Venturi scrubber and packed column using a hypoclorite solution for odor removal to be located at the Iron Bridge Regional Water Pollution Control Plant, in Seminole County, Florida. The UTM coordinates are 478.250 East and 3,166.50 North.

The construction shall be in accordance with the attached permit application, plans and documents except as otherwise noted on pages 1 through 7, Specific Conditions.

Attachments:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16) received on September 26, 1983.

2. Clair Fancy's letters of October 26, 1983 and November 22, 1983.

3. City of Orlando's letters of October 27, 1983 and December 23, 1983 (Responses to technical discrepancies).

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76662
Date of Issue:
Expiration Date: June 30, 1984

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 therefor 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.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76662
Date of Issue:
Expiration Date: June 30, 1984

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: City of Orlando

I. D. Number:
Permit Number: AC 59-76662
Date of Issue:
Expiration Date: June 30, 1984

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.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76662
Date of Issue:
Expiration Date: June 30, 1984

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. Emissions from this source shall not exceed the following allowable emissions.

Opacity	PM lb/hr	SO_2 lb/hr	NO_2 lb/hr	HC lb/hr	Hg
10%	7.0	4.7	2.0	0.1	3200 grams per 24-hour period

2. This source shall be allowed to operate 5824 hours per year.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76662
Date of Issue:
Expiration Date: June 30, 1984

SPECIFIC CONDITIONS:

3. The fuel used to fire the dryer will be No. 2 fuel oil. Sulfur content in the oil shall not exceed 0.36 percent. Maximum heat input shall not exceed 18.72 MMBTU/hr.

4. Before this construction permit expires and thereafter on an annual basis, this source shall be tested for particulate matter, sulfur dioxide, visible emissions, objectionable odor and mercury emissions. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR or other State approved methods.

   a. Method 1. Sample and Velocity Traverses
   b. Method 2. Volumetric Flow Rate.
   c. Method 3. Gas Analysis
   d. Method 5. Determination of Particulate Emissions for Stationary Sources
   g. Method 9. Determination of the Opacity of Emissions from Stationary Sources

   A compliance test shall consist of the average of three consecutive runs. The test will be conducted at 90 to 100 percent maximum capacity while burning No. 2 fuel oil. The Department shall be notified 30 days in advance of the compliance test.

5. No objectionable odor shall be allowed from this facility. Test method shall be the American Society for Testing Materials Method D 1391-78 (Standard Method for Measurement of Odor in Atmospheres [(Dilution Method)].

6. Compliance with the SO_2 emission limit will be based upon the sulfur content of the fuel fired. Applicable test methods by the American Society for Testing Material (A.S.T.M.) will be used.

7. Compliance with the mercury emission shall be determined as specified in the 40 CFR 61, Subpart E, National Emission Standard for Mercury.

8. Reasonable precautions to prevent unconfined and fugitive emissions of particulate matter shall be taken by the

permittee. Reasonable controls shall mean an enclosed loading building or other forms of controls as approved by the St. Johns River District office. During material handling operations, visible emissions shall not exceed 5% opacity.

9. The applicant will demonstrate compliance with the conditions of the construction permit, and submit a complete application for an operating permit to the Department's St. Johns River District office prior to 90 days of the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date or issuance of an operating permit.

10. Upon obtaining an operating permit, the applicant will be required to submit annual test reports on the actual operation and emissions of the facility. Reports will give emission test data, emission test results, hours of operation, fuel oil usage, average and maximum percent sulfur in oil, pressure drop across the scrubber, pressure on scrubber header, and flow of water through scrubber.

11. Stack sampling facilities will include the eyebolt and angle described in Chapter 17-2.700, Florida Administrative Code.

12. The source shall comply with the provisions and requirements of the attached general conditions.

Issued this ____ day of ____________, 1984.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

____
Victoria J. Tschinkel, Secretary

_________ Pages Attached.

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

PERMITTEE:

City of Orlando
P. O. Box 1418
Oviedo, Florida
32765

Permit Number: AC 59-76663
Date of Issue:
Expiration Date: June 30, 1984
County: Seminole
Latitude/Longitude: 28° 37' 20" N
81° 13' 10" W
Project: Sludge Drying Facility. East Line

This permit is issued under the provisions of Chapter(s) 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 installation of a cyclone followed by a Venturi scrubber and packed column using a hypoclorite solution for odor removal to be located at the Iron Bridge Regional Water Pollution Control Plant, in Seminole County, Florida. The UTM coordinates are 478.250 East and 3,166.50 North.

The construction shall be in accordance with the attached permit application, plans and documents except as otherwise noted on pages 1 through 7, Specific Conditions.

Attachments:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16) received on September 26, 1983.

2. Clair Fancy's letters of October 26, 1983 and November 22, 1983.

3. City of Orlando's letters of October 27, 1983 and December 23, 1983 (Responses to technical discrepancies).

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76663
Date of Issue:
Expiration Date: June 30, 1984

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 therefor 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.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76663
Date of Issue:
Expiration Date: June 30, 1984

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: City of Orlando

I. D. Number:
Permit Number: AC 59-76663
Date of Issue:
Expiration Date: June 30, 1984

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.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76663
Date of Issue:
Expiration Date: June 30, 1984

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. Emissions from this source shall not exceed the following allowable emissions.

Opacity	PM lb/hr	SO_2 lb/hr	NO_2 lb/hr	HC lb/hr	Hg
10%	7.0	4.7	2.0	0.1	3200 grams per 24-hour period

2. This source shall be allowed to operate 5824 hours per year.

PERMITTEE: City of Orlando

I. D. Number:
Permit Number: AC 59-76663
Date of Issue:
Expiration Date: June 30, 1984

SPECIFIC CONDITIONS:

3. The fuel used to fire the dryer will be No. 2 fuel oil. Sulfur content in the oil shall not exceed 0.36 percent. Maximum heat input shall not exceed 18.72 MMBTU/hr.

4. Before this construction permit expires and thereafter on an annual basis, this source shall be tested for particulate matter, sulfur dioxide, visible emissions, objectionable odor and mercury emissions. Except as provided under 40 CFR 60.8(b), the performance tests shall be in accordance with the provisions of the following reference methods in Appendix A of 40 CFR or other State approved methods.

   a. Method 1. Sample and Velocity Traverses
   b. Method 2. Volumetric Flow Rate.
   c. Method 3. Gas Analysis
   d. Method 5. Determination of Particulate Emissions for Stationary Sources
   g. Method 9. Determination of the Opacity of Emissions from Stationary Sources

   A compliance test shall consist of the average of three consecutive runs. The test will be conducted at 90 to 100 percent maximum capacity while burning No. 2 fuel oil. The Department shall be notified 30 days in advance of the compliance test.

5. No objectionable odor shall be allowed from this facility. Test method shall be the American Society for Testing Materials Method D 1391-78 (Standard Method for Measurement of Odor in Atmospheres [(Dilution Method)].

6. Compliance with the SO_2 emission limit will be based upon the sulfur content of the fuel fired. Applicable test methods by the American Society for Testing Material (A.S.T.M.) will be used.

7. Compliance with the mercury emission shall be determined as specified in the 40 CFR 61, Subpart E, National Emission Standard for Mercury.

8. Reasonable precautions to prevent unconfined and fugitive emissions of particulate matter shall be taken by the

permittee. Reasonable controls shall mean an enclosed loading building or other forms of controls as approved by the St. Johns River District office. During material handling operations, visible emissions shall not exceed 5% opacity.

9. The applicant will demonstrate compliance with the conditions of the construction permit, and submit a complete application for an operating permit to the Department's St. Johns River District office prior to 90 days of the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date or issuance of an operating permit.

10. Upon obtaining an operating permit, the applicant will be required to submit annual test reports on the actual operation and emissions of the facility. Reports will give emission test data, emission test results, hours of operation, fuel oil usage, average and maximum percent sulfur in oil, pressure drop across the scrubber, pressure on scrubber header, and flow of water through scrubber.

11. Stack sampling facilities will include the eyebolt and angle described in Chapter 17-2.700, Florida Administrative Code.

12. The source shall comply with the provisions and requirements of the attached general conditions.

Issued this ____ day of ____________, 1984.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

____
Victoria J. Tschinkel, Secretary

________ Pages Attached.

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

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

ST. JOHNS RIVER DISTRICT

DER
JAN 19 1984
BAQM

TO: FILE

THROUGH: C. Collins cmc

FROM: R. Caldwell

DATE: January 13, 1984

SUBJECT: Iron Bridge Stack Test

1. Both East and West dryer systems passed the particulate and the odor and mercury standard.

2. The system was designed for 32000 ACFM, during the test there was only 25,560 ACFM.
   A. One cyclone was blocked off on account of the reduced flow to increase their efficiency, leaving 3 cyclones in use.

3. The scrubber was designed to have 310 gpm of water through it, during the test only 230 gpm occurred.

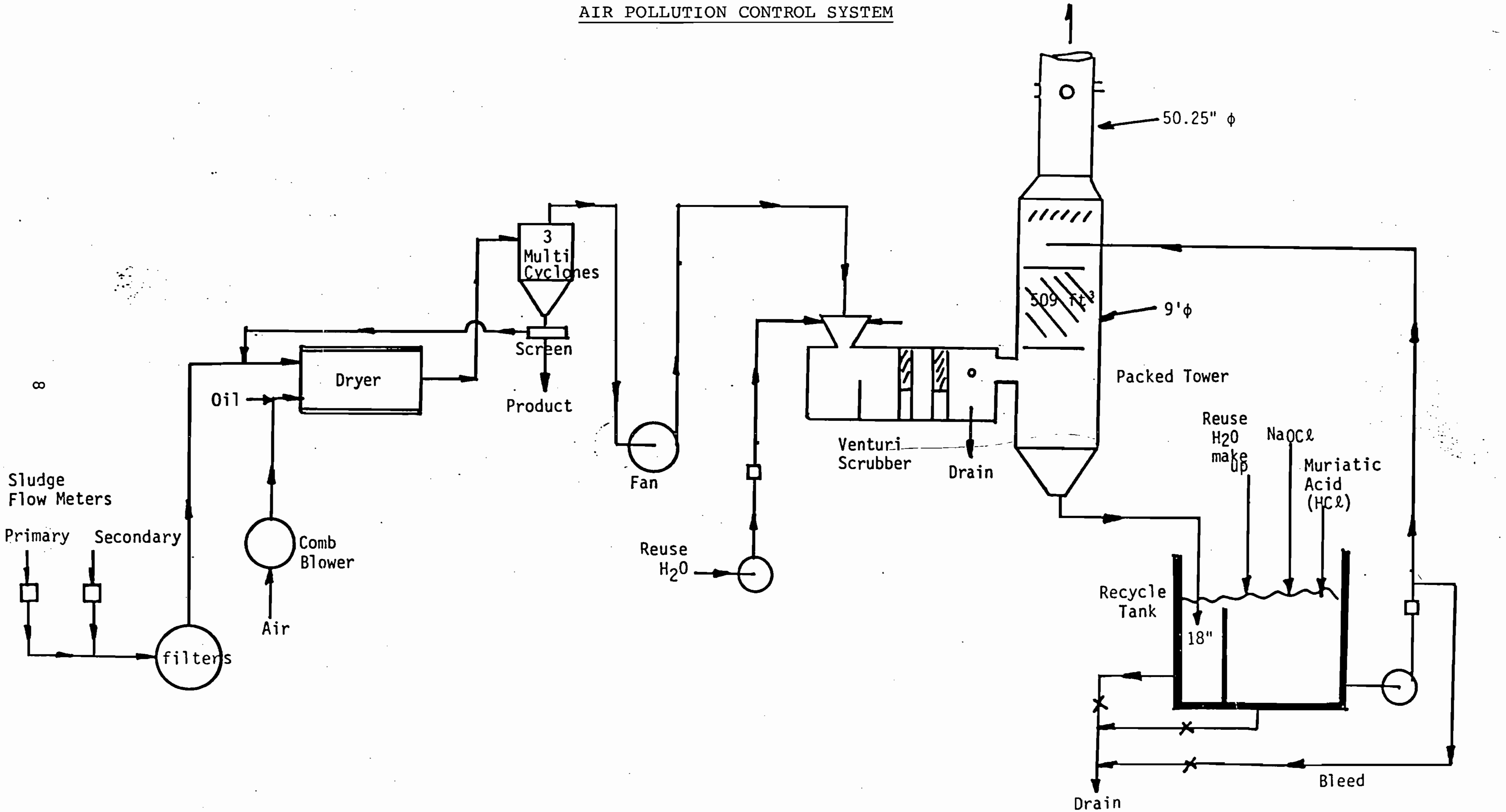
4. One major problem with the system, that I was told during the test was: the venturi scrubber was not collecting at design efficiency, causing a buildup of particulate in the packed tower and in turn large drop in pressure and a need for a larger size packing material. Even with the larger packing material the system needed to be shut down fairly frequently in order to clean out the packed tower.

5. Big problem with the loading of the dried sludge into the trucks. There was an enormous amount of fugitive dust.

RC:es

cc: Bill Thomas
Theresa Heron

AIR POLLUTION CONTROL SYSTEM



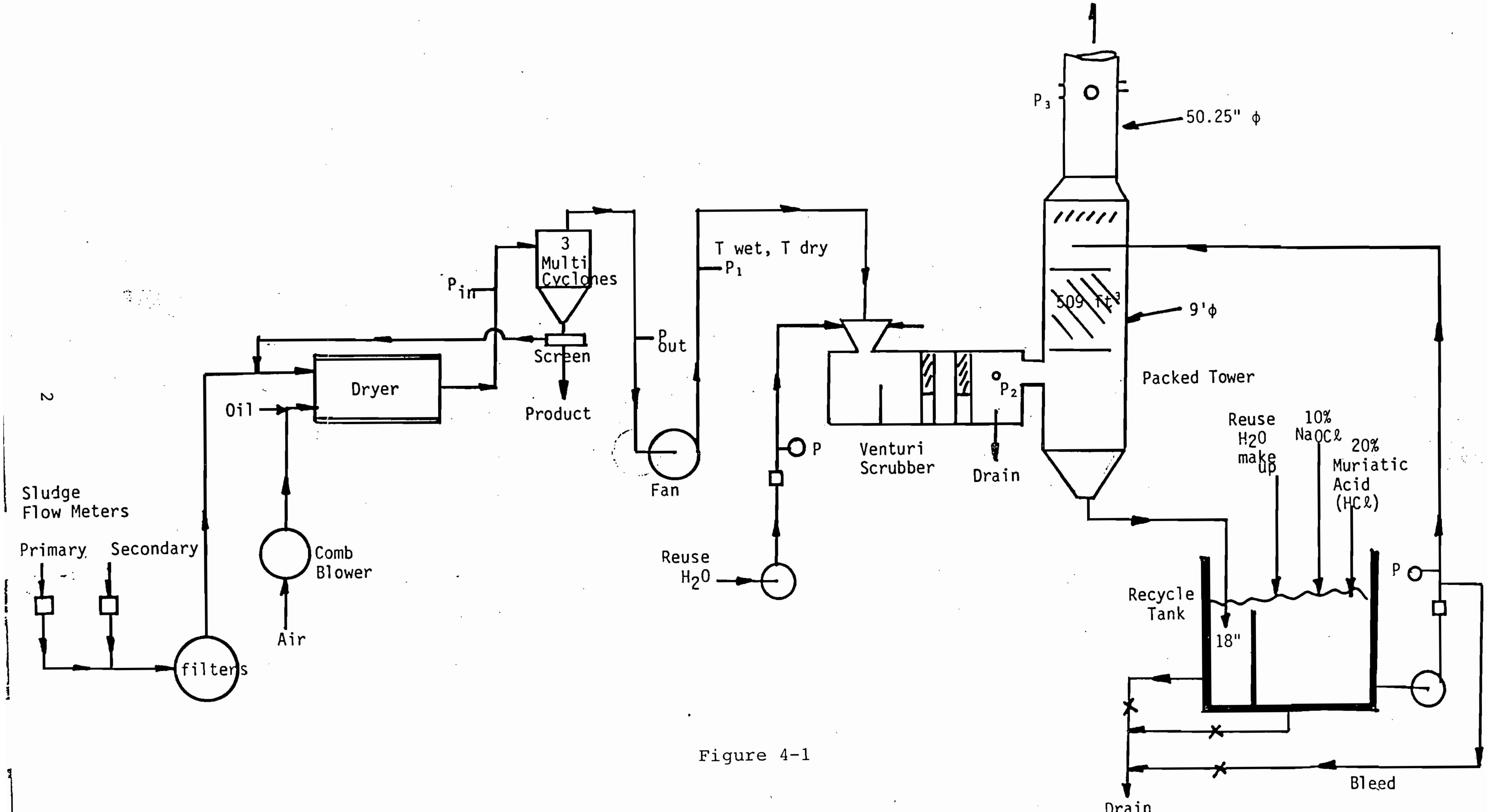


Figure 4-1

H. E. Hesketh, P.E.

<u>SLUDGE DRYING SYSTEM FLOW DIAGRAM</u>

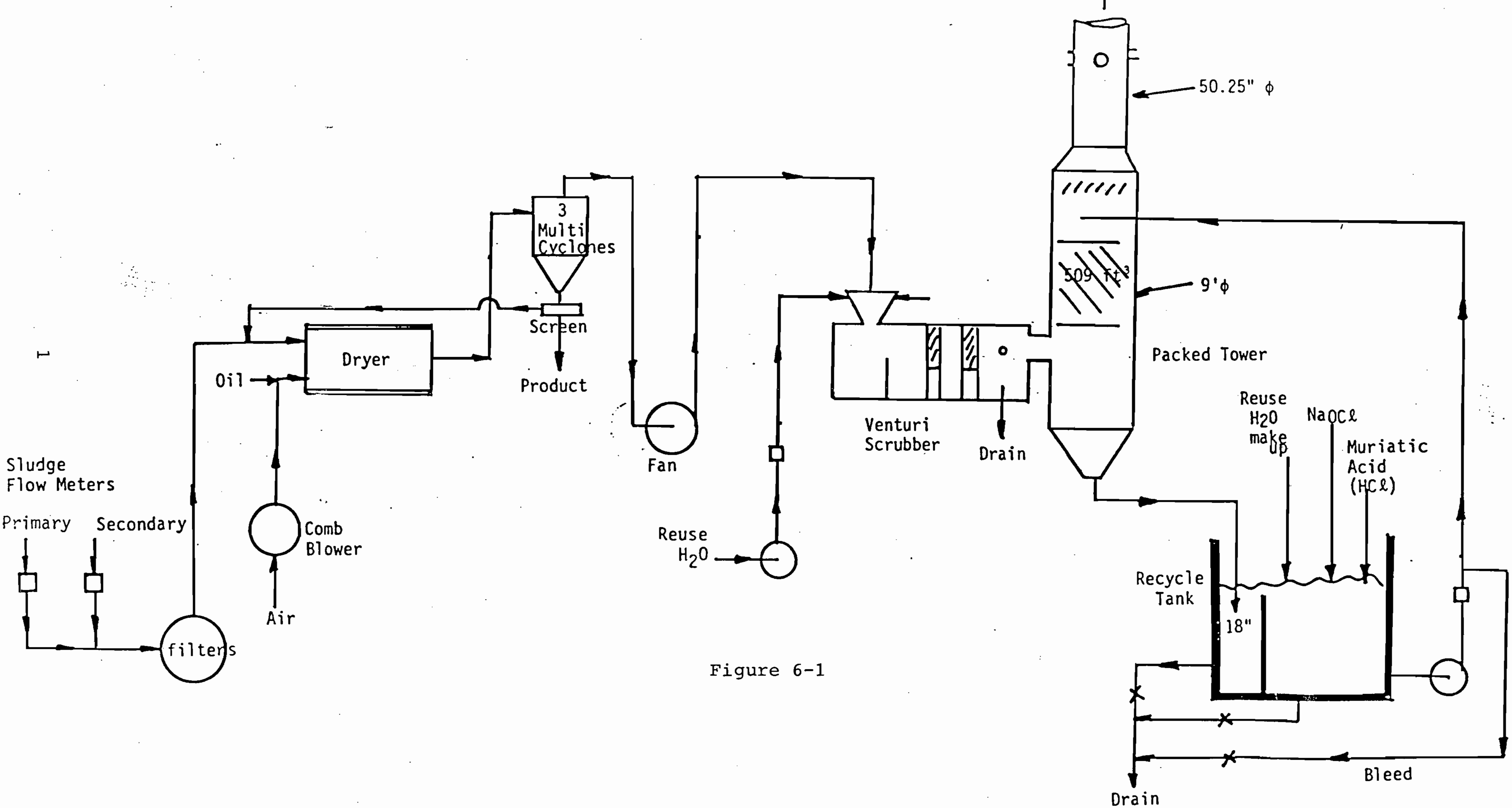
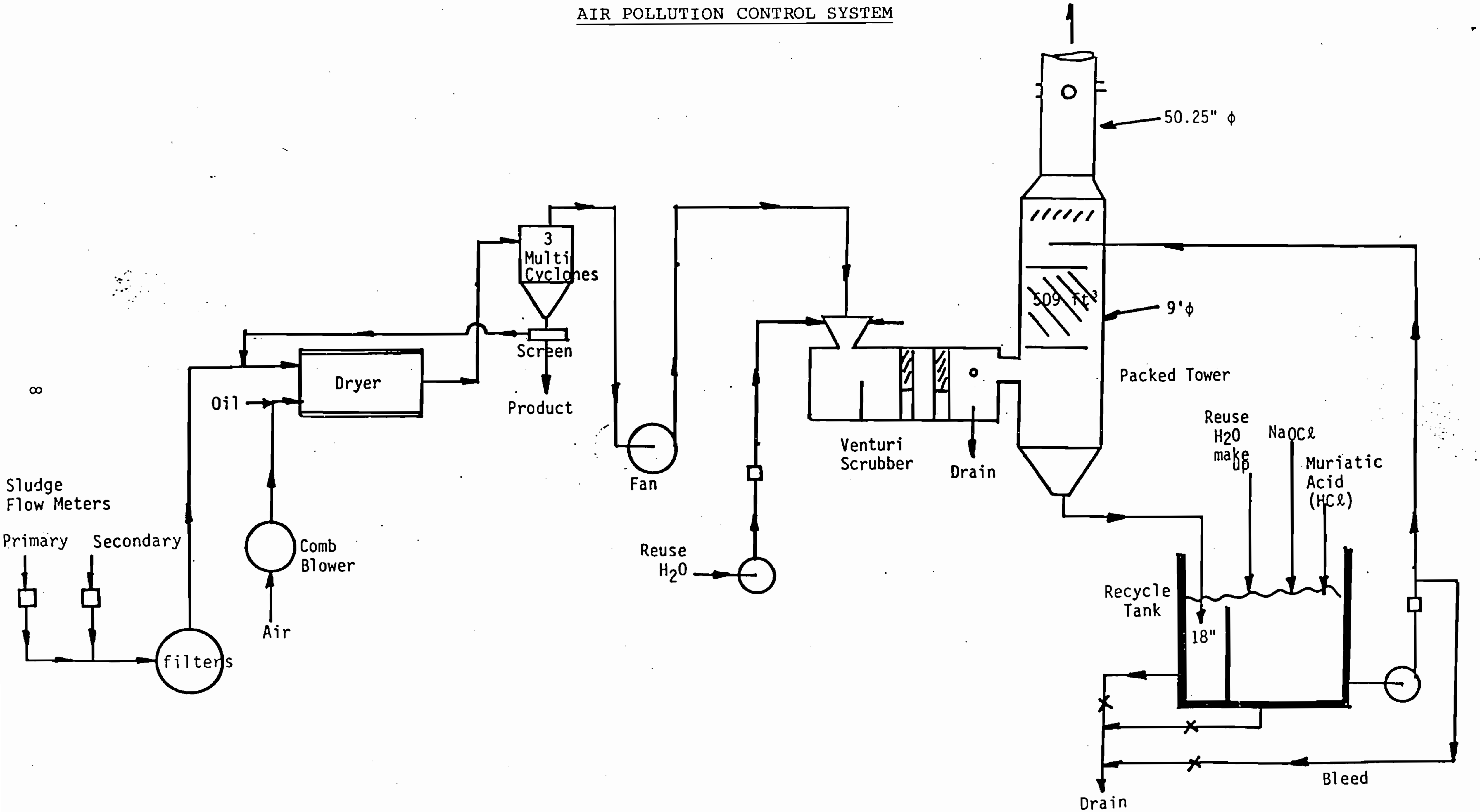


Figure 6-1

AIR POLLUTION CONTROL SYSTEM



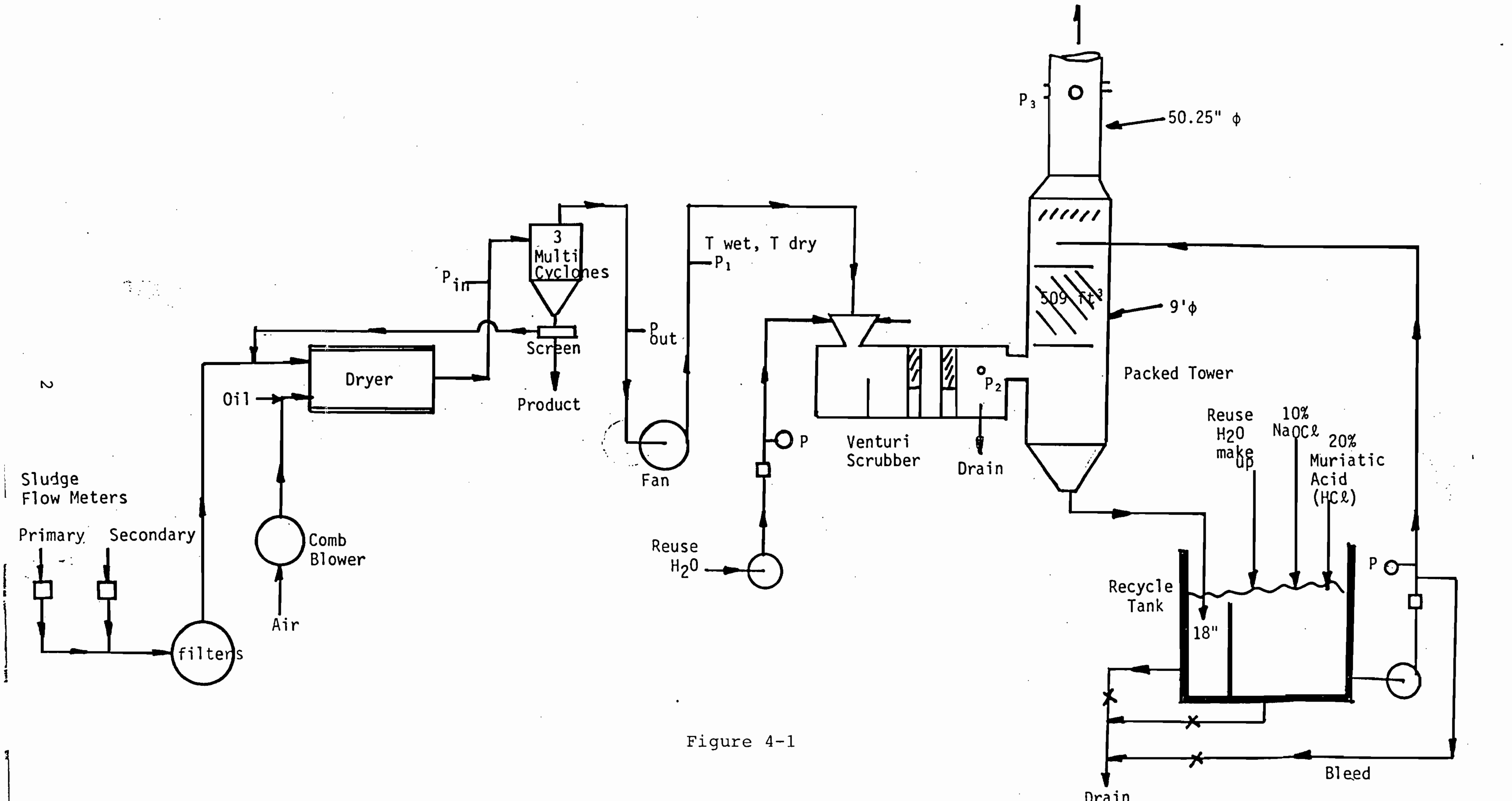


Figure 4-1

H. E. Hesketh, P.E.

SLUDGE DRYING SYSTEM FLOW DIAGRAM

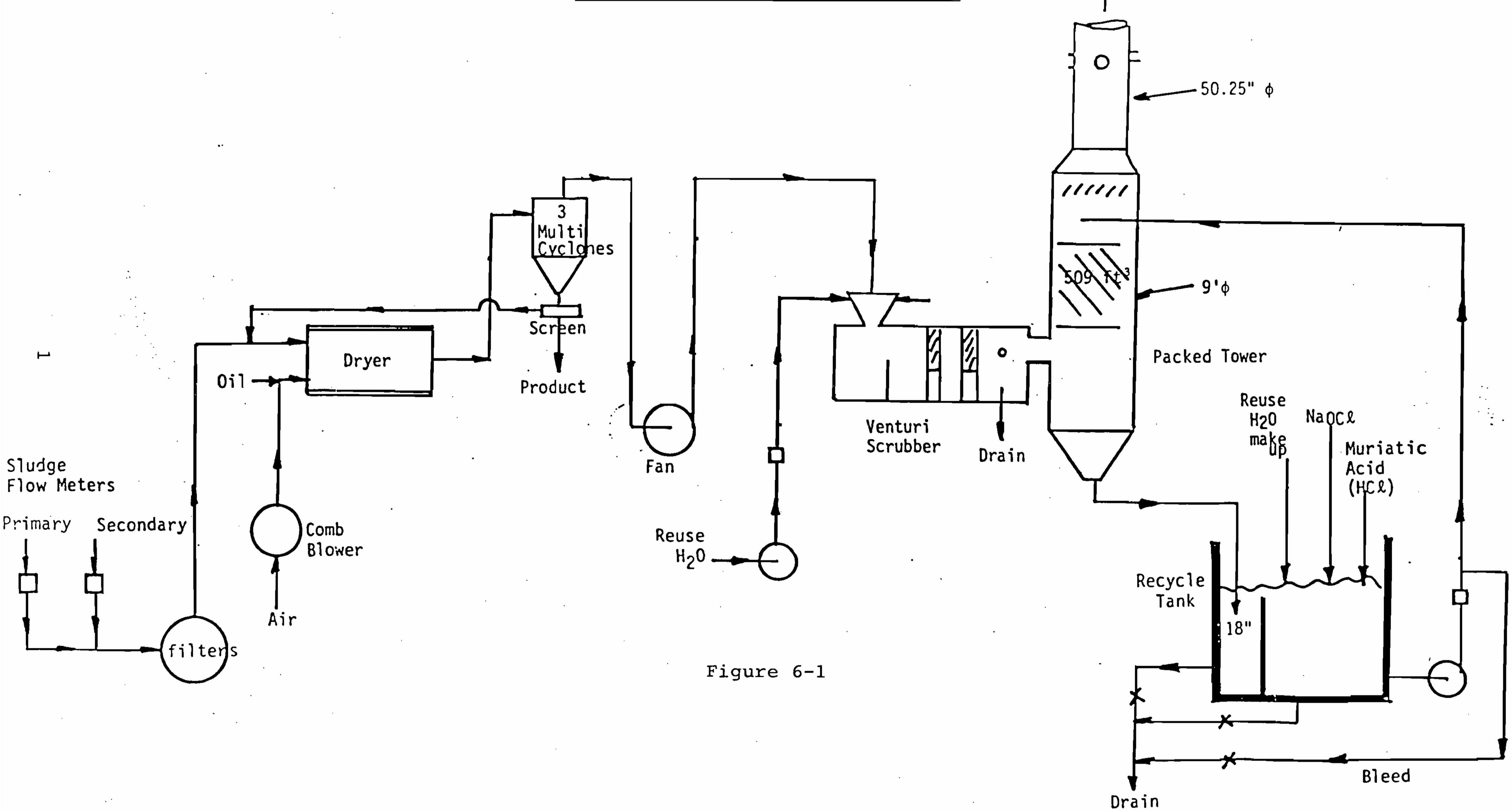


Figure 6-1

City of Orlando

400 S. ORANGE AVENUE
ORLANDO, FLORIDA
32801

PUBLIC WORKS
DEPARTMENT

TELEPHONE
(305) 849-2266

December 19, 1983

DER
DEC 23 1983
BAQM

Mr. C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32301-8241

Subject: Iron Bridge Regional WPCF
Air Construction Permit Applications
AC 59-76662 and AC 59-76663

Dear Mr. Fancy:

We have received your letter dated November 27, 1983 relative to the subject project. In response to your question regarding fugitive emmissions from the sludge pellet handling operation, I offer the following explanation.

The Sludge Recovery System at the Iron Bridge Plant has been unable, after more than a year of operation, to perform in accordance with the contract documents, and to meet all the requirements for air quality. The system has experienced severe operating and maintenance problems, is unable to meet full production, and cannot operate "odor free" and comply with the other air quality parameters including fugitive emmissions. As of mid-August the Sludge Recovery System has been shut down pending the resolution of law suits filed by the City against the contractor and supplier of the Sludge Recovery System. At the present time the City is pursuing two courses of action. The first is an agreement with the Contractor to operate the system for thirty days to demonstrate that the system can perform as specified and meet the permitting requirements.

Secondly, the City is evaluating several sludge disposal alternatives including major modifications to the Sludge Recovery System so that we can develop a long range sludge disposal plan.

For these reasons we are not able to give you a firm answer regarding the resolution of the fugitive emmissions question other than to say that we will address the issue with the contractor, and/or make the necessary modifications to control fugitive emmissions if the City undertakes the required system modifications by itself.

If you have any questions regarding this matter, please contact me personally at (305) 849-2266.

Sincerely,

Michael J. Hanlon, P.E.
Project Manager

MJH/ws

cc: Robert C. Haven
P. Feeney
J. Wilson
R. Oldham
File

PS Form 3811, Jan. 1979

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

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

1. The following service is requested (check one.)
- [X] Show to whom and date delivered. .... ¢
- [ ] Show to whom, date and address of delivery.... ¢
- [ ] RESTRICTED DELIVERY
  Show to whom and date delivered. .... ¢
- [ ] RESTRICTED DELIVERY.
  Show to whom, date, and address of delivery. $____

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
Mr. Robert C. Haven
P. O. Box 1418
Oviedo, FL 32765

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	0158229	

(Always obtain signature of addressee or agent)

I have received the article described above.
SIGNATURE ☐Addressee ☐Authorized agent

Linda L. Lackey

4. DATE OF DELIVERY POSTMARK

OVIEDO, FL NOV 28 1983 USPO

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE: CLERK'S INITIALS

☆GPO : 1979-300-459

No. 0158229

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED— NOT FOR INTERNATIONAL MAIL

(See Reverse)

SENT TO
Mr. Robert C. Haven

STREET AND NO.

P.O., STATE AND ZIP CODE

POSTAGE			$
CONSULT POSTMASTER FOR FEES	CERTIFIED FEE		¢
	OPTIONAL SERVICES	SPECIAL DELIVERY	¢
		RESTRICTED DELIVERY	¢
	RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED	¢
		SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
		SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
		SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
TOTAL POSTAGE AND FEES			$

POSTMARK OR DATE

11/23/83

PS Form 3800, Apr. 1976

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

DEPARTMENT OF ENVIRONMENTAL REGULATION STATE OF FLORIDA

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

November 22, 1983

Mr. Robert C. Haven
Director of Public Work
City of Orlando
P. O. Box 1418
Oviedo, Florida 322761

Re: Air Construction Permit Applications
AC 59-76662 - AC 59-76663

Dear Mr. Haven:

This is to inform you that on October 31, 1983, we received the stack test and odor reports for your sludge drying facility. These reports answered the first question of our October 26, 1983, letter (see copy attached). Since a response to our second question was not included, your applications remain incomplete.

If you have any question on this matter, please call Teresa M. Heron of this office 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

CHF/TH/s

CROSS/TESSITORE & ASSOCIATES, P.A.
4759 S. CONWAY ROAD, SUITE D
ORLANDO, FLORIDA 32812
305/851-1484

October 27, 1983

DER
OCT 31 1983
BAQM

Teresa Heron
Bureau of Air Quality Management
Florida Dept. of Environmental
Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

re: "Emission Testing, Performance Measurement and Odor Emission Evaluation for the Air Pollution Control System for the Sludge Drying Facilities at Iron Bridge Road Regional Water Pollution Control Facility" prepared for the City of Orlando, Florida 10 September 1983

Dear Ms. Heron:

In response to a telephoned request from Mr. Roger Caldwell, Air Engineering, St. Johns River District, enclosed is a copy of subject report.

Sincerely,

Joseph L. Tessitore

Joseph L. Tessitore, P.E.
Vice President

JLT:kim
Enc.a/s

cc: Roger Caldwell, FDER

CROSS/TESSITORE & ASSOCIATES, P.A.

REGISTERED PROFESSIONAL ENGINEERS

ENVIRONMENTAL ENGINEERS

NEW ADDRESS
4759 S. Conway Rd.
Unit D
Orlando, Florida 32812

1611 E. HILLCREST STREET
ORLANDO, FLORIDA 32803
305/898-6140

EMISSION TESTING, PERFORMANCE MEASUREMENT AND ODOR EMISSION EVALUATION FOR THE AIR POLLUTION CONTROL SYSTEM FOR THE SLUDGE DRYING FACILITIES AT IRON BRIDGE ROAD REGIONAL WATER POLLUTION CONTROL FACILITY

FDER PERMITS AC59-59313
AC59-59312

PREPARED FOR

CITY OF ORLANDO, FLORIDA

SEPTEMBER 10, 1983

CROSS/TESSITORE & ASSOCIATES, P.A.
4759 SOUTH CONWAY ROAD, SUITE D
ORLANDO, FLORIDA 32812

(305) 851-1484

OUTLINE

IRON BRIDGE ROAD REGIONAL WATER POLLUTION CONTROL FACILITY

Emission Testing, Performance Measurement and Odor Emission Evaluation for the Air Pollution Control System for the Sludge Drying Facilities

1.0 INTRODUCTION

Cross/Tessitore & Associates, P.A. (C/TA) was retained by the City of Orlando, Florida, to conduct testing (emissions and odor) of the Air Pollution Control Systems for the sludge drying system at the Iron Bridge Road Regional Water Pollution Control Facility (RWPCF). The Air Pollution Control Systems for the sludge dryers were permitted under FDER AC59-59313 (West Line) and FDER AC59-59312 (East Line) on February 3, 1983, and required emission testing and odor evaluation prior to receiving an operational permit. The FDER requirements listed in the above permits are:

(1) Emission testing for particulates

(2) Visible emission observations

(3) Odor panel evaluation and air dispersion modeling

(4) Emission testing for mercury (Hg)

(5) Fuel oil consumption and sulfur content measurement, and,

(6) Air Pollution Control System (APCS) performance monitoring during testing.

In addition to the above, the City of Orlando required that:

(1) The APCS be tested and evaluated for compliance with Specifications and Contract Document: Section 525 Sludge Recovery System dated November 15, 1978, and,

(2) APCS operation be measured during testing to establish baseline operational and performance parameters.

The APCS testing was conducted during the week of May 23, 1983, to May 27, 1983, and the details of the testing procedure and results are presented in the following sections of the report. In general, the testing methodology and procedures are presented in Table 1-1. The testing was conducted by the following firms and individuals:

Mr. Joseph Tessitore, C/TA (Odor Panel & Operational Parameters)

Mr. Frank Cross, C/TA (Emission Testing & Operational Parameters)

Dr. Howard Hesketh, University of Southern Illinois at Carbondale (Operational Parameters)

Mr. Harvey Gray, TSI (Chemist, Odor Panel and Emission Testing)

Mr. Allen Luther, TSI (Emission Testing)

Mr. Walter Gordon, TSI (Emission Testing)

Mr. John Glorioso, ESP (Odor Panel, Chemical Scrubbing System Operation)

Mr. David Hammer, MSEA (Odor Panel, Chemical Scrubbing System Operation)

Mr. Richard Kruse, MSEA (Chemical Scrubbing System Operation)

Mr. Charlie Thompson, City of Orlando (Production rate measurement, and sludge parameters).

The above tests were also witnessed by Mr. Charles Collins, FDER (Operational Parameters and Emission Testing), and Mr. Roger Caldwell, FDER (Operational Parameters, Emission Testing, and Odor Panel).

1.1 Process Description

Figure 1-1 shows a general schematic of the Sludge Recovery System at the Iron Bridge RWPCF. The system is designed to convert primary and secondary waste water sludge to a dry, pelletized product. The APCS consists of three main components: (1) the cyclones, (2) a horizontal Venturi scrubber, and (3) a vertical packed tower. The cyclones are designed to remove larger dust particles from the air stream, while the horizontal Venturi scrubber removes the finer particles prior to entering the packed tower. The packed tower is designed to remove odorous gases and any remaining particulate from the air stream, by use of a NaOCl scrubbing solution which flows concurrently through the gas stream and reacts chemically with the odorous compound. The packed tower also includes a mist eliminator (mesh packing) which prevents liquid droplets of scrubbing solution from exiting the stack. Detailed performance observations on these APCS components are presented in Section 5.0 of this report.

Table 1-1

TESTING METHODOLOGY

Test	Test Method
Odor Panel Qualification	ANSI/ASTM Method No. D1391, dated 1978
Odor Sample Evaluation	ANSI/ASTM Method No. D1391, dated 1978
Particulates	EPA Method 1-5
Visible Emissions	EPA Method 9
Hg Emissions	Analysis of particulate sampling filter for Hg and emissions based on stack parameters (40CFR61, Subpart E, National Emission Standards for Mercury)
Sulfur Dioxide (SO_2)	Fuel analysis provided in lieu of stack test (ASTM)

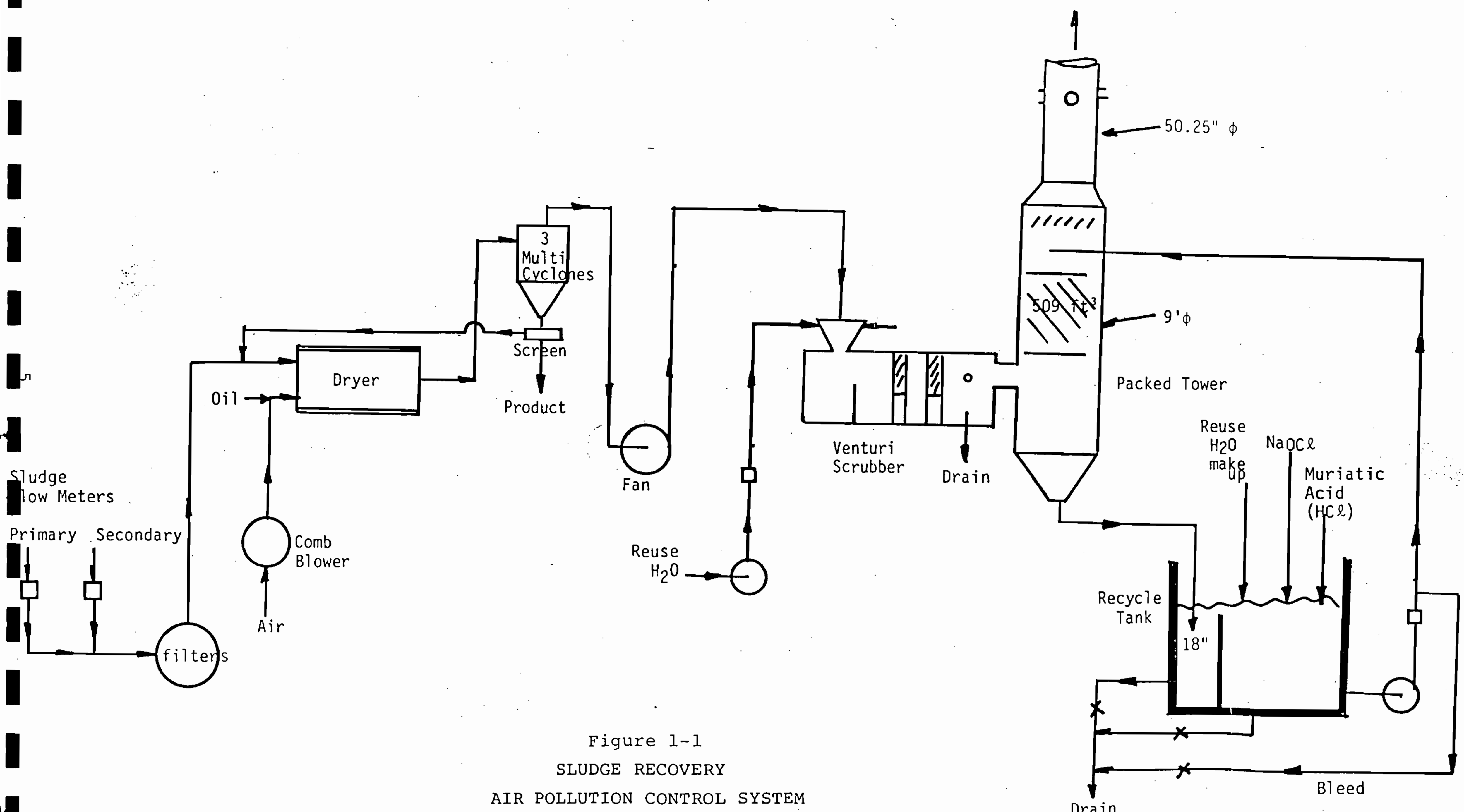


Figure 1-1

SLUDGE RECOVERY

AIR POLLUTION CONTROL SYSTEM

2.0 SUMMARY AND RESULTS

The results for the odor panel and emission tests conducted during the week of May 23, 1983, to May 27, 1983, are presented in Table 2-1 and Table 2-2. Table 2-1 presents a comparison between the FDER Construction Permit requirements and the measured values, while Tables 2-2 and 2-3 compare the Specification and Contract Document requirements with test results.

In general, both the East and West stacks were in compliance with the FDER Permit requirements for opacity, and objectional odor at the property line. Sulfur Dioxide (SO_2) and Mercury (Hg) testing and analyses show compliance with FDER Permit requirements. For the case of particulate, the East stack was in compliance with FDER Permit requirements, while the West stack particulate results show marginal compliance with permit conditions at an average production rate of 1.04 tons/hour which is significantly below the design or specification value of 1.30 tons/hour. This would imply that the West stack may be limited to this lower production rate until the particulate emission values are reduced.

Also, the operational problems experienced during the testing of the West stack, such as (1) insufficient scrubber water flow (May 24, 1983, 14:55 hours to 20:21 hours), and (2) mist eliminator malfunction (May 27, 1983) during the third particulate run (17:02 to 18:15 hours), indicate long term and reliable compliance with FDER permit limitations may be difficult.

The stack odor emissions (ou/sec) which were projected past the property line using the FDER stack plume computer program showed no ground level concentrations above the threshold odor level (1 ou/m^3), and therefore both the West and East stacks meet the FDER odor requirements.

For the case of compliance with Specification and Contract Documents (November 15, 1978), the following can be concluded:

(1) Neither the West nor the East stack was in compliance with the specification condition that stack off-gases "Have no obnoxious odor and meet regulatory requirements for air pollution", as shown in Table 2-3.

(2) Both West and East stack gas flow rates were below the specification requirement of 32,000 ACFM as shown in Table 2-2.

(3) Both West and East dryer scrubber did not meet the design requirement of 310 gpm for packed tower liquid flow rate.

(4) Based on the facility production data during the test as presented in Table 2-2 and Appendix D, the West and East dryers did not meet the specification requirement of 1.3 tons per hour of dry solids.

Table 2-1

Comparison of FDER Permit Requirements and Test Results

PARAMETER	PERMIT REQUIREMENT	TEST RESULTS EAST STACK	TEST RESULTS WEST STACK
Opacity (%)	10	1.10	1.97
Particulate Matter (lb/hr)	7.7 *	3.375 **	6.972**
SO_2 (lb/hr)	4.7	2.76***	2.76***
Hg	3200 gr/ 24 hour period	9.32	22.82
Objectionable Odor	<1.0 unit/m^3 at property line	0.0450 unit/m^3	0.0093 unit/m^3

* FDER Construction Permit Requirement for a design production rate of 1.3 TPH per dryer.

** Test results based on production values shown in Table 2-2.

*** Based on average fuel consumption during test period.

Table 2-2

Comparison of Specification Requirements

and Test Results

PARAMETER	SPECIFICATION REQUIREMENT	TEST RESULTS	
		EAST STACK	WEST STACK
Air Flow (ACFM)	32,000	25,567	25,557
Production Rate (tons/hr)	Maximim* 1.3	0.95	1.04
Scrubber Water Flow Rate (gpm)	310	~230	~230

*Specification requires maximum of 2.6 tons dry solids per hour for two units.

Table 2-3

City of Orlando Specification Conditions for Odor (No Obnoxious Odor at the Stack)

LOCATION WHERE ODOR SAMPLES WERE COLLECTED	NUMBER OF PEOPLE ON ODOR PANEL	NUMBER OF PEOPLE ON THE PANEL WHO CONSIDERED THE ODOR OBNOXIOUS	PERCENT OF PEOPLE JUDGING ODOR OBNOXIOUS
West Stack	12	8	66.7%
East Stack	13	10	76.9%

SECTION 3.0 EMISSION TESTING

3.1 INTRODUCTION

Cross/Tessitore & Associates, P.A. (C/TA) conducted emission testing of the air pollution control systems for the sludge drying facilities at the Iron Bridge Road Regional Water Pollution Control Facility during the week of May 23, 1983.

Tests were conducted for particulates and visible emissions. Particulate samples were also analyzed for mercury (Hg).

3.2 TEST PROCEDURE AND DISCUSSION

The West stack and the East stack were tested for particulate emissions by EPA Method 5 and for visible emissions using EPA Method 9. SO_2 emissions were determined by measuring fuel sulfur content and fuel consumption and assuming stoichiometric combustion products. Particulate sample filters were also analyzed for mercury content using the EPA Method defined by 40CFR61, Subpart E, National Emissions Standard for Mercury.

Particulate sampling on the West stack began at approximately 10:00 hours on May 24, 1983, but was terminated during the second test run due to sludge dryer shut-down caused by excessive product in the storage bins. The problem was rectified and testing commenced at 14:55 hours and was completed at 20:21 hours. However, during this sampling period, the West scrubber did not appear to be functioning normally. The liquid flow rate in the packed tower was about 150 gpm which is considerably below the nominal value of 240 gpm and the design value of approximately 310 gpm. Subsequent inspection of the West stack scrubber revealed that the spray bar nozzles were plugged and scrubber flow rate was inadequate.

The East stack control system was tested on May 25, 1983, between 14:56 hours and 19:23 hours. No apparent problems occurred during this sampling period and control system operating parameters appeared nominal.

Since the West stack control system operation on May 24, 1983, was not representative of normal operation, the system was retested on May 27, 1983. The system operated satisfactorily during the first two particulate test runs; however, the mist eliminator pads broke loose during the third run and excessive particulate emissions were recorded. Operating data from the first two runs indicate that scrubber operation was nominal until the mist eliminator pads broke loose.

3.3 SUMMARY OF RESULTS

The emission testing results are summarized in Tables 3-1 and 3-2. Field data, testing procedure, calculations, laboratory analyses, and calibration data are presented in the Appendices to this report.

Table 3 - 1

Summary of Stack Sampling Data

Iron Bridge RWWTF - Sludge Drying Facility

Particulate Emissions

Location	Date	Run No.	Concentration (gr/scf)	Emission (lbs/hr)	Isokinetics (%)	Comments
West Side Control System	5/24/83	1	0.0427	7.033	109	system not performing correctly-tests not considered representative
		2	0.0578	9.964	107	
		3	0.0637	10.723	106	
Average			0.0547	9.24	107	
East Side Control System	5/26/83	1	0.0159	2.913	102	runs considered representative
		2	0.0168	3.013	103	
		3	0.0237	4.200	105	
Average			0.0188	3.375	103	
West Side Control System	5/27/83	1	0.0260	4.655	106	during run 3 mist elimination pads broke loose -cause of high reading
		2	0.0176	3.074	109	
		3	0.0739	13.187	105	
Average			0.0392	6.972 *	107	

*Run 3 not considered representative -Average of Runs 1 & 2 = 3.865 lbs/hr.

Table 3-2

Summary of Stack Tests

Iron Bridge RWPCF - Sludge Drying Facility

Visible Emissions

Stack	Date	Time	VE Observations (opacity-%)
East Scrubber	5/26/83	1538-1638	1.0
West Scrubber	5/24/83	1730-1830	2.0

Mercury (Hg) Emissions

Stack	Date	Emissions (lbs/hour)	Emissions (grams/24 hours)
East Scrubber	5/26/83	0.000855	9.32
West Scrubber	5/24/83 5/27/83	0.002094	22.82

SECTION 4.0 ODOR PANEL TESTING AND AIR DISPERSION MODELING

4.1 INTRODUCTION

Odor panel testing and subsequent air dispersion modeling were conducted for the West and East dryer stacks to fulfill the requirements of (1) FDER Construction Permits AC59-59313 and AC59-59312, and (2) Sludge Dryer System Specifications.

The FDER Construction Permits require that no obnoxious odor exit from the system. Subsequent meetings and discussions with the FDER Bureau of Air Permitting, in Tallahassee, have interpreted this requirement to mean no perceivable odor (ambient odor concentration is less than 1 per cubic meter) at the property line of the facility. FDER also required the use of the ASTM Method D1391-78 to define odor thresholds and air dispersion modeling to predict odor concentration at the facility property line.

The Sludge Dryer System Specifications require that no obnoxious odor exist in stack off-gases. Compliance with this requirement was determined by a modification of ASTM Method D1391-78 and the use of undiluted stack gases. These procedures will be discussed in greater detail in the following sections.

4.2 ODOR PANEL/TESTING METHODOLOGY

The odor panel/testing procedure and methodology was based on ASTM D1391-78, agreements from meetings and discussions between the City of Orlando, Cross/Tessitore & Associates (C/TA), ESP, Inc., and Michigan Science and Engineering Associates (MSEA), and discussions between C/TA, ESP, MSEA, and FDER. Correspondence relating to these discussions and agreements have been included in Appendix B.

The general methodology is shown in Figure 4-1. The odor samples were obtained and all testing was conducted during the week of May 23, 1983, to May 27, 1983. Gas samples from the inlet to the West stack scrubber were obtained on the morning of May 23, 1983, and presented to 37 potential panelists for preliminary screening. From this screening, 30 panelists (15 for each stack) were chosen to evaluate the stack odors. As shown in Figure 4-1 odor panels for the West stack and East stack were conducted respectively on May 25 and May 27 at the University Quality Inn located at Highway 50 and Alafaya Trail.

In both cases, the samples were obtained between 7:00 to 9:00 A.M. and the odor panel testing began at 10:00 A.M. The use of 15 potential panelists for each stack resulted in 12 acceptable panelists for the West stack and 13 acceptable panelists for the East stack.

<u>Iron Bridge Odor Test Procedure (5-23-83 to 5-27-83)</u>

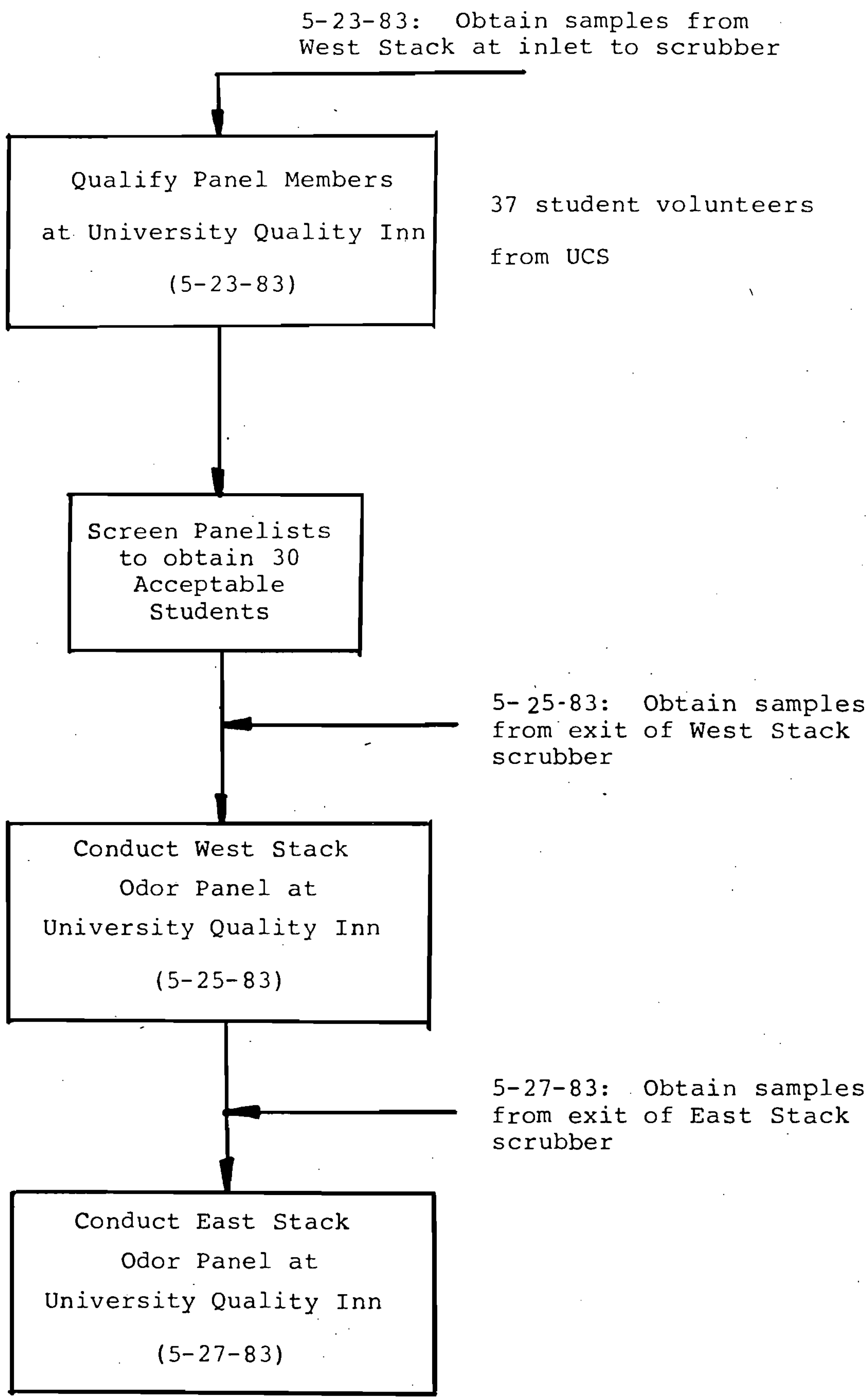


Figure 4-1

Also all panel qualifications and testing was witnessed continuously by the following:

David Hammer	MSEA (ESP Consultant)
John Glorioso	ESP, Inc.
Harvey Gray	TSI (C/TA)
Stan Kochar	Ducon

and on an intermittent basis by the following:

Joe Tessitore	C/TA
Richard Kruse	MSEA (ESP Consultant)
Frank Cross	C/TA
Harold Schmidt	PBSJ
Robert Higgins	LDDK

4.2.1. SELECTION OF PANEL

Panelists for the odor panel test were obtained on a voluntary basis from the University of Central Florida students. The procedure consisted of distributing a sign-up list for two sections of the class EGN 3704 "Engineering and the Environment" taught by Dr. John Dietz. All potential volunteers were informed that an odor panel would be formed and they would receive $15.00 for qualification and $25.00 for serving on a panel. No information was given on the nature or source of the odors and no attempt was made to define the test procedure in detail. All panelists on the list were called and told to report to the University Quality Inn for qualification.

4.2.2 SAMPLE COLLECTION PROCEDURE

Stainless steel spheres of six (6) liter capacity were used to collect and contain samples. The procedure for cleaning the spheres and collecting the samples was as follows:

1) Valves and fittings were removed, placed in warm detergent-in-water solution to soak. After soaking for a minimum of four hours, they were thoroughly rinsed with tap water, deionized water, acetone and hexane (both solvents were reagent grade) and dried in laboratory oven for two hours at 100°C.

2) The spheres were washed internally with hot detergent solution followed by rinsing with tap water, deionized water, acetone (reagent grade) and hexane (reagent grade).

3) The cleaned spheres were flushed with zero grade air until the effluent gave a zero response on a flame ionization detector.

4) The cleaned valves and fittings were reattached and the spheres sealed until used for sampling.

5) Just prior to sampling, the spheres were evacuated to greater than 29 inches Hg using a vacuum pump.

6) A sampling system consisting of a Thomas diaphragm pump (teflon and stainless steel), a stainless steel needle valve for flow control, a teflon sampling probe and connecting tubing and a combination vacuum-pressure gauge was assembled.

7) The sampling probe was placed in the stack, the pump started and the system flushed with stack gas. The sphere to be filled with sample was attached to the sampling system, the appropriate valves opened and adjusted to give a flow rate sufficient to fill the sphere in approximately ten (10) minutes.

8) The vacuum in the sphere was allowed to draw sample until this was satisfied and then the

sphere was pressurized to approximately 22 lbs. (1½ atmospheres) pressure. The valves were closed and sampling discontinued.

9) A set of samples (2 spheres) was collected in the afternoon of the day before each odor panel was run and a second set of samples was collected between 7:00 and 8:00 AM on the day the panels were run. In the case of both stacks, the second or fresh set of samples was used for the odor panel to minimize any possible changes in composition which may have occurred over an extended time period.

4.2.3 SAMPLE PREPARATION PROCEDURE

Samples for the odor panel testing were prepared as specified in ASTM Method D1391-78. This procedure consisted of the following:

1) Odor samples were extracted from the stainless steel spheres using a 100 cc glass syringe according to the above ASTM Method. The samples were diluted by using odor free air, room air which had passed through an activated charcoal filter.

2) "Blank" or odor free samples were prepared by passing room air through an activated charcoal filter and collecting it in an 100 cc glass syringe.

3) Any glass syringes which contained odor samples and were reused were washed with a hot detergent solution, followed by a rinsing with tap water, and then a rinsing with deionized water.

4.2.4 PANEL QUALIFICATION AND TESTING

Panel qualification consisted of subjecting 37 students to samples of varying dilutions of gases from the West stack scrubber inlet and samples of room ambient air ("blanks"). From these 37 students, 7 were eliminated for one or more of the following reasons:

1) Inconsistent responses;

2) Inability to recognize "blank" samples;

3) Previous exposure to Iron Bridge Dryer stack gases during an odor panel.

The remaining 30 students were divided in groups of 15 so that no student would be a panelist for both the West and East stacks. The 15 panelists for each stack were then scheduled for testing on May 25 or May 27 respectively. All students were then informed as to general preparation for the odor panel (See correspondence in Appendix B).

On the day of each odor panel, each arriving panelist was given the explanation shown in Figure 4-2 which defines the word "obnoxious" and the general guidelines for the odor panel. This initial explanation occurred in a separate and detatched room from the odor panel testing room. Each panelist was then taken to the odor panel testing room and the explanation in Figure 4-2 was repeated. Samples were prepared in a connected and adjacent room to the testing room. Panelists were presented with syringes which contained known mixtures of stack exit gases and room air, or simply room air, as "blanks". Each panelists would then expel gas from the syringe, and report whether he perceived an odor or not. Responses were recorded and the raw data is presented in Appendix B.

The detailed procedure in evaluating odor samples was as follows:

1) The panelist was given two separate syringes; one with a diluted odor sample and one with odor free air. The panelist would then expel the gas from each syringe and attempt to detect an odor. If an odor was detected in the sample syringe and none in the blank syringe, the next sample contained one-half the original concentration. If no odor was detected in either syringe, the next sample contained double the original concentration. This process was repeated until an odor threshold was established for each candidate.

2) The panelists were presented odor samples at concentrations above and below their threshold level with at least two concentrations above their threshold included in each test. Double blanks (two odor free syringes) were also interspersed throughout the samples to reduce bias as much as possible.

3) Each time a panelist indicated an odor was detected, he/she was asked to express an opinion as to whether the odor was "obnoxious" based on the definition in Figure 4-2. This information was recorded along with odor response.

4) Upon completion of the testing with diluted stack gases, the procedure was repeated for undiluted stack gases and the panelist was questioned as to whether the odor was obnoxious or not based on the definition in Figure 4-2. Again the results were recorded and are presented in Appendix B.

4.3 ODOR PANEL/TESTING DATA REDUCTION

The raw data for each odor panel as presented in Appendix B were analyzed to determine threshold dilution ratios or percents for each panel. The threshold ratios for each panelist were combined and the geometric mean for each panel (West Stack and East Stack) was determined. These calculations produced the following results:

ODOR PANEL INSTRUCTIONS:

WE WILL ASK YOU TO SMELL A NUMBER OF AIR SAMPLES. YOU MAY DETECT AN ODOR IN SOME OF THESE SAMPLES, OR YOU MAY NEVER ENCOUNTER ANY ODORS AT ALL. THIS IS NOT A TEST OF YOUR SENSE OF SMELL, BUT RATHER WE WANT TO DETERMINE WHETHER ANY OF THESE SAMPLES HAVE A NOTABLE ODOR OR NOT. PLEASE DO NOT GUESS IF YOU ARE NOT SURE.

IF YOU DETECT AN ODOR IN ANY PARTICULAR SAMPLE, WE WILL IN ADDITION ASK YOU FOR YOUR OPINION AS TO WHETHER OR NOT THE ODOR IS "OBNOXIOUS". FOR THE PURPOSES OF THIS EXPERIMENT, "OBNOXIOUS" IS DEFINED AS "HIGHLY OFFENSIVE AND HIGHLY DISAGREEABLE".

FIGURE 4-2

	West Stack	East Stack
Geometric Mean of Threshold	4.436%	1.247%
Odor Dilution Ratio (z)	22.54 to 1.0	80.17 to 1.0

The raw data for each panelist was also reviewed to determine the existence of obnoxious odors from the stack off-gases. The results of this review were as follows:

	West Stack	East Stack
Existence of Obnoxious Odor		
Yes	8	10
No	4	3

4.4 AIR DISPERSION MODELING METHODOLOGY

As a requirement of the FDER Construction Permits, odor concentrations at property line were determined. These concentrations were calculated using FDER PTPLU (Point Plume) air dispersion model. Inputs and assumptions used in this model for the East and West stacks are presented in Table 4-1 and the results of the modeling are presented in Table 4-2, showing maximum odor concentrations occurring at 320 and 309 meters for the East and West stacks respectively.

4.5 RESULTS

The results of the odor panel/testing and air dispersion modeling are summarized in Table 4-3. In general, the following can be concluded:

(1) The West and East stacks both meet FDER odor concentration limits at the property line.

(2) The combined odor ground level concentration of both stacks is also below FDER threshold of 1.0 o.u./M^3.

(3) The odor panel results show that a majority of the panelists found the undiluted stack gases of the West and East stack scrubbers "obnoxious"; West stack (8 out of 12), East stack (10 out of 13).

(4) The West stack scrubber appears to be performing significantly better than the East stack scrubber based on the odor panel test data.

Table 4-1

FDER PTPLU Air Dispersion Model

INPUT PARAMETERS*

°Stack Data	East Stack	West Stack
--Stack Height (m)	15.30	15.30
--Stack Diameter (m)	1.28	1.28
--Stack Temperature (°K)	316	326
--Stack Velocity (m/s)	9.36	9.10
--Gas Flow (m^3/sec)	12.04	11.7

°Emission Data

--Emission (m^3/sec)	895.6	237.5

°Receptor Information

--Property Line Distances

East Direction = 76.2m

West Direction = 304.8m

--Residences

Occupant	Distance (m)
Jones	548.6
Smithson	1097.3
Seminole Terrace	1408.2

* Input parameters based on (1) Emission testing of West and East stack during week of May 23 to 27, 1983; (2) Odor panel results during week of May 23 and 27, 1983; and, (3) Meteorology and site conditions based on meeting with FDER on April 29, 1983.

Table 4-2

FDER PTPLU Results For Iron Bridge Sludge Dryers

SOURCE	LOCATION OF MAXIMUM GLC (m) (1)	METEOROLOGICAL CONDITIONS		GLC (2) (3) (ou/m^3)
		STABILITY CLASS	WIND SPEED (m/s)	
East Stack	320	3	3	0.045
West Stack	309	3	4	0.0093

Notes:

(1) Distance to Property Line: East - 76.2m
West - 304.8m

(2) GLC: Ground Level Concentration

(3) GLC of 1 ou/m^3 is the threshold odor level

Table 4-3

Summary of Results for Iron Bridge Dryers
Odor Threshold Testing and Modeling

Parameter	West Stack	East Stack
Odor Threshold (%) (1)	4.436	1.247
Odor Dilution Ratio (z)	22.54	80.17
Odorous Emission Rate ($\frac{m^3}{sec}$)	240.30	906.50
Maximum Odor GLC ($^{ou}/m^3$) (2)	0.0095 (4)	0.0460 (4)
"Obnoxious Odor" Response (3)	8 Yes	10 Yes
	4 No	3 No

(1) Geometric Mean Threshold

(2) Ground Level Concentration in Odor Units per cubic meter

(3) Response to "full strength" (undiluted stack gases) sample by panelist when asked: Obnoxious or not Obnoxious.

(4) Values below 1.0 ou/m^3 are acceptable according to FDER criteria.

5.0 SYSTEM OPERATING PARAMETERS

The original odor control system submitted to the FDER (FDER Permits AC59-59312 and AC59-59313) consisted of cyclone collectors, a Venturi scrubber for particle removal, and an absorber (packed tower) for odor control. The odor control unit was operated with recirculated potassium permanganate ($KMnO_4$) as the scrubbing medium. After start-up, the air pollution control systems were modified to accommodate lower system air flows and to correct maintenance problems with the $KMnO_4$ system. At the time of testing, one of the cyclone inlets had been blocked off to achieve a higher efficiency at the lower air flow, and the absorbing solution had been changed from a $KMnO_4$ solution to a hypochlorite solution. The packing in the West Tower (AC59-59313) had been replaced with a different type packing. Also, the test ports and platform had been modified to meet the requirements of FAC Chapter 17.2.

The basic flow diagram for the system as tested is illustrated in Figure 5-1. The test data recorded and measured during the emission testing are presented in Table 5-1.

Table 5-2 is a comparison of measured operating conditions during testing with the design conditions for the system.

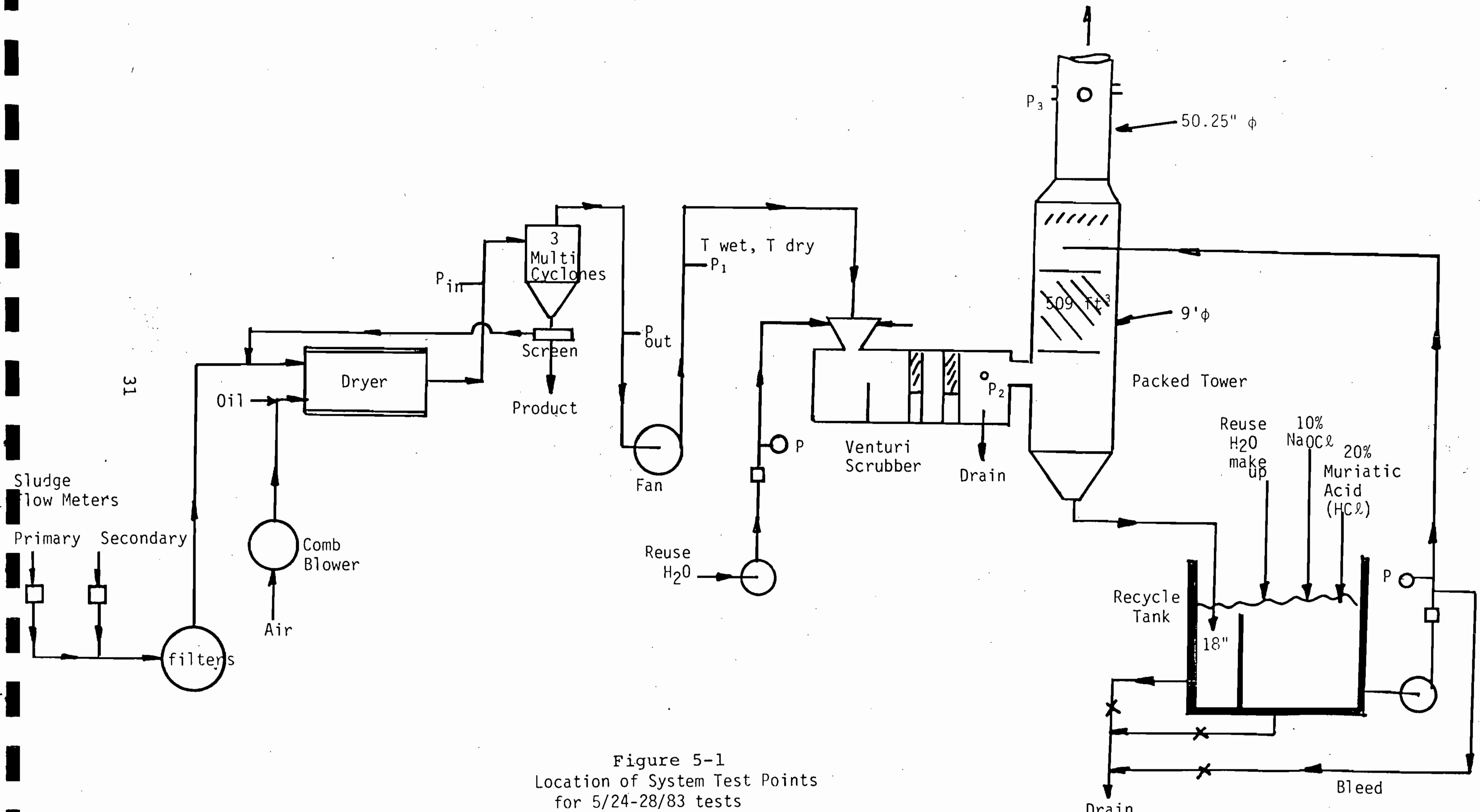


Figure 5-1
Location of System Test Points
for 5/24-28/83 tests

H. E. Hesketh, P.E.

Table 5-1

Summary of Weighted Data Representative of Particulate and Odor Test Conditions for City of Orlando, Iron Bridge WWTP Sludge Systems Dust Control Tests

	5/24/83	5/26/83	5/27/83	5/27/83
Test Date	5/24/83	5/26/83	5/27/83	5/27/83
Test Side	West	East	East	West
Test For	Partic. & Odor	Partic.	Odor	Partic.
Combustion Blower current, amps	8 1/2	7 1/2	7	8 1/2
Dryer Temp in, °F	800	700	710	750
out, °F	175	172	170	173
Cyclone ΔP, "H_2O	5 1/4	4 3/4	4 1/2	5 1/4
Exhaust Fan current, amps	163	166	162	168
overall static ΔP, "H_2O	23 1/2	23 3/4	23	23 1/4
Venturi Scrubber gas in temp., °F	175	174	174	175
gas out temp., °F	121	116	114	117
water rate, gpm	215	245	245	215
water pump, psig	15	18	15	16
overall ΔP, "H_2O	8 1/2	8 1/2	7 3/4	9
Parked Tower gas in temp, °F	121	116	114	117
gas out temp, °F	124	108	113	120
overall ΔP, "H_2O	5 1/2	6	5 1/4	4
gas residence time, sec.*	1.2	1.2	1.2	1.2
recycle liquid rate, gpm	150	230	235	230
recycle pump, psig	21	27	27	22
recycle liquid ORP, mv	810	840	780	750
recycle liquid acidity, pH	7.0	7.0	7.3	7.0
recycle liquid temp, °F	122	114	110	116
recycle liquid holdup, min*	11.7	7.6	7.5	7.6
recycle liquid conc, ppm Cl_2**	100	65	60	--
tower drain liq.conc, ppm Cl_2**	20	30	20	--
bleed liquid rate, gpm	12	10	10	10
10% NaOCl feed rate, gph**	4	4	4	4
20% muriatic acid feed, gph**	0.1	0.1	0.1	0.1

Note: Data are corrected to account for plant instrument offsets

* Calculated

**See data of Richard J. Kruse, Michigan Science and Engineering Associates for complete values.

Table 5.2

Comparison of Operating Parameters

Location			
(A) Venturi	Design	West (5/27/83)	East (5/26/83)
L/G (Liquid to gas ratio)	8.66	8.27	9.58
Gas Volumetric Flowrate	33,700ACFM	25,557ACFM	25,567ACFM
Liquid Rate	Not Specified	215 gpm	245 gpm
ΔP (pressure drop)	20" H_2O	9.0" H_2O	8.5" H_2O
Pump	20 psig	16 psig	18 psig
Inlet temperature	180°F	175°F	174°F
(B) Packed Tower			
L/G	9.19	8.85	8.99
Liquid rate	310 gpm	230 gpm	230 gpm
Outlet Temperature	119°F	108-124°F	108-124°F
ΔP (pressure drop)	Not Specified	6" H_2O	4" H_2O
Reaction Tank	1000 gal	1000 gal	1000 gal

A P P E N D I C E S

APPENDIX A

Topic 3.0 "Emission Testing"

A-1 Data Summary Sheets

A-2 Description of Sampling Equipment and Procedure

A-3 Field Sheets

A-4 Laboratory Sheets

A-5 Calculation Equations

A-6 Calibration Sheets

A-7 Visible Emissions Field Sheets

A-8 Mercury Data Summary Sheets

A-1 Data Summary Sheets

Tel. (904) 353-5761

TECHNICAL SERVICES, INC.

ENVIRONMENTAL CONSULTANTS

Air and Water Pollution Sampling,
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2471 SWAN STREET
P. O. BOX 52329
JACKSONVILLE, FLORIDA 32201

PLANT-IRON BRIDGE SEWAGE TREATMENT PLANT, SLUDGE DRYING DATE-5/24/83
STACK-WEST UNIT RUN-1 FROM-1455-1652
WEATHER CONDITIONS-PARTLY CLOUDY PB-30.11 IN. HG- PS 30.11 IN.H
AS'-13.77 SQ. FEET- TS-587.6 ^{O}R TM 562.2 ^{O}R
$\sqrt{H}$-0.497 IN H_2O ΔH 0.974 IN H_2O AN-.000341 SQ.FT. CP-.8
VM- 39.572CF VC-136.1 ML TOTAL TIME- 72 MIN. NPTS-
ORSAT: CO_2 1.5 % O_2 19.5 % CO 0.0 % N_2 79.0 %

1.	VOLUME WATER VAPOR	1.	6.424 SCF
2.	GAS VOLUME SAMPLED - STPD	2.	37.496 SCFD
3.	TOTAL VOLUME	3.	43.920 SCF
4.	MOISTURE IN STACK GAS - VOLUME FRACTION	4.	0.146
5.	DRY STACK GAS - VOLUME FRACTION	5.	0.854
6.	ASSUMED MOISTURE IN STACK GAS - VOLUME FRACTION	6.	
7.	MOLECULAR WEIGHT OF STACK GAS - DRY BASIS	7.	29.020
8.	MOLECULAR WEIGHT OF STACK GAS - STACK CONDITIONS	8.	27.408
9.	SPECIFIC GRAVITY OF STACK GAS RELATIVE TO AIR	9.	0.945
10.	EXCESS AIR - PERCENT	10.	1288 %
11.	AVERAGE OF FACTOR ($\sqrt{H \times TS}$)	11.	
12.	AVERAGE STACK VELOCITY	12.	1807.0 FPM
13.	ACTUAL STACK GAS FLOW RATE	13.	24882 ACFM
14.	ACTUAL STACK GAS FLOW RATE DRY	14.	21243 CFMD
15.	STACK GAS FLOW RATE - STPD	15.	19209 SCFMD
16.	PERCENT ISOKINETIC	16.	109.4 %

	MG	GR/SCF	GR/ACF	LBS/HR
FILTER	45.2			
PREFILTER	58.6			
TOTAL	103.8	0.0427		7.033

Comments: ______

Tests Conducted by: ______

Tel. (904) 353-5761

TSI

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ENVIRONMENTAL CONSULTANTS

Air and Water Pollution Sampling, Surveys, Testing and Analytical Services

2471 SWAN STREET
P. O BOX 52329
JACKSONVILLE, FLORIDA 32201

PLANT- IRON BRIDGE SEWAGE TREATMENT PLANT, SLUDGE DRYING DATE - 5/24/83
STACK- WEST UNIT RUN- 2 FROM- 1716-1832
WEATHER CONDITIONS- PB- 30.11 IN. HG- PS 30.11 IN.HG
AS'- 13.77 SQ. FEET- TS- 590.0 °R TM 566 °R
$\sqrt{H}$- 0.513 IN H_2O ΔH 1.045 IN H_2O AN- .000341 SQ.FT. CP-.84
VM- 40.903 CF VC- 120.2 ML TOTAL TIME- 72 MIN. NPTS-
ORSAT: CO_2 1.5 % O_2 19.5 % CO 0.0 % N_2 79.0 %

1.	VOLUME WATER VAPOR	1.	5.673 SCF
2.	GAS VOLUME SAMPLED - STPD	2.	38.504 SCFD
3.	TOTAL VOLUME	3.	44.177 SCF
4.	MOISTURE IN STACK GAS - VOLUME FRACTION	4.	0.128
5.	DRY STACK GAS - VOLUME FRACTION	5.	0.872
6.	ASSUMED MOISTURE IN STACK GAS - VOLUME FRACTION	6.	
7.	MOLECULAR WEIGHT OF STACK GAS - DRY BASIS	7.	29.020
8.	MOLECULAR WEIGHT OF STACK GAS - STACK CONDITIONS	8.	27.605
9.	SPECIFIC GRAVITY OF STACK GAS RELATIVE TO AIR	9.	0.952
10.	EXCESS AIR - PERCENT	10.	1288 %
11.	AVERAGE OF FACTOR ($\sqrt{H}$ x TS)	11.	
12.	AVERAGE STACK VELOCITY	12.	1861.1 FPM
13.	ACTUAL STACK GAS FLOW RATE	13.	25627 ACFM
14.	ACTUAL STACK GAS FLOW RATE DRY	14.	22336 CFMD
15.	STACK GAS FLOW RATE - STPD	15.	20116 SCFMD
16.	PERCENT ISOKINETIC	16.	107.3 %

	MG	GR/SCF	GR/ACF	LBS/HR
FILTER	53.0			
PREFILTER	91.2			
TOTAL	144.2	0.0578		9.964

Comments: __________

Tests Conducted by: __________

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PLANT- IRON BRIDGE SEWAGE TREATMENT PLANT SLUDGE DRYING DATE- 5/24/83
STACK- WEST UNIT RUN- 3 FROM- 1907-2021
WEATHER CONDITIONS- CLEAR PB- 30.09 IN. HG- PS 30.09 IN.HG
AS'- 13.77 SQ. FEET- TS- 583 ^{o}R TM 562 ^{o}R
$\sqrt{H}$- 0.500 IN H_2O ΔH 0.990 IN H_2O AN- .000341 SQ.FT. CP-.84
VM- 39.192 CF VC-121.0 ML TOTAL TIME- 72 MIN. NPTS-
ORSAT: CO_2 1.5 % O_2 19.5 % CO 0.0 % N_2 79.0 %

1.	VOLUME WATER VAPOR	1.	5.711 SCF
2.	GAS VOLUME SAMPLED - STPD	2.	37.126 SCFD
3.	TOTAL VOLUME	3.	42.837 SCF
4.	MOISTURE IN STACK GAS - VOLUME FRACTION	4.	0.133
5.	DRY STACK GAS - VOLUME FRACTION	5.	0.867
6.	ASSUMED MOISTURE IN STACK GAS - VOLUME FRACTION	6.	
7.	MOLECULAR WEIGHT OF STACK GAS - DRY BASIS	7.	29.020
8.	MOLECULAR WEIGHT OF STACK GAS - STACK CONDITIONS	8.	27.551
9.	SPECIFIC GRAVITY OF STACK GAS RELATIVE TO AIR	9.	0.950
10.	EXCESS AIR - PERCENT	10.	1288 %
11.	AVERAGE OF FACTOR ($\sqrt{H}$ x TS)	11.	
12.	AVERAGE STACK VELOCITY	12.	1806.5 FPM
13.	ACTUAL STACK GAS FLOW RATE	13.	24875 ACFM
14.	ACTUAL STACK GAS FLOW RATE DRY	14.	21559 CFMD
15.	STACK GAS FLOW RATE - STPD	15.	19636 SCFMD
16.	PERCENT ISOKINETIC	16.	106.0 %

	MG	GR/SCF	GR/ACF	LBS/HR
FILTER	76.0			
PREFILTER	77.3			
TOTAL	153.3	0.0637		10.723

Comments: __________

Tests Conducted by: __________

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PLANT-IRON BRIDGE SEWAGE TREATMENT PLANT, SLUDGE DRYERS DATE- 5/26/83
STACK-EAST UNIT RUN- 1 FROM-1456-1610
WEATHER CONDITIONS- CLEAR PB- 30.04 IN. HG- PS30.04 IN.HG
AS'- 13.77 SQ. FEET- TS-567.9 ^{O}R TM555.0 ^{O}R
$\sqrt{H}$-0.528 IN H_2O ΔH 1.07 IN H_2O AN- .000341 SQ.FT. CP-.84
VM-40.462 CF VC- 107.3ML TOTAL TIME- 72 MIN. NPTS-
ORSAT: CO_2 1.1 % O_2 19.4% CO 0.0 % N_2 79.5 %

1.	VOLUME WATER VAPOR	1.	5.065 SCF
2.	GAS VOLUME SAMPLED - STPD	2.	38.756 SCFD
3.	TOTAL VOLUME	3.	43.821 SCF
4.	MOISTURE IN STACK GAS - VOLUME FRACTION	4.	0.116
5.	DRY STACK GAS - VOLUME FRACTION	5.	0.884
6.	ASSUMED MOISTURE IN STACK GAS - VOLUME FRACTION	6.	
7.	MOLECULAR WEIGHT OF STACK GAS - DRY BASIS	7.	28.952
8.	MOLECULAR WEIGHT OF STACK GAS - STACK CONDITIONS	8.	27.686
9.	SPECIFIC GRAVITY OF STACK GAS RELATIVE TO AIR	9.	0.955
10.	EXCESS AIR - PERCENT	10.	1110 %
11.	AVERAGE OF FACTOR ($\sqrt{H \times TS}$)	11.	
12.	AVERAGE STACK VELOCITY	12.	1877.1 FPM
13.	ACTUAL STACK GAS FLOW RATE	13.	25848 ACFM
14.	ACTUAL STACK GAS FLOW RATE DRY	14.	22861 CFMD
15.	STACK GAS FLOW RATE - STPD	15.	21340 SCFMD
16.	PERCENT ISOKINETIC	16.	101.8 %

	MG	GR/SCF	GR/ACF	LBS/HR
FILTER	22.5			
PREFILTER	17.5			
TOTAL	40.0	0.0159		2.913

Comments: __________

Tests Conducted by: __________

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PLANT-IRON BRIDGE SEWAGE TREATMENT PLANT,SLUDGE DRYER   DATE 5/26/83
STACK- EAST UNIT   RUN- 2   FROM- 1637-1750
WEATHER CONDITIONS- CLEAR   PB- 30.06 IN. HG-   PS 30.06 IN.HG
AS'- 13.77 SQ. FEET-   TS- 569.1 °R   TM 558.8 °R
$\sqrt{\bar{H}}$- 0.522 IN H_2O ΔH 1.049 IN H_2O AN- .000341 SQ.FT.   CP- .84
VM- 40.397 CF   VC- 116.4 ML   TOTAL TIME- 72 MIN.   NPTS-
ORSAT: CO_2 1.0 % O_2 19.4%   CO 0.0 % N_2 79.6 %

1.	VOLUME WATER VAPOR	1.	5.494	SCF
2.	GAS VOLUME SAMPLED - STPD	2.	38.454	SCFD
3.	TOTAL VOLUME	3.	43.948	SCF
4.	MOISTURE IN STACK GAS - VOLUME FRACTION	4.	0.125	
5.	DRY STACK GAS - VOLUME FRACTION	5.	0.875	
6.	ASSUMED MOISTURE IN STACK GAS - VOLUME FRACTION	6.		
7.	MOLECULAR WEIGHT OF STACK GAS - DRY BASIS	7.	28.936	
8.	MOLECULAR WEIGHT OF STACK GAS - STACK CONDITIONS	8.	27.569	
9.	SPECIFIC GRAVITY OF STACK GAS RELATIVE TO AIR	9.	0.951	
10.	EXCESS AIR - PERCENT	10.	1094	%
11.	AVERAGE OF FACTOR ($\sqrt{H}$ x TS)	11.		
12.	AVERAGE STACK VELOCITY	12.	1861.7	FPM
13.	ACTUAL STACK GAS FLOW RATE	13.	25635	ACFM
14.	ACTUAL STACK GAS FLOW RATE DRY	14.	22430	CFMD
15.	STACK GAS FLOW RATE - STPD	15.	20908	SCFMD
16.	PERCENT ISOKINETIC	16.	103.1	%

	MG	GR/SCF	GR/ACF	LBS/HR
FILTER	27.4			
PREFILTER	14.5			
TOTAL	41.9	0.0168		3.013

Comments: ______

Tests Conducted by: ______

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PLANT- IRON BRIDGE SEWAGE TREATMENT PLANT, SLUDGE DRYER DATE - 5/26/83
STACK- EAST UNIT RUN- 3 FROM- 1810-1923
WEATHER CONDITIONS- CLEAR PB- 30.04 IN. HG- PS 30.04 IN. HG
AS' - 13.77 SQ. FEET- TS - 569.8 ^oR TM 560.2 ^oR
$\sqrt{H}$ - 0.514 IN H_2O ΔH 1.076 IN H_2O AN- .000341 SQ.FT. CP- .84
VM- 40.889 CF VC- 109.2 ML TOTAL TIME- 72 MIN. NPTS-
ORSAT: CO_2 1.0 % O_2 19.5 % CO 0.0 % N_2 79.5 %

1.	VOLUME WATER VAPOR	1.	5.154 SCF
2.	GAS VOLUME SAMPLED - STPD	2.	38.802 SCFD
3.	TOTAL VOLUME	3.	43.956 SCF
4.	MOISTURE IN STACK GAS - VOLUME FRACTION	4.	0.117
5.	DRY STACK GAS - VOLUME FRACTION	5.	0.883
6.	ASSUMED MOISTURE IN STACK GAS - VOLUME FRACTION	6.	
7.	MOLECULAR WEIGHT OF STACK GAS - DRY BASIS	7.	28.94
8.	MOLECULAR WEIGHT OF STACK GAS - STACK CONDITIONS	8.	27.657
9.	SPECIFIC GRAVITY OF STACK GAS RELATIVE TO AIR	9.	0.954
10.	EXCESS AIR - PERCENT	10.	1184 %
11.	AVERAGE OF FACTOR ($\sqrt{H}$ x TS)	11.	
12.	AVERAGE STACK VELOCITY	12.	1831.3 FPM
13.	ACTUAL STACK GAS FLOW RATE	13.	25217 ACFM
14.	ACTUAL STACK GAS FLOW RATE DRY	14.	22260 CFMD
15.	STACK GAS FLOW RATE - STPD	15.	20710 SCFMD
16.	PERCENT ISOKINETIC	16.	105.0 %

	MG	GR/SCF	GR/ACF	LBS/HR
FILTER	32.3			
PREFILTER	27.2			
TOTAL	59.5	0.0237		4.200

Comments:

Tests Conducted by:

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PLANT- IRON BRIDGE SEWAGE TREATMENT PLANT, SLUDGE DRYERS DATE - 5/27/83
STACK- WEST UNIT RUN- 1 FROM- 1405-1518
WEATHER CONDITIONS- PARTLY CLOUDY PB- 30.06 IN. HG- PS 30.06 IN.HG
AS'- 13.77 SQ. FEET- TS- 576.1 °R TM 560.0 °R
$\sqrt{H}$- 0.519 IN H_2O ΔH 1.112 IN H_2O AN- 000341 SQ.FT. CP- 0.84
VM- 41.773 CF VC- 104.8 ML TOTAL TIME- 72 MIN. NPTS-
ORSAT: CO_2 1.5 % O_2 19.3 % CO 0.0 % N_2 79.2 %

1.	VOLUME WATER VAPOR	1.	4.947 SCF
2.	GAS VOLUME SAMPLED - STPD	2.	39.665 SCFD
3.	TOTAL VOLUME	3.	44.612 SCF
4.	MOISTURE IN STACK GAS - VOLUME FRACTION	4.	0.111
5.	DRY STACK GAS - VOLUME FRACTION	5.	0.889
6.	ASSUMED MOISTURE IN STACK GAS - VOLUME FRACTION	6.	
7.	MOLECULAR WEIGHT OF STACK GAS - DRY BASIS	7.	29.012
8.	MOLECULAR WEIGHT OF STACK GAS - STACK CONDITIONS	8.	27.792
9.	SPECIFIC GRAVITY OF STACK GAS RELATIVE TO AIR	9.	0.959
10.	EXCESS AIR - PERCENT	10.	1092 %
11.	AVERAGE OF FACTOR ($\sqrt{H} \times \sqrt{TS}$)	11.	
12.	AVERAGE STACK VELOCITY	12.	1854.6 FPM
13.	ACTUAL STACK GAS FLOW RATE	13.	25537 ACFM
14.	ACTUAL STACK GAS FLOW RATE DRY	14.	22707 CFMD
15.	STACK GAS FLOW RATE - STPD	15.	20909 SCFMD
16.	PERCENT ISOKINETIC	16.	106.4 %

	MG	GR/SCF	GR/ACF	LBS/HR
FILTER	34.1			
PREFILTER	32.7			
TOTAL	66.8	0.0260		4.655

Comments:

Tests Conducted by:

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PLANT-IRON BRIDGE SEWAGE TREATMENT PLANT, SLUDGE DRYERS DATE-5/27/83
STACK-WEST UNIT RUN- 2 FROM-1540-1653
WEATHER CONDITIONS-PARTLY CLOUDY PB- 30.06 IN. HG- PS 30.06 IN.HG
AS'-13.77 SQ. FEET- TS-582.5 °R TM 563.9 °R
$\sqrt{H}$- 0.527 IN. H_2O ΔH 1.098 IN H_2O AN-.000341 SQ.FT. CP-0.84
VM-42.095 CF VC- 140.6ML TOTAL TIME- 72 MIN. NPTS-
ORSAT: CO_2 1.5 % O_2 19.3% CO 0.0 % N_2 79.2 %

1.	VOLUME WATER VAPOR	1.	6.636 SCF
2.	GAS VOLUME SAMPLED - STPD	2.	39.713 SCFD
3.	TOTAL VOLUME	3.	46.349 SCF
4.	MOISTURE IN STACK GAS - VOLUME FRACTION	4.	0.143
5.	DRY STACK GAS - VOLUME FRACTION	5.	0.857
6.	ASSUMED MOISTURE IN STACK GAS - VOLUME FRACTION	6.	
7.	MOLECULAR WEIGHT OF STACK GAS - DRY BASIS	7.	29.012
8.	MOLECULAR WEIGHT OF STACK GAS - STACK CONDITIONS	8.	27.435
9.	SPECIFIC GRAVITY OF STACK GAS RELATIVE TO AIR	9.	0.946
10.	EXCESS AIR - PERCENT	10.	1092 %
11.	AVERAGE OF FACTOR ($\sqrt{H}$ x TS)	11.	
12.	AVERAGE STACK VELOCITY	12.	1906.899 FPM
13.	ACTUAL STACK GAS FLOW RATE	13.	26258 ACFM
14.	ACTUAL STACK GAS FLOW RATE DRY	14.	22503 CFMD
15.	STACK GAS FLOW RATE - STPD	15.	20851 SCFMD
16.	PERCENT ISOKINETIC	16.	108.4 %

	MG	GR/SCF	GR/ACF	LBS/HR
FILTER	29.7			
PREFILTER	15.6			
TOTAL	45.3	0.0176		3.146

Comments:

Tests Conducted by:

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PLANT-IRON BRIDGE SEWAGE TREATMENT PLANT, SLUDGE DRYER DATE - 5/27/83
STACK-WEST UNIT RUN- 3 FROM-1702-1815
WEATHER CONDITIONS- CLEAR PB-30.06 IN. HG- PS30.06 IN.HG
AS'-13.77 SQ. FEET- TS-582.4 °R TM562.8 °R
$\sqrt{H}$- 0.529IN H_2O ΔH 1.075 IN H_2O AN-.000341 SQ.FT. CP-0.84
VM-41.187 CF VC- 124.3ML TOTAL TIME- 72 MIN. NPTS-
ORSAT: CO_2 1.5 % O_2 19.4% CO 0.0 % N_2 79.1 %

1.	VOLUME WATER VAPOR	1.	5.867 SCF
2.	GAS VOLUME SAMPLED - STPD	2.	38.930 SCFD
3.	TOTAL VOLUME	3.	44.797 SCF
4.	MOISTURE IN STACK GAS - VOLUME FRACTION	4.	0.131
5.	DRY STACK GAS - VOLUME FRACTION	5.	0.869
6.	ASSUMED MOISTURE IN STACK GAS - VOLUME FRACTION	6.	
7.	MOLECULAR WEIGHT OF STACK GAS - DRY BASIS	7.	29.016
8.	MOLECULAR WEIGHT OF STACK GAS - STACK CONDITIONS	8.	27.573
9.	SPECIFIC GRAVITY OF STACK GAS RELATIVE TO AIR	9.	0.951
10.	EXCESS AIR - PERCENT	10.	1182 %
11.	AVERAGE OF FACTOR ($\sqrt{H \times TS}$)	11.	
12.	AVERAGE STACK VELOCITY	12.	1910.5FPM
13.	ACTUAL STACK GAS FLOW RATE	13.	26308 ACFM
14.	ACTUAL STACK GAS FLOW RATE DRY	14.	22863 CFMD
15.	STACK GAS FLOW RATE - STPD	15.	20824 SCFMD
16.	PERCENT ISOKINETIC	16.	104.8 %

	MG	GR/SCF	GR/ACF	LBS/HR
FILTER	76.0			
PREFILTER	110.4			
TOTAL	186.4	0.0739		13.187

Comments:

Tests Conducted by:

A-2 Description of Sampling Equipment and Procedure

DESCRIPTION OF SAMPLING EQUIPMENT

The sampling equipment consisted of the following:

(1) Pitot Assembly

a. Nozzle - Stainless steel with a sharp, tapered leading edge.

b. Probe - Stainless steel sheath with a 5/8-inch OD stainless steel insert wrapped with nichrome wire. Rheostat controlled and capable of maintaining a minimum temperature of 250°F.

c. Pitot - Type "S" constructed and attached to probe according to specifications outlined in Part 60 of Chapter 1 of Title 40 of the Code of Federal Regulations, Appendix A, Method 2 as amended August 18, 1977.

d. Orsat Probe - Stainless steel 1/4-inch tubing attached to pitot tube in an interference-free arrangement.

e. Thermocouple - Type "K" attached to the pitot tube such that the tip has no contact with metal and does not interfere with the pitot tube face openings.

(2) Filter Holder - Pyrex glass with fritted glass filter support.

(3) Filter Heating Assembly - Controlled heating element in aluminum module attached to end of probe; capable of maintaining 250°F±°F.

(4) Impingers - Four impingers connected in series with glass ball joint fittings and placed in an ice bath. The first, third, and fourth impingers are the modified Greenburg-Smith design. The second impinger is the Greenburg-Smith design with a standard tip. Final gas exit temperature is measured to within ±5° with a dial thermometer immersed in the gas stream.

(5) Control Box - Module containing vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within ±5°, dry gas meter with a minimum of 2 percent accuracy, valves, and related equipment as required to maintain an isokinetic sampling rate and to determine sample volume.

(6) Nomograph - To determine isokinetic sampling rate.

A schematic of the sampling train is included.

Prior to leaving the laboratory, glass fiber filters had been numbered for identification, heated for two hours at 105°C, desiccated for two hours, and preweighed to the nearest 0.1 mg. Silica gel (indicating type, 6-16 Mesh) had also been preweighed to approximately 200 grams after drying for two hours.

Upon arrival at the sampling site, the control box was leak-checked from pump to orifice at 5 to 7 inches of water.

SAMPLING PROCEDURE

The sample train was prepared in the following manner: 125 ml of distilled water was added to each of the first two impingers. The third impinger was left empty to act as a moisture trap, and the preweighed silica gel was added to the fourth impinger. After assembling the train with the pitot as shown in the schematic, the system was leak-checked by plugging the inlet to the probe nozzle and pulling a 15-inch Hg vacuum. A leakage rate not in excess of 0.02 cfm was considered acceptable. The pitot tube system was also leak-checked at 5 to 7 inches of water, and any leaks found were corrected.

The inside dimensions of each stack were measured and recorded. The number of sampling points and the location of these points on a traverse were determined by the guidelines set forth in the Federal Register, Vol. 36, No. 247, Sec. 60.85, Method 1. These points were then marked on the probe for easy visibility.

A preliminary traverse was conducted to determine the range of velocity head and the pressure of the stack. A wet bulb and a dry bulb temperature were taken to determine stack temperature and moisture. From these data, the correct nozzle size and the nomograph correction factor were determined. The correct nozzle tip was measured to within 0.001 in. and recorded on the data sheet.

The probe was attached and the heater was adjusted to provide a gas temperature of approximately 250°F. The filter heating system was turned on, and crushed ice was placed around the impingers. After a suitable warmup period, the nozzle was placed on the first traverse point with the tip point directly into the gas stream. The pump was started immediately, the flow was adjusted to isokinetic conditions. After the required time interval had elapsed, the probe was repositioned to the next traverse point, and isokinetic sampling was reestablished. This was done for each point on the traverse until the run was completed. Reading of stack conditions were taken at least every six minutes or when significant changes in stack conditions necessitated additional adjustments in flow rate. At the conclusion of each run, the pump was turned off and the final readings were recorded.

A final leak check of the system was performed as previously described at the highest vacuum encountered during testing and a leak check of the pitot system was repeated.

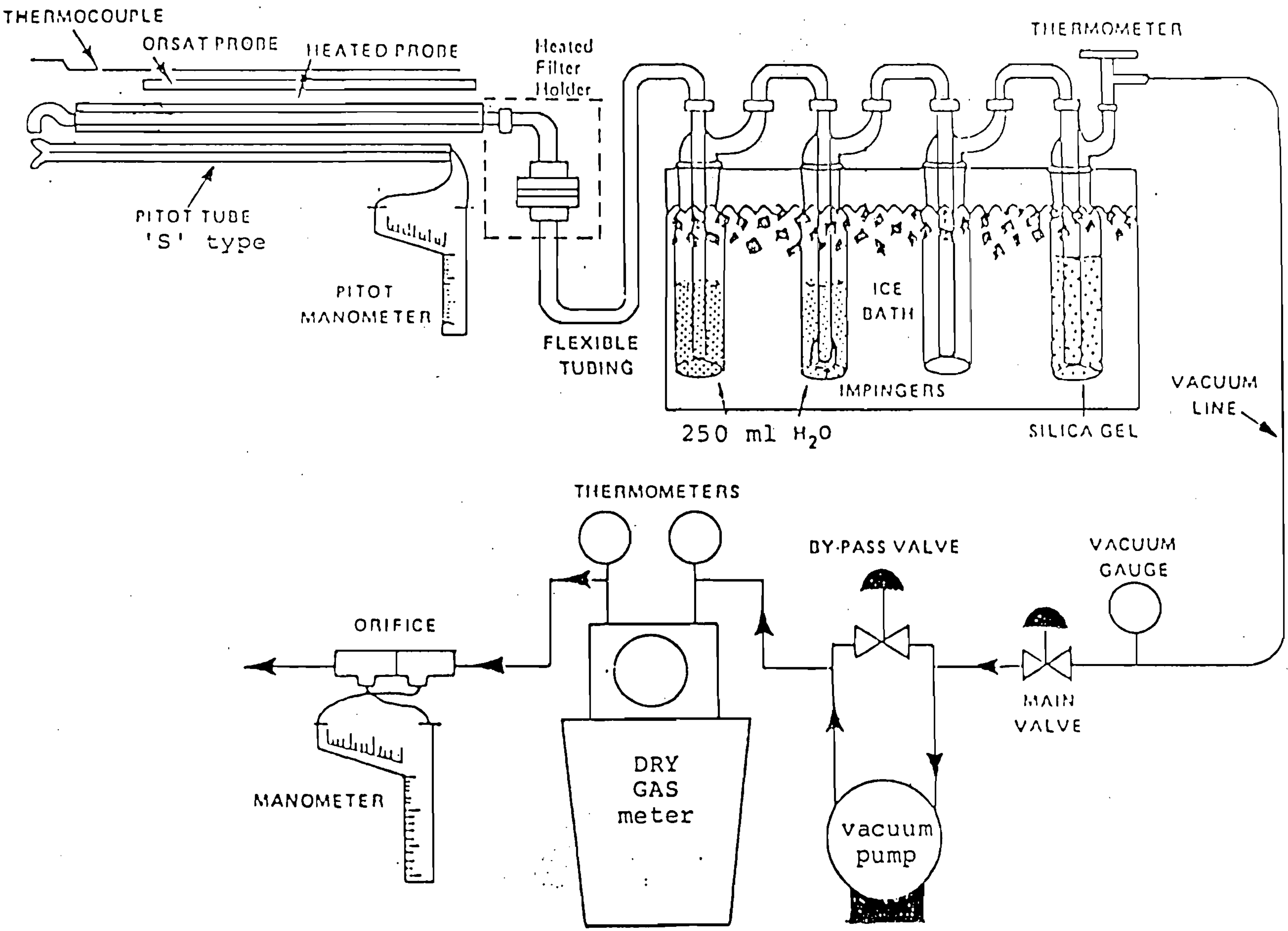
Particulate Sample Recovery

Care was exercised in moving the collection train to the sample recovery area to minimize the loss of collected sample or the gain of extraneous particulate matter. The volume of water in the first three impingers was measured and recorded on the field data sheet. The probe, nozzle, and all sample-exposed surfaces were washed with reagent grade acetone and put into a clean sample bottle marked "prefilter". A brush was used to loosen any adhering particulate matter, and subsequent washings were put into the "prefilter" container. The filter was carefully removed from the fritted glass support and placed in its original container.* The silica gel was removed from the fourth impinger and transferred to its original container. A sample of the acetone used in washing the probe was saved for a blank laboratory analysis.

* When practical, samples are changed out upon return to laboratory.

The filter and any loose particulate matter were transferred from the sample bottle to a clean, tared glass weighing dish. The filter was placed in an oven at 105°C for two hours, desiccated for two hours, and then weighed. The original weight of the filter was deducted, and the weight gain was recorded to the nearest 0.1 mg.

The "prefilter" and blank solutions were transferred to clean, tared beakers, evaporated to dryness, and desiccated to a constant weight. The blank correction was made, and the weight gain was recorded to the nearest 0.1 mg. The silica gel was weighed, and the weight gain was recorded to the nearest 0.1 gram.


THERMOCOUPLE
ORSAT PROBE
HEATED PROBE
Heated Filter Holder
THERMOMETER
PITOT TUBE 'S' type
PITOT MANOMETER
FLEXIBLE TUBING
ICE BATH
IMPINGERS
250 ml H_2O
SILICA GEL
VACUUM LINE
THERMOMETERS
BY-PASS VALVE
VACUUM GAUGE
ORIFICE
MAIN VALVE
MANOMETER
DRY GAS meter
vacuum pump

A-3 Field Sheets

TSI

SOURCE SAMPLING FIELD DATA SHEET

Plant Iron Bridge Sewage Treatment Plant, Orlando

Sample Location West Scrubber

Control Device Scrubber

Type of Samples: Particulate

Date May 24, 1983 Run No. 1

Moisture 11 %, FDA .89, Gas Density Factor ____

Barometric Press 30.1 "Hg, Stack Press ____ "Hg

Weather P. Cloudy

Temp. 89 °F, W/D ____, W/S ____

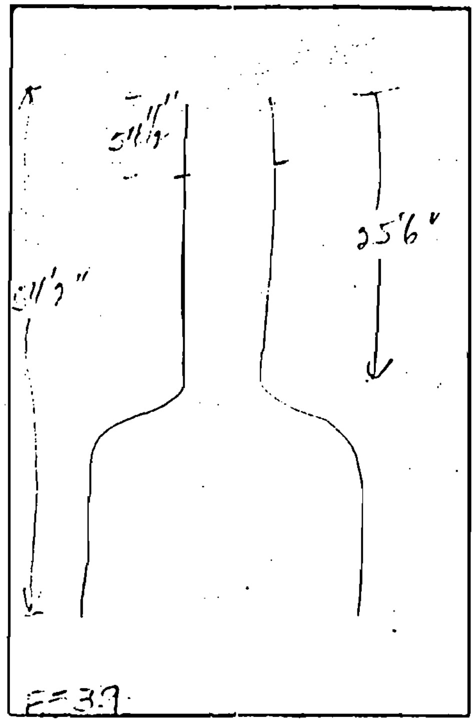
Sample Box No. ____ Meter Box No. 1A

Meter ΔH@ 2.1 Pitot Corr. Factor .84

Nozzle Dia. .250 in., Probe Length 6 ft

Probe Heater Setting 250

Stack Dimensions: Inside Diameter 50.25 in
Inside Area ____ ft²
Height ____ ft



Time Start 14:55

Time End 16:52

Effective Stack Area ____ ft² 36 pts. @ 2 min/pt = 72 min.

Mat'l Processing Rate ____

Final Gas Meter Reading 96.196 ft³

Initial Gas Meter Reading 56.624 ft³

Total Condensate in Impingers 115 ml

Moisture in Silica Gel 21.1 gm

Silica Gel Container No. ____ Filter No. ____

Orsat: CO_2 1.5, 1.5 Vm = 39.572

O_2 19.5, 19.5

CO ____

N_2 ____

Excess Air ____

Test Conducted by: Gordon, Luther, Gray

Leak Rate pre: ok
post: .0001 @ 7" vac CFM @ 15" Hg

Remarks: pitot leak check pre: ok
post: ok

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP		STACK GAS TEMP. (°F)	METER TEMPERATURE		FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
					CALC.	ACTUAL		IN	OUT			
1-1	1.0	14:57	57.6	.22	.86	.86	131	100	98	250	55	2
2	2.2	59	58.6	.22	.86	.86	131	100	98	250	55	2
3	3.8	1501	59.7	.23	.90	.90	132	100	98	250	55	2
4	5.5	03	60.8	.23	.90	.90	132	101	98	250	55	2
5	7.3	05	61.8	.23	.90	.90	131	102	98	250	55	2
6	9.4	07	62.8	.23	.90	.90	131	103	98	245	58	2
7	11.9	09	63.9	.21	.82	.82	130	104	99	245	58	2
8	14.9	11	65.0	.22	.86	.86	129	105	99	245	58	2
9	19.2	13	66.0	.22	.86	.86	129	105	99	250	58	2
10	30.1	15:15	67.1	.25	.98	.98	125	105	99	250	58	2

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD ("H_2O)	("H_2O) ORIFICE PRESS. DROP		STACK GAS TEMP. (°F)	METER TEMPERATURE		FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
					CALC.	ACTUAL		IN	OUT			
1-11	35.4	15:17	68.2	.22	.86	.86	128	106	99	250	58	2
12	38.4	19	69.2	.23	.90	.90	127	106	99	250	58	2
13	40.8	* ~~21~~ 15:55	70.4	.27	1.1	1.1	128	102	99	250	58	2
14	42.9	~~23~~ 57	71.6	.28	1.1	1.1	133	102	100	260	60	2
15	44.8	~~25~~ 59	72.8	.31	1.2	1.2	132	102	100	260	60	2
16	46.5	~~27~~ 1601	74.0	.34	1.3	1.3	131	103	100	250	60	2
17	48.0	~~29~~ 03	75.2	.34	1.3	1.3	130	104	100	250	60	2
18	49.25	~~15:31~~ 1605	76.5	.34	1.3	1.3	130	105	100	250	60	2
2-1		16:18	77.7	.31	1.2	1.2	124	101	100	250	60	2
2		20	79.0	.33	1.3	1.3	124	101	100	250	60	2
3		22	80.2	.30	1.2	1.2	124	101	100	255	55	2
4		24	81.4	.30	1.2	1.2	122	102	99	250	56	2
5		26	82.6	.25	.98	.98	123	103	99	250	55	2
6		28	83.6	.25	.98	.98	123	105	99	250	55	2
7		30	84.7	.21	.82	.82	126	105	99	250	55	2
8		32	85.7	.20	.78	.78	124	106	99	250	55	2
9		34	86.7	.20	.78	.78	124	108	100	250	55	2
10		36	87.7	.23	.90	.90	126	108	100	250	55	2
11		37	88.7	.23	.90	.90	126	109	100	250	55	2
12		40	89.8	.21	.82	.82	127	110	101	250	55	2
13		42	90.9	.23	.90	.90	126	110	101	250	55	2
14		44	92.0	.23	.90	.90	127	110	101	250	55	2
15		46	93.0	.21	.82	.82	127	110	101	250	55	2
16		48	94.1	.23	.90	.90	126	110	101	250	55	2
17		50	95.1	.23	.90	.90	126	110	101	250	55	2
18		16:52	96.196	.23	.90	.90	125	110	102	250	55	2
				$\sqrt{H}$ = .497	ΔH =	.974	Ts = 587.6	TM =	562.2			

* Test was delayed from 15:19 to 15:55 due to a clog in the cyclone

A22

TSI

SOURCE SAMPLING FIELD DATA SHEET

Plant Iron Bridge Sewage Treatment Plant, Orlando
Sample Location West Scrubber
Control Device Scrubber
Type of Samples: particulate
Date May 24, 1983 Run No. 2
Moisture 11, FDA .89, Gas Density Factor
Barometric Press 30.11 "Hg, Stack Press "Hg
Weather Mostly Cloudy
Temp. 91 °F, W/D , W/S
Sample Box No. Meter Box No. 1A
Meter ΔH@ 2.1 Pitot Corr. Factor .84
Nozzle Dia. .250 in., Probe Length 6 ft
Probe Heater Setting 250
Stack Dimensions: Inside Diameter 50.25 in
Inside Area 13.77 ft2
Height ft

F=3.9

Time Start 17:16
Time End 18:32

Effective Stack Area ft2 36 pts. @ 2 min/pt= 72 min.

Mat'l Processing Rate
Final Gas Meter Reading 137.204 ft^3
Initial Gas Meter Reading 96.301 ft^3
Total Condensate in Impingers 105 ml
Moisture in Silica Gel 15.2 gm
Silica Gel Container No. Filter No.
Orsat: CO_2 1.5, 1.5
O_2 19.5, 19.5
CO
N_2
Excess Air
Test Conducted by: Luther, Gordon, Gray
Leak Rate pre: ok CFM @ 15" Hg
post: 0.005
Remarks: pitot leak check pre: ok
post: ok

A23

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP CALC.	ACTUAL	STACK GAS TEMP. (°F)	METER TEMPERATURE IN	OUT	FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
1-1		17:18	97.6	.36	1.4	1.4	123	102	100	250	55	2
2		20	98.9	.37	1.4	1.4	123	101	100	250	55	2
3		22	100.0	.28	1.1	1.1	123	101	100	250	55	2
4		24	101.1	.24	.94	.94	124	102	99	250	55	2
5		26	102.3	.26	1.0	1.0	124	103	99	250	55	2
6		28	103.4	.24	.94	.94	123	104	99	250	55	2
7		30	104.4	.24	.94	.94	126	105	99	250	56	2
8		32	105.5	.22	.86	.86	128	107	100	250	56	2
9		34	106.6	.23	.90	.90	128	107	100	250	57	2
10		36	107.7	.24	.94	.94	129	107	100	250	57	2

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP CALC.	ACTUAL	STACK GAS TEMP. (°F)	METER TEMPERATURE IN	OUT	FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
11		1738	108.8	0.20	0.78	0.78	130	108	101	250	58	2
12		40	109.8	0.24	0.94	0.94	130	108	101	250	58	2
13		42	110.9	0.24	0.94	0.94	129	109	102	250	58	2
14		44	112.0	0.24	0.94	0.94	129	109	102	250	58	2
15		46	113.1	0.24	0.94	0.94	129	110	102	250	58	2
16		48	114.2	0.23	0.90	0.90	129	110	102	250	58	2
17		50	115.2	0.23	0.90	0.90	129	111	103	250	58	2
18		52	116.2	0.22	0.86	0.86	129	111	103	250	58	2
2-1		1758	117.6	0.35	1.37	1.37	133	111	104	250	58	2
2		1800	118.9	0.35	1.37	1.37	134	111	104	250	58	2
3		1802	120.2	0.37	1.44	1.44	132	111	104	250	58	2
4		04	121.5	0.35	1.37	1.37	133	112	104	250	58	2
5		06	122.7	0.30	1.17	1.17	133	112	105	250	58	2
6		08	123.9	0.30	1.17	1.17	133	112	105	250	58	2
7		10	125.0	0.28	1.09	1.09	134	113	105	250	58	2
8		12	126.1	0.26	1.01	1.01	133	113	105	250	58	2
9		14	127.2	0.26	1.01	1.01	133	114	105	250	58	2
10		16	128.3	0.24	0.94	0.94	133	114	105	250	58	2
11		18	129.4	0.26	1.01	1.01	131	114	105	250	58	2
12		20	130.5	0.26	[illegible]	[illegible]	132	114	105	250	58	2
13		22	131.6	0.24	0.94	0.94	131	114	105	250	59	2
14		24	132.7	0.24	0.94	0.94	132	114	105	250	59	2
15		26	133.8	0.24	0.94	0.94	131	114	105	250	59	2
16		28	134.9	0.24	0.94	0.94	131	115	105	250	59	2
17		30	136.0	0.25	0.98	0.98	131	115	106	250	60	2
18		32	137.204	0.28	1.09	1.09	131	115	106	250	60	2
				$\sqrt{\Delta H}$ = .5143	ΔH = 1.045		Ts = 130	Tm = 106				

A24

TSI

SOURCE SAMPLING FIELD DATA SHEET

Plant Iron Bridge Sewage Treatment Plant, Orlando
Sample Location West Scrubber
Control Device Scrubber
Type of Samples: Particulate
Date May 24, 1983 Run No. 3
Moisture 11 %, FDA .89, Gas Density Factor ___
Barometric Press ___ "Hg, Stack Press ___ "Hg
Weather Clear
Temp. 90 °F, W/D ___, W/S ___
Sample Box No. ___ Meter Box No. 1A
Meter ΔH@ 2.1 Pitot Corr. Factor .84
Nozzle Dia. .250 in., Probe Length 6 ft
Probe Heater Setting 250
Stack Dimensions: Inside Diameter 50.25 in
Inside Area ___ ft2
Height ___ ft
Effective Stack Area ___ ft2 36 pts. @ 2 min/pt= 72 min.

F= 3.9
Time Start 19:07
Time End 20:21

Mat'l Processing Rate ___
Final Gas Meter Reading 76.503 ft^3
Initial Gas Meter Reading 37.311 ft^3
Total Condensate in Impingers 105 ml
Moisture in Silica Gel 16.0 gm
Silica Gel Container No. ___ Filter No. ___
Orsat: CO_2 1.5, 1.5
O_2 19.5, 19.5
CO ___
N_2 ___
Excess Air ___
Test Conducted by: Luther, Gordon, Gray
Leak Rate pre: ok CFM @ 15" Hg
post: 0.001 @ 7" vac
Remarks: Pitot leak check pre: ok
post: ok

A25

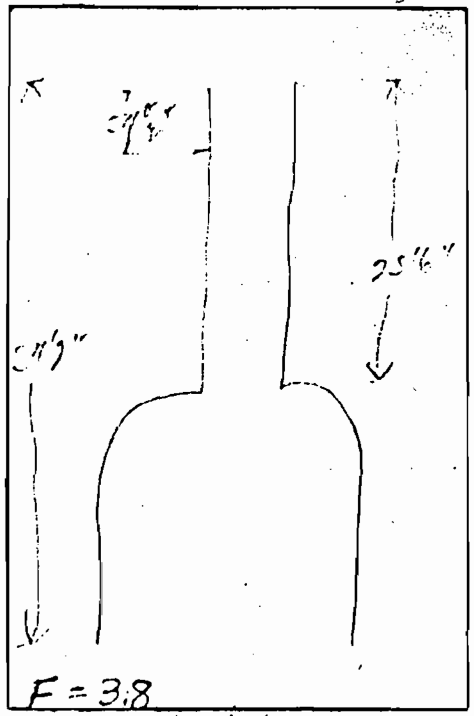
PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP		STACK GAS TEMP. (°F)	METER TEMPERATURE		FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
					CALC.	ACTUAL		IN	OUT			
1-1		1909	38.4	.33	1.3	1.3	125	103	102	250	55	2
2		11	39.7	.33	1.3	1.3	124	103	102	250	55	2
3		13	40.9	.33	1.3	1.3	125	103	102	250	55	2
4		15	42.1	.30	1.2	1.2	125	103	101	250	55	2
5		17	43.3	.28	1.1	1.1	125	103	101	250	55	2
6		19	44.5	.30	1.2	1.2	125	104	101	250	55	2
7		21	45.6	.26	1.0	1.0	125	105	100	250	55	2
8		23	46.6	.24	.94	.94	123	105	100	250	55	2
9		25	47.7	.24	.94	.94	123	105	100	250	55	2
10		1927	48.8	.24	.94	.94	124	105	100	250	55	2

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP CALC.	ACTUAL	STACK GAS TEMP. (°F)	METER TEMPERATURE IN	OUT	FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
1-11		19:29	49.9	.24	.94	.94	123	106	100	250	55	2
12		31	50.9	.23	.90	.90	123	106	100	250	55	2
13		33	52.0	.23	.90	.90	123	106	100	250	55	2
14		35	53.0	.23	.90	.90	124	106	100	250	55	2
15		37	54.1	.23	.90	.90	122	106	100	250	55	2
16		39	55.1	.23	.90	.90	123	106	100	250	55	2
17		41	56.1	.21	.82	.82	123	106	100	250	55	2
18		1943	57.1	.21	.82	.82	122	106	100	250	55	2
2-1		1947	58.3	.30	1.2	1.2	123	103	100	250	55	2
2		49	59.4	.25	.98	.98	123	103	100	250	55	2.5
3		51	60.6	.30	1.2	1.2	123	103	99	250	55	2.5
4		53	61.8	.31	1.2	1.2	123	103	99	250	55	2.5
5		55	63.0	.30	1.2	1.2	123	104	99	250	55	2
6		57	64.1	.28	1.1	1.1	123	104	99	250	55	2
7		1959	65.3	.26	1.0	1.0	123	104	99	250	55	2
8		2001	66.4	.26	1.0	1.0	122	104	98	250	55	2
9		03	67.3	.20	.78	.78	122	104	98	250	55	2
10		05	68.3	.20	.78	.78	122	104	98	250	55	2
11		07	69.4	.22	.86	.86	122	104	98	250	55	2
12		09	70.3	.20	.78	.78	121	104	98	250	55	2
13		11	71.3	.20	.78	.78	121	104	98	250	55	2
14		13	72.4	.23	.90	.90	122	104	98	250	55	2
15		15	73.4	.23	.90	.90	122	104	98	250	55	2
16		17	74.5	.23	.90	.90	122	104	98	250	55	2
17		19	75.5	.23	.90	.90	121	104	98	250	55	2
18		2021	76.503	.21	.82	.82	120	104	98	250	55	2
				.500	0.99		563	562				

TSI

SOURCE SAMPLING FIELD DATA SHEET

Plant Iron Bridge Sewage Treatment Plant, Orlando
Sample Location East Scrubber
Control Device Scrubber
Type of Samples Particulate
Date May 26, 1983 Run No. 1
Moisture 13.1 ~~11~~, FDA ~~.89~~ .87, Gas Density Factor ____
Barometric Press 30.04 "Hg, Stack Press ____ "Hg
Weather Clear
Temp. ____ °F, W/D ____, W/S ____
Sample Box No. ____ Meter Box No. 1A
Meter ΔH@ 2.1 Pitot Corr. Factor .84
Nozzle Dia. .250 in., Probe Length 6 ft
Probe Heater Setting 250
Stack Dimensions: Inside Diameter 50.25 in
Inside Area ____ ft²
Height ____ ft



Time Start 14:56
Time End 16:10

Effective Stack Area ____ ft² 36 pts. @ 2 min/pt = 72 min.

Mat'l Processing Rate ____
Final Gas Meter Reading 117.068 ft³
Initial Gas Meter Reading 76.606 ft³
Total Condensate in Impingers 95 ml
Moisture in Silica Gel 12.3 gm
Silica Gel Container No. ____ Filter No. ____
Orsat: CO_2 1.1, 1.1 Vm = 40.462
O_2 19.4, 19.4
CO ____
N_2 79.5
Excess Air ____
Test Conducted by: Luther, Gordon, Gray
Leak Rate pre: OK post: 0.000 @ 6" Vac CFM @ 15" Hg
Remarks: pitot leak check pre: OK post: OK

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP CALC.	ACTUAL	STACK GAS TEMP. (°F)	METER TEMPERATURE IN	OUT	FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
1-1		1458	77.5	.20	.75	.75	107	89	89	250	56	2
2		1500	78.6	.24	.91	.91	108	89	89	250	56	2
3		02	79.6	.23	.87	.87	108	90	89	250	56	2
4		04	80.6	.23	.87	.87	109	92	89	250	56	2
5		06	81.6	.23	.87	.87	110	92	89	250	56	2
6		08	82.7	.23	.87	.87	109	93	89	250	56	2
7		10	83.7	.25	.95	.95	108	94	90	250	56	2
8		12	84.9	.28	1.1	1.1	106	94	90	250	56	2
9		14	86.1	.33	1.3	1.3	106	95	90	250	56	2
10		1516	87.3	.31	1.2	1.2	105	96	90	250	56	2

A27

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT³)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP CALC.	ACTUAL	STACK GAS TEMP. (°F)	METER TEMPERATURE IN	OUT	FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
1-11		15:18	88.5	.31	1.2	1.2	107	97	90	250	56	2
12		20	89.7	.31	1.2	1.2	108	98	90	250	56	2
13		22	90.9	.31	1.2	1.2	108	98	90	250	56	2
14		24	92.1	.30	1.14	1.14	107	99	91	250	56	2
15		26	93.2	.30	1.14	1.14	107	99	91	250	56	2
16		28	94.4	.30	1.14	1.14	107	100	91	250	56	2
17		30	95.5	.30	1.14	1.14	107	100	92	250	56	2
18		1532	96.6	.28	1.06	1.06	107	100	92	250	56	2
2-1		1536	97.8	.31	1.2	1.2	107	99	92	250	57	2
2		38	99.0	.33	1.25	1.25	106	99	92	250	56	2
3		40	100.2	.33	1.25	1.25	106	100	92	250	57	2
4		42	101.4	.34	1.29	1.29	108	100	92	250	57	2
5		44	102.6	.31	1.2	1.2	108	100	93	250	57	2
6		46	103.8	.31	1.2	1.2	108	100	93	250	58	2
7		48	105.0	.34	1.29	1.29	109	100	93	250	58	2
8		50	106.3	.36	1.37	1.37	109	101	93	250	58	2
9		52	107.6	.36	1.37	1.37	109	101	93	250	58	2
10		54	108.8	.32	1.22	1.22	108	102	93	250	58	2
11		56	109.9	.28	1.06	1.06	109	102	93	250	58	2
12		58	111.0	.26	0.99	0.99	108	103	93	250	58	2
13		1600	113.1	.24	0.91	0.91	108	103	94	250	58	2
14		02	113.1	.24	0.91	0.91	108	103	94	250	58	2
15		04	114.1	.22	0.84	0.84	108	103	94	250	58	2
16		06	115.1	.21	0.80	0.80	109	103	94	250	58	2
17		08	116.1	.20	0.76	0.76	111	103	94	250	59	2
18		1610	117.068	.20	0.76	0.76	110	103	95	250	59	2
				1.528		[illegible]	107.9		[illegible]			
				[illegible]								

A28

TSI

SOURCE SAMPLING FIELD DATA SHEET

Plant Iron Bridge Sewage Treatment Plant, Orlando

Sample Location East Scrubber

Control Device Scrubber

Type of Samples: Particulate

Date May 26, 1983 Run No. 2

Moisture 4.1, FDA .87, Gas Density Factor

Barometric Press "Hg, Stack Press "Hg

Weather Clear 85°

Temp. °F, W/D , W/S

Sample Box No. Meter Box No. 1A

Meter ΔH@ 2.1 Pitot Corr. Factor .84

Nozzle Dia. .250 in., Probe Length 6 ft

Probe Heater Setting 250

Stack Dimensions: Inside Diameter 50.25 in

Inside Area ft²

Height ft

Time Start 16:37

Time End 17:50

Effective Stack Area ft² 36 pts. @ 2 min/pt= 72 min.

Mat'l Processing Rate

Final Gas Meter Reading 57.783 ft³

Initial Gas Meter Reading 17.386 ft³

Total Condensate in Impingers 98 ml

Moisture in Silica Gel 18.4 gm

Silica Gel Container No. Filter No.

Orsat: CO_2 1.0, 1.0

O_2 19.4, 19.4

CO

N_2

Excess Air

Test Conducted by: Luther, Gordon, Gray

Leak Rate pre: OK CFM @ 15" Hg

post: 0.001 @ 8" vac

Remarks: pitot leak check pre: OK

post: OK

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP CALC.	ACTUAL	STACK GAS TEMP. (°F)	METER TEMPERATURE IN	OUT	FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
1-1		16:39	18.6	.23	.87	.87	106	95	91	250	59	2
2		41	19.6	.23	.87	.87	106	95	91	250	59	2
3		43	20.7	.23	.87	.87	107	95	92	250	59	2
4		45	21.7	.23	.87	.87	107	96	92	250	57	2
5		47	22.7	.24	.91	.91	107	97	92	250	57	2
6		16:49	23.8	.24	.91	.91	108	97	92	250	57	2
7		51	24.9	.25	.95	.95	109	98	92	250	57	2
8		53	26.1	.28	1.1	1.1	107	98	92	250	57	2
9		55	27.2	.31	1.2	1.2	106	100	93	250	57	2
10		16:57	28.3	.31	1.2	1.2	105	101	94	250	57	2

A29

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP		STACK GAS TEMP. (°F)	METER TEMPERATURE		FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
					CALC.	ACTUAL		IN	OUT			
1-11		1659	29.5	.32	1.2	1.2	106	102	94	250	56	2
12		1701	30.7	.31	1.2	1.2	107	103	95	250	56	2
13		1703	31.9	.31	1.2	1.2	108	103	95	250	56	2
14		05	33.1	.30	1.1	1.1	107	104	95	250	57	2
15		07	34.3	.30	1.1	1.1	108	104	95	250	57	2
16		17:09	35.4	.28	1.1	1.1	109	104	95	250	57	2
17		11	36.5	.28	1.1	1.1	109	104	95	250	57	2
18		1713	37.6	.28	1.1	1.1	109	104	95	250	57	2
2-1		1716	38.8	.30	1.1	1.1	108	104	95	250	57	2
2		18	39.9	.28	1.1	1.1	109	104	96	250	57	2
3		20	41.1	.32	1.2	1.2	110	104	96	250	55	2
4		22	42.4	.33	1.3	1.3	110	104	97	250	55	2
5		24	43.6	.34	1.3	1.3	110	105	97	250	55	2
6		26	44.9	.34	1.3	1.3	111	105	97	250	55	2
7		28	46.2	.36	1.4	1.4	113	105	97	250	55	2
8		30	47.4	.36	1.4	1.4	113	105	97	250	55	2
A30 9		32	48.7	.34	1.3	1.3	112	105	97	250	55	2
10		34	49.9	.30	1.1	1.1	112	105	97	250	60	2
11		36	50.9	.25	.95	.95	112	105	97	250	60	2
12		38	52.0	.24	.91	.91	112	105	98	250	60	2
13		40	53.0	.23	.87	.87	112	105	98	250	60	2
14		42	54.0	.21	.80	.80	112	105	98	250	60	2
15		44	55.0	.20	.76	.76	112	105	98	250	60	2
16		46	55.9	.19	.72	.72	110	105	98	250	60	2
17		48	56.9	.19	.72	.72	110	105	98	250	60	2
18		17 50	57.783	.18	.68	.68	108	105	98	250	60	2
				$\sqrt{.522}$	1.049		109.1	98.8				

TSI

A31

SOURCE SAMPLING FIELD DATA SHEET

Plant Iron Bridge Sewage Treatment Plant, Orlando

Sample Location East Scrubber

Control Device Scrubber

Type of Samples Particulate

Date May 26, 1983 Run No. 3

Moisture 11 %, FDA .89, Gas Density Factor ___

Barometric Press ___ "Hg, Stack Press ___ "Hg

Weather Clear 85°

Temp. ___ °F, W/D ___, W/S ___

Sample Box No. ___ Meter Box No. 1A

Meter ΔH@ 2.1 Pitot Corr. Factor .84

Nozzle Dia. .250 in., Probe Length 6 ft

Probe Heater Setting 250

Stack Dimensions: Inside Diameter 50.25 in

Inside Area ___ ft²

Height ___ ft

Effective Stack Area ___ ft² 36 pts. @ 2 min/pt= 72 min.

F=4.1

Time Start 18:10

Time End 19:23

Mat'l Processing Rate ___

Final Gas Meter Reading 98.723 ft³

Initial Gas Meter Reading 57.834 ft³

Total Condensate in Impingers 96 ml

Moisture in Silica Gel 13.2 gm

Silica Gel Container No. ___ Filter No. ___

Orsat: CO_2 1.0, 1.0

O_2 19.5, 19.5

CO ___

N_2 ___

Excess Air ___

Test Conducted by: Luthou, Gordon, Gray

Leak Rate pre: OK CFM @ 15" Hg

post: 0.002 @ 9" vac

Remarks: pitot leak check pre: OK

post: OK

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP CALC.	ACTUAL	STACK GAS TEMP. (°F)	METER TEMPERATURE IN	OUT	FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
1-1		1812	58.9	.24	.98	.98	110	98	97	250	63	2
2		14	60.0	.23	.94	.94	108	98	97	250	61	2
3		18:16	61.1	.23	.94	.94	107	98	97	250	60	2
4		18	62.2	.25	1.0	1.0	109	99	97	250	60	2
5		20	63.3	.26	1.1	1.1	109	100	97	250	60	2
6		22	64.4	.26	1.1	1.1	110	101	97	250	60	2
7		24	65.6	.30	1.2	1.2	110	102	97	250	60	2
8		26	66.8	.30	1.2	1.2	110	103	97	250	60	2
9		28	68.0	.30	1.2	1.2	108	103	97	250	60	2
10		18 30	69.1	.28	1.1	1.1	108	104	97	250	60	2

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP		STACK GAS TEMP. (°F)	METER TEMPERATURE		FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
					CALC.	ACTUAL		IN	OUT			
1-11		1832	70.3	.28	1.1	1.1	109	104	97	250	60	2
12		34	71.5	.28	1.1	1.1	108	104	97	250	60	2
13		36	72.7	.30	1.2	1.2	110	104	97	250	60	2
14		38	73.8	.26	1.1	1.1	110	104	97	250	60	2
15		40	75.0	.26	1.1	1.1	110	104	97	250	60	2
16		42	76.1	.28	1.1	1.1	110	104	97	250	60	2
17		44	77.2	.27	1.1	1.1	109	104	97	250	60	2
18		1846	78.4	.27	1.1	1.1	109	105	97	250	60	2
2-1		1849	79.3	.19	.78	.78	108	105	97	250	60	2
2		51	80.4	.21	.86	.86	108	105	97	250	60	2
3		53	81.4	.21	.86	.86	109	104	97	250	60	2
4		55	82.4	.21	.86	.86	110	104	97	250	60	2
5		57	83.5	.21	.86	.86	111	103	97	250	60	2
6		1859	84.5	.21	.86	.86	111	103	97	250	60	2
7		1901	85.6	.24	.98	.98	108	104	97	250	60	2
8		03	86.7	.27	1.1	1.1	108	104	97	250	60	2
9		05	87.9	.30	1.2	1.2	107	104	97	250	60	2
10		07	89.1	.30	1.2	1.2	108	104	97	250	60	2
11		09	90.3	.30	1.2	1.2	113	105	97	250	60	2
12		11	91.5	.30	1.2	1.2	113	105	97	250	60	2
13		13	92.8	.30	1.2	1.2	112	105	97	250	60	2
14		15	94.0	.30	1.2	1.2	112	105	97	250	60	2
15		17	95.1	.27	1.1	1.1	112	105	97	250	60	2
16		19	96.3	.29	1.2	1.2	113	105	97	250	60	2
17		21	97.5	.29	1.2	1.2	112	105	97	250	60	2
18		1923	98.7	.29	1.2	1.2	112	105	98	250	60	2
				$\sqrt{.5144}$	ΔH 1.076		109.8 569.8	560.2				

A38

TSI

SOURCE SAMPLING FIELD DATA SHEET

Plant Iron Bridge

Sample Location West Scrubber

Control Device Scrubber

Type of Samples: Particulate

Date May 27, 1983 Run No. 1

Moisture 11.1, FDA .89, Gas Density Factor ____

Barometric Press 30.20 "Hg, Stack Press ____ "Hg

Weather P. Cloudy

Temp. 90 °F, W/D ____, W/S ____

Sample Box No. ____ Meter Box No. 1A

Meter ΔH@ 2.1 Pitot Corr. Factor .84

Nozzle Dia. .250 in., Probe Length 6 ft

A33

Probe Heater Setting 250

Stack Dimensions: Inside Diameter 20.25 in

Inside Area ____ ft²

Height ____ ft

F = 4.1

Time Start 14:05

Time End 15:18

Effective Stack Area ____ ft² 36 pts. @ 2 min/pt = 72 min.

Mat'l Processing Rate ____

Final Gas Meter Reading 140.783 ft³

Initial Gas Meter Reading 99.010 ft³

Total Condensate in Impingers 94 ml

Moisture in Silica Gel 10.8 gm

Silica Gel Container No. ____ Filter No. ____

Orsat: CO_2 1.5, 1.5

O_2 19.3, 19.3

CO ____

N_2 ____

Excess Air ____

Test Conducted by: Luther, Gordon, Gray

Leak Rate pre: ok CFM @ 15" Hg

post: 0.002 @ 7" Vac

Remarks: Pitot leak check pre: ok

post: ok

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP CALC.	ACTUAL	STACK GAS TEMP. (°F)	METER TEMPERATURE IN	OUT	FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
1-1		1407	100.0	.20	.82	.82	103	94	94	250	56	2
2		09	101.1	.22	.90	.90	108	94	94	250	56	2
3		11	102.2	.24	.98	.98	109	94	94	250	56	2
4		13	103.3	.24	.98	.98	111	95	94	250	56	2
5		15	104.4	.26	1.1	1.1	112	95	94	250	56	2
6		17	105.5	.26	1.1	1.1	114	96	94	250	56	2
7		19	106.7	.26	1.1	1.1	115	96	94	250	56	2
8		21	107.8	.24	.98	.98	116	97	94	250	56	2
9		23	108.9	.24	.98	.98	117	98	94	250	56	2
10		1425	110.1	.32	1.3	1.3	116	99	94	250	56	2

AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP CALC.	ACTUAL	STACK GAS TEMP. (°F)	METER TEMPERATURE IN	OUT	FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
2-11		1427	111.5	.34	1.4	1.4	113	100	94	250	56	2
12		29	112.8	.37	1.5	1.5	114	101	94	250	56	2
13		31	114.1	.37	1.5	1.5	114	102	95	250	54	2
14		33	115.5	.37	1.5	1.5	112	102	95	250	54	2
15		35	116.8	.34	1.4	1.4	111	103	95	250	54	2
16		37	118.0	.31	1.3	1.3	111	104	95	250	54	2
17		39	119.3	.31	1.3	1.3	115	105	95	250	54	2
18		1441	120.5	.31	1.3	1.3	115	105	95	250	54	2
2-1		1444	121.8	.35	1.4	1.4	118	105	95	250	57	2
2		46	123.1	.31	1.3	1.3	119	106	96	250	57	2
3		48	124.3	.32	1.3	1.3	118	106	97	250	57	2
4		50	125.6	.30	1.2	1.2	115	107	97	250	57	2
5		52	126.7	.28	1.1	1.1	114	108	98	250	57	2
6		54	127.9	.28	1.1	1.1	114	108	98	250	57	2
7		56	129.1	.28	1.1	1.1	115	108	99	250	57	2
8		58	130.2	.28	1.1	1.1	116	108	99	250	57	2
9		1500	131.4	.26	1.1	1.1	117	108	99	250	57	2
10		02	132.4	.21	.86	.86	119	108	100	250	56	2
11		04	133.6	.30	1.2	1.2	119	109	100	250	56	2
12		06	134.8	.21	.86	.86	122	109	100	250	56	2
13		08	135.7	.22	.90	.90	123	109	100	250	55	2
14		10	136.8	.23	.94	.94	126	108	100	250	55	2
15		12	137.8	.19	.78	.78	124	108	101	250	55	2
16		14	138.8	.19	.78	.78	124	108	101	250	55	2
17		16	139.8	.19	.78	.78	125	108	101	250	56	2
18		1518	140.783	.19	.78	.78	126	108	101	250	56	2
						1.112	116.1		[illegible]			
							576.1		560			

TSI

SOURCE SAMPLING FIELD DATA SHEET

Plant Iron Bridge Sewage Treatment Plant, Orlando

Sample Location west scrubber

Control Device Scrubber

Type of Samples Particulate

Date 5-27-83 Run No. 2

Moisture 12.1, FDA .98, Gas Density Factor

Barometric Press 30.06 "Hg, Stack Press "Hg

Weather P. Cloudy

Temp. 92 °F, W/D , W/S

Sample Box No. Meter Box No. 1A

Meter ΔH@ 2.1 Pitot Corr. Factor 0.84

Nozzle Dia. .250 in., Probe Length 6 ft

Probe Heater Setting 250

Stack Dimensions: Inside Diameter 50.25 in

Inside Area ft^2

Height ft

Effective Stack Area ft^2 36 pts. @ 2 min/pt= 72 min.

Time Start 1540

Time End 1653

Mat'l Processing Rate

Final Gas Meter Reading 82.944 ft^3

Initial Gas Meter Reading 40.849 ft^3

Total Condensate in Impingers 128 ml

Moisture in Silica Gel 12.6 gm

Silica Gel Container No. Filter No.

Orsat: CO_2 6.5, 6.5

O_2 19.3, 19.3

CO

N_2

Excess Air

Test Conducted by: Gordon, Luther

Leak Rate Pre: OK CFM @ 15" Hg

Post: 0.002 @ 6" Vac

Remarks: pitot leak check - pre: OK post: OK

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP		STACK GAS TEMP. (°F)	METER TEMPERATURE		FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
					CALC.	ACTUAL		IN	OUT			
1-1		1542	41.9	.23	.94	.94	118	102	100	250	62	2
2		44	43.0	.23	.94	.94	120	102	100	250	61	2
3		46	44.1	.24	.94	.94	120	102	100	250	60	2
4		48	45.1	.24	.94	.94	122	102	100	250	60	2
5		50	46.3	.27	1.1	1.1	123	102	100	250	60	2
6		52	47.4	.27	1.1	1.1	122	102	100	250	60	2
7		54	48.5	.27	1.1	1.1	122	104	100	250	60	2
8		56	49.7	.28	1.1	1.1	123	105	100	250	60	2
9		58	50.9	.28	1.1	1.1	123	105	100	250	58	2
10		1600	52.1	.30	1.2	1.2	124	105	100	250	58	2

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP		STACK GAS TEMP. (°F)	METER TEMPERATURE		FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
					CALC.	ACTUAL		IN	OUT			
1-11		1602	53.3	.31	1.2	1.2	122	106	100	250	58	2
12		04	54.6	.31	1.2	1.2	124	106	100	250	58	2
13		06	55.8	.32	1.2	1.2	124	107	100	250	58	2
14		08	57.0	.33	1.3	1.3	124	107	100	250	58	2
15		10	58.3	.32	1.2	1.2	123	108	100	250	58	2
16		12	59.5	.32	1.2	1.2	123	108	100	250	58	2
17		14	60.7	.30	1.2	1.2	123	108	101	250	57	2
18		1616	61.9	.30	1.2	1.2	123	108	101	250	58	2
2-1		1619	63.0	.20	0.78	.78	123	108	101	250	59	2
2		21	64.0	.20	.78	.78	123	108	101	250	57	2
3		23	65.0	.21	.82	.82	123	107	101	250	57	2
4		25	66.0	.21	.82	.82	123	107	101	250	57	2
5		27	67.0	.24	.94	.94	123	107	101	250	57	2
6		29	68.1	.24	.94	.94	123	107	101	250	57	2
7		31	69.2	.24	.94	.94	124	108	101	250	57	2
8		33	70.3	.24	.94	.94	123	109	101	250	57	2
9		35	71.5	.27	1.1	1.1	122	109	102	250	57	2
10		37	72.7	.28	1.1	1.1	121	109	102	250	57	2
11		39	73.7	.28	1.1	1.1	121	109	102	250	57	2
12		41	75.1	.31	1.2	1.2	122	110	102	250	57	2
13		43	76.4	.34	1.3	1.3	122	110	102	250	57	2
14		45	77.7	.36	1.4	1.4	122	110	102	250	56	2
15		47	79.0	.36	1.4	1.4	122	110	103	250	56	2
16		49	80.3	.33	1.3	1.3	123	110	103	250	56	2
17		51	81.6	.33	1.3	1.3	123	110	103	250	56	2
18		53	82.944	.32	1.2	1.2	123	110	103	250	56	2
						1.098	122.5	103.9				
							582.5	563.9				

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TSI

SOURCE SAMPLING FIELD DATA SHEET

Plant Iron Bridge Sewage Treatment Plant
Sample Location west Scrubber
Control Device scrubber
Type of Samples Particulate
Date May 27, 1983 Run No. 3
Moisture .131, FDA .87, Gas Density Factor
Barometric Press 30.06 "Hg, Stack Press "Hg
Weather Clear
Temp. 90 °F, W/D , W/S
Sample Box No. Meter Box No. 1A
Meter ΔH@ 2.1 Pitot Corr. Factor .84
Nozzle Dia. .250 in., Probe Length 6 ft
Probe Heater Setting 250
Stack Dimensions: Inside Diameter 50.25 in
Inside Area ft^2
Height ft
Effective Stack Area ft^2 36 pts. @ 2 min/pt= 72 min.

Time Start 1702
Time End 1815

Mat'l Processing Rate
Final Gas Meter Reading 124.176 ft^3
Initial Gas Meter Reading 82.989 ft^3
Total Condensate in Impingers 107 ml
Moisture in Silica Gel 17.3 gm
Silica Gel Container No. Filter No.
Orsat: CO_2 1.5, 1.5
O_2 19.4, 19.4
CO
N_2
Excess Air
Test Conducted by: Gordon, Luther
Leak Rate Pre: ok CFM @ 15" Hg
Post: .000 @ 6" vac
Remarks: pitot check - pre: ok
post: ok

PORT AND TRAVERSE POINT NO.	INCHES INSIDE STACK WALL	CLOCK TIME	GAS METER READING (FT^3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP		STACK GAS TEMP. (°F)	METER TEMPERATURE		FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
					CALC.	ACTUAL		IN	OUT			
1-1		1704	84.0	.22	.84	.84	124	104	101	245	63	2
-2		06	85.0	.21	.80	.80	122	104	101	250	60	2
3		08	86.0	.21	.80	.80	122	104	101	250	60	2
4		10	87.0	.20	.76	.76	123	104	101	250	60	2
5		12	88.0	.21	.80	.80	123	104	101	250	60	2
6		14	89.0	.23	.87	.87	123	104	101	250	57	2
7		16	90.1	.26	.99	.99	123	105	101	250	57	2
8		18	91.3	.29	1.1	1.1	123	105	101	250	57	2
9		20	92.5	.30	1.1	1.1	123	105	101	250	57	2
10		1722	94.8	.30	1.1	1.1	123	106	101	250	57	2

PORT AND TRAVERSE POINT NO.	~~INCHES INSIDE STACK WALL~~ Clock Time	~~CLOCK TIME~~	GAS METER READING (FT^3)	STACK VELOCITY HEAD ("H2O)	("H2O) ORIFICE PRESS. DROP CALC.	ACTUAL	STACK GAS TEMP. (°F)	METER TEMPERATURE IN	OUT	FILTER TEMP. (°F)	LAST IMPINGER TEMP. (°F)	VACUUM ("HG)
1-11	1724		94.8	.31	1.2	1.2	123	106	101	250	57	2
12	26		96.1	.33	1.3	1.3	121	106	101	250	57	2
13	28		97.3	.33	1.3	1.3	122	106	101	250	57	2
14	30		98.6	.36	1.4	1.4	122	106	101	250	57	2
15	32		99.9	.36	1.4	1.4	124	106	100	250	57	2
16	34		101.1	.32	1.2	1.2	121	106	100	250	57	2
17	36		102.3	.31	1.2	1.2	122	106	100	250	57	2
18	1738		103.6	.31	1.2	1.2	122	106	100	250	57	2
2-1	1741		104.6	.23	.87	.87	120	106	100	250	60	2
2	43		105.7	.23	.87	.87	120	106	100	250	60	2
3	45		106.8	.23	.87	.87	120	105	100	250	59	2
4	47		107.8	.23	.87	.87	119	105	100	250	59	2
5	49		108.9	.25	.95	.95	122	105	100	250	59	2
6	51		110.0	.27	1.0	1.0	121	105	100	250	59	2
7	53		111.1	.27	1.0	1.0	121	105	100	250	59	2
8	55		112.3	.31	1.2	1.2	123	105	100	250	58	2
9	57		113.5	.31	1.2	1.2	123	105	100	250	58	2
10	1759		114.8	.34	1.3	1.3	124	105	100	250	58	2
11	1801		116.0	.31	1.2	1.2	123	105	100	250	58	2
12	03		117.2	.32	1.2	1.2	123	105	100	250	58	2
13	05		118.3	.32	1.2	1.2	123	105	100	250	59	2
14	07		119.5	.32	1.2	1.2	123	105	100	250	59	2
15	09		120.7	.30	1.1	1.1	123	105	100	250	59	2
16	11		121.8	.29	1.1	1.1	124	105	100	250	59	2
17	13		123.0	.29	1.1	1.1	124	105	100	250	59	2
18	1815		124.176	.28	1.1	1.1	124	105	100	250	59	2
						1.075	122.4	102.8				
							582.4	562.8				

A38

A-4 Laboratory Sheets

PLANT AND LOCATION Iron Bridge, Orlando, FL

STACK West Scrubber

DATE 5/24/83 ANALYST Gordon LAB. NO.

	RUN 1	RUN 2	RUN 3
FILTERS			
Sample No.			
Filter No.	496480	496482	496483
Beaker & Filter Wt.	68.1750	69.6555	70.3946
Beaker Tare Wt.	67.7034	69.1328	69.9000
Gross Gain	.4716	.4727	.4946
Filter Tare Weight	.4264	.4197	.4186
Net Gain (grams)	.0452	.0530	.0760
SAMPLE ID			
Sample No.			
Sample Volume	180	160	170
Aliquot	180	160	170
Factor	1	1	1
Final Weight	107.8119	103.1418	101.3296
Tare Weight	107.7533	103.0506	101.7523
Net Gain	.0586	.0912	.0773
Net Gain x factor = Total (grams)	.0586	.0912	.0773
SAMPLE ID			
Sample No.			
Sample Volume			
Aliquot			
Factor			
Final Weight			
Tare Weight			
Net Gain			
Net gain x factor = Total (grams)			
FOR INSOLUBLE-SOLUBLE MATERIAL			
Solvent			
Sample No.			
Sample Volume			
Aliquot			
Factor			
Filter Final			
Filter Tare			
Net Gain			
Net Gain x Factor - Total Insoluble			
Beaker Final			
Beaker Tare			
Net Gain			
Net Gain x Factor = Total Soluble			

PLANT AND LOCATION Iron Bridge, Orlando, FL

STACK East Scrubber

DATE 5/26/83 ANALYST Gordon LAB. NO. ______

	RUN 1	RUN 2	RUN 3
FILTERS			
Sample No.			
Filter No.	491486	491485	491484
Beaker & Filter Wt.	67.8679	68.1501	70.3506
Beaker Tare Wt.	67.4237	67.7049	69.9012
Gross Gain	.4442	.4452	.4494
Filter Tare Weight	.4217	.4178	.4171
Net Gain (grams)	.0225	.0274	.0323
SAMPLE ID			
Sample No.			
Sample Volume	160	240	155
Aliquot	160	240	155
Factor	1	1	1
Final Weight	100.6980	101.8549	95.0630
Tare Weight	100.6805	101.8404	95.0358
Net Gain	.0175	.0145	.0272
Net Gain x factor = Total (grams)	.0175	.0145	.0272
SAMPLE ID			
Sample No.			
Sample Volume			
Aliquot			
Factor			
Final Weight			
Tare Weight			
Net Gain			
Net gain x factor = Total (grams)			
FOR INSOLUBLE-SOLUBLE MATERIAL			
Solvent ______			
Sample No.			
Sample Volume			
Aliquot			
Factor			
Filter Final			
Filter Tare			
Net Gain			
Net Gain x Factor - Total Insoluble			
Beaker Final			
Beaker Tare			
Net Gain			
Net Gain x Factor = Total Soluble			

PLANT AND LOCATION Iron Bridge, Orlando, FL

STACK West Scrubber

DATE 5/27/83 ANALYST Gordon LAB. NO.

	RUN 1	RUN 2	RUN 3
FILTERS			
Sample No.			
Filter No.	496483	496489	496487
Beaker & Filter Wt.	67.8749	68.2960	68.1992
Beaker Tare Wt.	67.4196	67.8508	67.7033
Gross Gain	.4553	.4452	.4959
Filter Tare Weight	.4212	.4155	.4199
Net Gain (grams)	.0341	.0297	.0760
SAMPLE ID			
Sample No.			
Sample Volume	150	200	230
Aliquot	150	200	230
Factor	1	1	1
Final Weight	103.2014	108.3468	102.0883
Tare Weight	103.1687	108.3312	101.9779
Net Gain	.0327	.0156	.1104
Net Gain x factor = Total (grams)	.0327	.0156	.1104
SAMPLE ID			
Sample No.			
Sample Volume			
Aliquot			
Factor			
Final Weight			
Tare Weight			
Net Gain			
Net gain x factor = Total (grams)			
FOR INSOLUBLE-SOLUBLE MATERIAL			
Solvent			
Sample No.			
Sample Volume			
Aliquot			
Factor			
Filter Final			
Filter Tare			
Net Gain			
Net Gain x Factor - Total Insoluble			
Beaker Final			
Beaker Tare			
Net Gain			
Net Gain x Factor = Total Soluble			

A-5 Calculation Equations

EQUATIONS FOR CALCULATING PARTICULATE EMISSIONS

$$VWV = (0.0472) \times (VC)$$

$$VSTPD = (17.65) \times (VM) \times (PB + \frac{\Delta H}{13.6}) \div TM$$

$$VT = (VWV) + (VSTPD)$$

$$W = (VWV) \div (VT)$$

$$FDA = (1.0) - (W)$$

FMOIST = Assumed moisture fraction

$$MD = (0.44 \times \%\ CO_2) + (0.32 \times \%\ O_2) + (0.28 \times \%\ N_2) + (0.28 \times \%\ CO)$$

$$MS = (MD \times FDA) + (18 \times W)$$

$$GS = (MS) \div (28.99)$$

$$EA = \left[(100) \times (\%\ O_2 - \frac{\%\ CO}{2})\right] \div \left[(0.266 \times \%\ N_2) - (O_2 - \frac{\%\ CO}{2})\right]$$

$$\underline{U} = (174) \times (CP) \times \sqrt{(\underline{H})} \times \sqrt{(TS \times 29.92) \div (GS \times PS)}$$

$$QS = (\underline{U}) \times (AS)$$

$$QD = (QS) \times (FDA)$$

$$QSTPD = (528) \times (QD) \times (PS) \div TS \div 29.92$$

$$PISO = \left[(0.00267 \times VC \times TS) + (P_o \times TS \times VM \div TM)\right] \div \left[(Time \times \underline{U} \times PS \times AN)\right]$$

$$ESTP = \frac{\left(\frac{15.43\ Grains}{GRAM}\right)(y)}{VSTPD}$$

$$E_{12} = \frac{(ESTP)\quad(12)}{(CO_2\ \%)}$$

$$E50 = \frac{(ESTP)\quad(100 + EA)}{150}$$

$$EM = (ESTP)\ (QSTPD)\ (60\ \frac{min}{hr})\ (\frac{lb}{7000\ grains})$$

A-6 Calibration Sheets

POST METER CALIBRATION FORM

DATE June 9, 1983

BOX NO. 1A

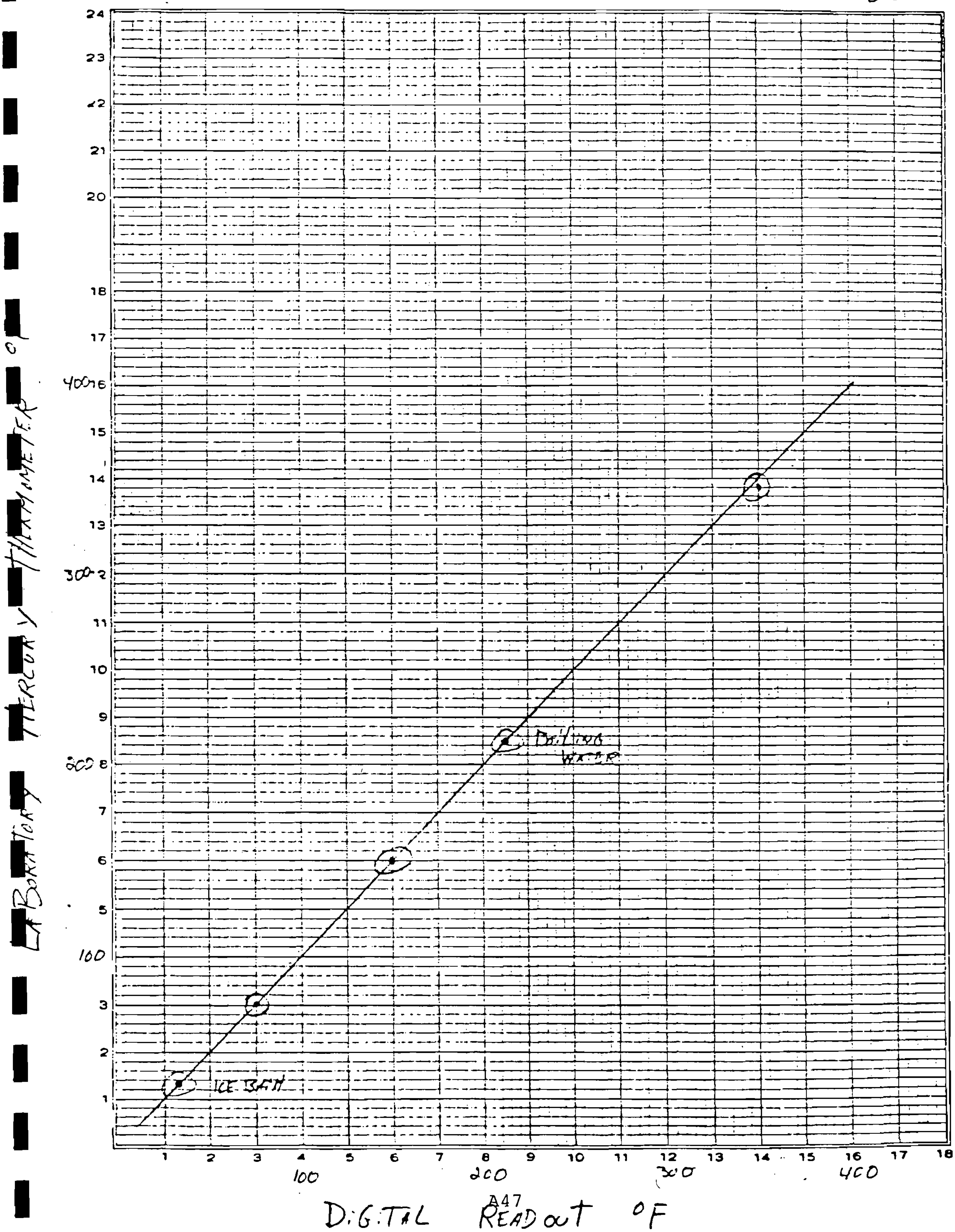
Barometric Pressure 29.96 inches Hg

VAC	ΔHD	Gas Volume, Wet Gas Meter			Gas Volume, Dry Gas Meter			Temp. of Wet Meter	Temp. of Dry Meter	Time Min.
		Initial	Final	Actual ft^3	Initial	Final	Actual ft^3			
5"	2.0	0.00	10.002	10.002	92.455	102.663	10.208	78	84	
5"	2.0	0.00	10.001	10.001	102.663	112.899	10.236	78	85	
5"	2.0	0.00	10.004	10.004	112.899	123.115	10.216	78	86	

$Y_1 = 0.986$ $Y_2 = 0.985$ $Y_3 = 0.989$

Mean = 0.987

#1 PYROMETER & THERMOCOUPLE CALIBRATION
2-22-83



TYPE S PITOT TUBE
SPECIFICATIONS AND ALIGNMENT

Pitot Tube Number 12

Baseline Coefficient, C_p .84

Pitot Tube Dimensions (Fig. 2-2 and 2-3)

P_a .504 D_t .375 W_s .02"

P_b .503 Z_s .06"

a1 0° B1 1°

a2 1° B2 2°

Pitot Tube-Sample Probe Type Button Hook

(Figure 2-6, 2-7, 2-8 and attached form)

X 1/2"

D_n

Z_p 2"

W_p —

Y 4.2"

CALIBRATED BY: Scott McKee 3/16/83

Subscript s: Type S Pitot Tube Dimension Reference.

Subscript p: Sample Probe-Pitot Tube Dimension Reference.

METER CALIBRATION FORM

DATE July 9, 1982

BOX NO. 1A

Barometric Pressure 30.04 inches Hg

ΔHW	ΔHD	GAS VOLUME, WET GAS METER			GAS VOLUME, DRY GAS METER			TEMP. OF WET METER	TEMP. OF DRY METER	TIME MIN.
		INITIAL	FINAL	ACTUAL FT^3	INITIAL	FINAL	ACTUAL FT^3			
	0.5	0.000	4.972	4.972	57.385	62.438	5.053	542	548.8	13.0
	1.0	0.000	4.897	4.897	52.225	57.227	5.002	542	548.8	9.22
	2.0	0.000	4.966	4.966	41.707	46.705	4.998	542	545.5	6.68
	3.0	0.000	5.000	5.000	46.915	51.932	5.017	542	547.8	5.50
	4.0	0.000	10.076	10.006	62.715	72.740	10.025	542	551.3	9.63

$Y_1 = 0.996$ $Y_2 = 0.989$ $Y_3 = 0.995$ $Y_4 = 1.000$ $Y_5 = 1.005$

$\Delta H_1 = 1.93$ $\Delta H_2 = 2.00$ $\Delta H_3 = 2.06$ $\Delta H_4 = 2.05$ $\Delta H_5 = 2.08$

Y MEAN = 0.997 Δ H MEAN = 2.02

A-7 Visible Emissions Field Sheets

Tel. (904) 3553701
103-7 STOCKTON STREET
P. O. BOX 52329
JACKSONVILLE, FLORIDA 32201

TSI

TECHNICAL SERVICES, INC.

VISIBLE EMISSIONS FIELD DATA SHEET

Company Name Iron Bridge
Source West scrubber

Date May 27, 1983
Time 16:30 – 17:30

Wind Direction and Speed WSW 0-5
Observer's Signature Walter H. Gordon

sec. / min.	0	15	30	45
0	5	0	0	0
1	0	0	5	0
2	0	5	5	0
3	0	0	0	0
4	0	0	0	5
5	0	0	0	0
6	5	0	0	0
7	5	5	0	0
8	0	0	0	0
9	0	0	5	0
10	0	0	0	0
11	5	0	5	0
12	0	0	0	0
13	0	0	0	0
14	0	0	5	0
15	0	0	0	0
16	0	0	0	5
17	0	0	5	0
18	5	0	0	0
19	5	0	0	0
20	0	0	0	0
21	0	0	5	0
22	0	0	5	5
23	0	5	0	0
24	0	0	0	0
25	5	0	5	0
26	5	5	0	0
27	0	0	0	0
28	0	0	5	0
29	0	0	0	0

sec. / min.	0	15	30	45
30	0	0	5	0
31	0	0	0	0
32	5	0	0	0
33	0	0	5	0
34	5	0	0	0
35	0	0	5	0
36	0	0	0	0
37	0	5	0	5
38	0	5	5	0
39	0	0	5	0
40	0	0	0	0
41	0	0	0	0
42	5	5	0	0
43	0	0	0	5
44	0	0	5	0
45	5	5	0	0
46	0	0	0	0
47	0	0	0	5
48	0	0	5	0
49	0	0	0	0
50	0	5	0	0
51	5	5	0	5
52	0	0	0	5
53	0	0	0	0
54	0	0	0	5
55	0	0	5	0
56	0	0	5	0
57	5	0	0	5
58	0	0	0	0
59	0	5	0	5

Height of Stack: 54'
Distance to Stack: 80'
Color of Plume: Brown/white
Condensed water: Yes No
Point of Opacity Reading:
point of steam dissipation

Background Description:
Mostly blue sky

Opacity = Sum of nos. recorded / Total nos. readings

N
W E
S

= 270/240 = 1.13

Sun ⊗ observer ⊗ Stack

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

THIS IS TO CERTIFY THAT Walter Gordon has completed the STATE OF FLORIDA visible emissions evaluation training and is a qualified observer of visible emissions as specified by EPA reference method 9.
This certificate expires on Sept. 15, 1983

Judi Sears — Certification Officer
Walter H. Gordon — Bearer's Signature

DER Form PERM 5-9 (Jun 79)

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Tel. (904) 353-5761
1037 STOCKTON STREET
P. O. BOX 52329
JACKSONVILLE, FLORIDA 32201

TSI TECHNICAL SERVICES, INC.

VISIBLE EMISSIONS FIELD DATA SHEET

Company Name Iron Bridge
Source East Scrubber

Date May 26, 1983
Time 15:38 – 16:38

Wind Direction and Speed W 5-10
Observer's Signature Walter H Gordon

min. \ sec.	0	15	30	45
0	5	0	0	0
1	0	0	5	0
2	0	5	5	0
3	0	0	0	0
4	0	0	0	5
5	0	0	0	0
6	5	0	0	0
7	0	5	0	0
8	0	0	0	0
9	0	0	5	0
10	0	0	0	0
11	5	0	5	0
12	0	0	0	0
13	0	0	0	0
14	0	0	5	0
15	0	0	0	0
16	0	0	0	5
17	0	0	5	0
18	5	0	0	0
19	5	0	0	0
20	0	0	0	0
21	0	0	5	0
22	0	0	5	5
23	0	5	0	0
24	0	0	0	0
25	5	0	5	0
26	5	5	0	0
27	0	0	0	0
28	0	0	5	0
29	0	0	0	0

min. \ sec.	0	15	30	45
30	0	0	5	0
31	0	0	0	0
32	5	0	0	0
33	0	0	5	0
34	5	0	0	0
35	0	0	5	0
36	0	0	0	0
37	0	5	0	5
38	0	5	5	0
39	0	0	5	0
40	0	0	0	0
41	0	0	0	0
42	5	5	0	0
43	0	0	0	5
44	0	0	5	0
45	5	5	0	0
46	0	0	0	0
47	0	0	0	5
48	0	0	5	0
49	0	0	0	0
50	0	5	0	0
51	5	5	0	5
52	0	0	0	5
53	0	0	0	0
54	0	0	0	5
55	0	0	5	0
56	0	0	5	0
57	5	0	0	5
58	0	0	0	0
59	0	5	0	5

Height of Stack: 54'
Distance to Stack: 20
Color of Plume: Brown/White
Condensed water: Yes / No
Point of Opacity Reading:

Point of dissipation

Background Description:

Blue Sky

Opacity = Sum of nos. recorded / Total nos. readings

N
W E
S

= 270/240 = 1.13

Sun Observer Stack

A52

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

THIS IS TO CERTIFY THAT Walter Gordon has completed the STATE OF FLORIDA visible emissions evaluation training and is a qualified observer of visible emissions as specified by EPA reference method 9.
This certificate expires on Sept. 15, 1983

Judie Sears — Certification Officer
Walter H Gordon — Bearer's Signature

DER Form PERM 5-9 (Jun 79)

Tel. (904) 353-5761
103-7 STOCKTON STREET
P. O. BOX 52329
JACKSONVILLE, FLORIDA 32201

TSI

TECHNICAL SERVICES, INC.

VISIBLE EMISSIONS FIELD DATA SHEET

Company Name Iron Bridge Sewage Treatment Date May 24, 1983

Source West scrubber Time 17:30 — 18:30

Wind Direction and Speed SSW 0-5

Observer's Signature Walter H. Gordon

min. \ sec.	0	15	30	45
0	0	5	5	0
1	0	0	0	0
2	0	0	5	0
3	0	0	0	0
4	5	0	0	0
5	0	0	0	5
6	0	0	0	0
7	0	0	5	0
8	0	0	5	5
9	5	0	0	0
10	0	5	5	5
11	5	5	0	0
12	0	0	0	5
13	0	0	5	5
14	0	0	5	0
15	5	0	0	0
16	0	0	0	0
17	0	5	0	5
18	5	0	0	0
19	0	5	5	0
20	5	5	0	5
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	5	0	0
25	0	5	5	0
26	5	5	0	0
27	5	0	5	5
28	5	0	5	5
29	5	0	0	5
30	5	0	0	0
31	0	5	5	0
32	0	5	0	5
33	0	5	0	5
34	5	0	0	0
35	0	5	5	0
36	0	0	0	5
37	0	0	0	5
38	5	5	0	5
39	0	0	5	0
40	0	0	0	0
41	0	5	0	0
42	0	0	0	5
43	5	5	0	0
44	5	0	0	5
45	5	0	0	0
46	0	5	5	0
47	0	0	0	0
48	5	0	5	0
49	5	5	0	5
50	5	5	0	5
51	0	0	5	5
52	5	0	0	5
53	5	0	5	5
54	5	0	0	5
55	5	0	0	5
56	0	5	0	0
57	5	5	0	5
58	5	0	5	0
59	5	5	0	5

Height of Stack: 54'

Distance to Stack: 80'

Color of Plume: Brown/white

Condensed water: Yes No

Point of Opacity Reading:
point of steam dissipation

Background Description:
Mostly blue sky

Opacity = Sum of nos. recorded / Total nos. readings

= 465/240 = 1.94

N
W E
S

SUN ⊗ observer ⊗ STACK ⊗

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

THIS IS TO CERTIFY THAT Walter Gordon has completed the STATE OF FLORIDA visible emissions evaluation training and is a qualified observer of visible emissions as specified by EPA reference method 9.
This certificate expires on Sept. 15, 1983

Judi Sears — Certification Officer
Walter H. Gordon — Bearer's Signature

DER Form PERM 5-9 (Jun 79)

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A-8 Mercury Data Summary Sheets

MERCURY DATA SUMMARY SHEETS

Iron Bridge RWPCF
Sludge Dryers
Mercury (Hg) Emissions

25 June 1983
TSI to Cross/Tessitore

UNIT	WEST	WEST	WEST
Date	5/24/83	5/24/83	5/24/83
Run Number	1	2	3
Total Mercury (Hg)	.0460 mg	.0671 mg	.0364 mg
Hg Gr/SCF	18.93 E-6	26.89 E-6	15.13 E-6
Hg Emissions lb/hr	.003117	.004636	.002546
Unit	WEST	WEST	WEST
Date	5/27/83	5/27/83	5/27/83
Run Number	1	2	3
Total Mercury (Hg)	.0140 mg	.0066 mg	.0119 mg
Hg Gr/SCF	5.40 E-6	2.56 E-6	4.72 E-6
Hg Emissions lb/hr	.000976	.000448	.000842
Unit	EAST	EAST	EAST
Date	5/26/83	5/26/83	5/26/83
Run Number	1	2	3
Total Mercury (Hg)	.0138 mg	.0097 mg	.0122 mg
Hg Gr/SCF	5.49 E-6	3.89 E-6	4.85 E-6
Hg Emissions lb/hr	.001005	.000698	.000861

Note: Total Mercury includes that found in the prefilter, on the filter and in the impingers.

APPENDIX B

Topic 4.0 "Odor Panel Testing and Air Dispersion Modeling

B-1 Odor Threshold and Odor Unit Calculations, West Stack (May 25, 1983)

Odor Threshold and Odor Unit Calculations

Iron Bridge Dryer, West Stack (May 25, 1983)

Threshold (%)*	Log[Threshold]
5.00	0.699
6.00	0.778
2.50	0.398
8.00	0.903
0.31	-0.509
10.00	1.000
10.00	1.000
5.00	0.699
2.50	0.398
1.25	0.097
20.00	1.301
10.00	1.000
	7.764

Geometric Mean of Threshold = 4.436%

Odor Dilution Ratio (z) = $\frac{1}{0.04436}$ = 22.54

*Percent stack gases in syringe at which panelist accurately and consistently perceived odor.

B-2 Odor Threshold and Odor Unit

Calculations, East Stack (May 27, 1983)

Odor Threshold and Odor Unit Calculations

Iron Bridge Dryer, East Stack (May 27, 1983)

Threshold (%)*	Log[Threshold]
5.00	0.699
0.15	-0.824
5.00	0.699
1.25	0.097
1.25	0.097
5.00	0.699
1.25	0.097
0.63	-0.201
0.63	-0.201
0.31	-0.509
0.63	-0.201
5.00	0.699
1.25	0.097
	1.248

Geometric Mean of Threshold = 1.247%

$$\text{Odor Dilution Ratio } (z) = \frac{1}{0.01247} = 80.17$$

*Percent stack gases in syringe at which panelist accurately and consistently perceived odor.

B-3 Calculation of Odor Emission Rates

Calculation of Odor Emission Rates

West Stack

Q (Measured) = 25098 ACFM @ 127°F

$$Q\ (STD) = (25098)\frac{(68 + 460)}{(127 + 460)} = 22{,}575\ SCFM$$

$$= 639.7\ (M^3/min)\ @\ 68°F$$

$$\text{Odorous Emissions Rate} = z \times Q\ \left(\frac{M^3}{min}\right)$$

$$= (22.54)(639.7)\ \frac{M^3}{min}\ \frac{min}{(60)\,sec} = 240.3\ \left(\frac{M^3}{sec}\right)$$

East Stack

Q (Measured) = 25800 ACFM @ 109°F

$$Q\ (STD) = (25800)\ \frac{(68 + 460)}{(109 + 460)} = 23{,}941\ SCFM$$

$$= 678.4\ \left(\frac{M^3}{min}\right)\ @\ 68°F$$

$$\text{Odorous Emissions Rate} = (80.17)\ \frac{(678.4)}{(60)} = 906.5\ \left(\frac{M^3}{sec}\right)$$

B-4 Computer Printouts PTPLU

East Stack and PTPLU West Stack

Iron Bridge 6-9-8?
East Stack

```
1 PTPLU VERSION 80021, TOM PIERCE AND BRUCE TURNER : ENVIRONMENTAL OPERATIONS BRANCH
 IRON BRIDGE
0 OPTIONS    1=YES USE THE OPTION    0=NO DO NOT USE THE OPTION
 IOPT(1) = 0 (COMPUTE GRADUAL PLUME RISE)          AMBIENT AIR TEMP = 293.00(DEG,K)
 IOPT(2) = 0 (COMPUTE STACK DOWNWASH)              WIND EXPONENTS =  .10   .15   .20   .25   .30   .30
 IOPT(3) = 0 (COMPUTE INITIAL PLUME SIZE)          ANEMOMETER HT =   7.00 (METERS)
           IF =1 USE PASQUILLS RECOMMENDATION
0                                  SOURCE PARAMETERS
 EMISSION RATE =    895.60(G/SEC)                  PHYSICAL STACK HEIGHT =     15.30(METERS)
 STACK TEMP =  316.00(DEG,K)                       STACK EXIT VELOCITY =     9.36(M/SEC)
 STACK DIAM =    1.28(METERS)                      VOLUME FLOW =    12.04(CU M/SEC)
 MIXING HT =  1500.0(METERS)                       RECEPTOR HT =     0.00(METERS)
```

ANALYSIS OF CONCENTRATION AS A FUNCTION OF STABILITY AND WIND SPEED

					****EXTRAPOLATED WINDS****			
STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
1	.50	3.0150E-02	.448	106.5	.54	3.0840E-02	.431	99.6
1	.80	3.4721E-02	.340	72.3	.87	3.5477E-02	.326	68.0
1	1.00	3.6753E-02	.301	60.9	1.08	3.7536E-02	.283	57.5
1	1.50	4.0305E-02	.229	45.7	1.62	4.0866E-02	.219	43.4
1	2.00	4.1916E-02	.193	38.1	2.16	4.2148E-02	.185	36.4
1	2.50	4.2278E-02	.172	33.5	2.70	4.2183E-02	.166	32.2
1	3.00	4.1877E-02	.158	30.5	3.24	4.1513E-02	.152	29.4

0

					****EXTRAPOLATED WINDS****			
STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
2	.50	2.4616E-02	.744	106.5	.56	2.6235E-02	.679	96.4
2	.80	3.1117E-02	.522	72.3	.90	3.2676E-02	.480	66.0
2	1.00	3.4022E-02	.446	60.9	1.12	3.5419E-02	.412	55.8
2	1.50	3.8933E-02	.329	45.7	1.69	4.0095E-02	.304	42.3
2	2.00	4.1395E-02	.273	38.1	2.25	4.1989E-02	.255	35.6
2	2.50	4.2298E-02	.240	33.5	2.81	4.2380E-02	.225	31.5
2	3.00	4.2305E-02	.218	30.5	3.37	4.1955E-02	.206	28.8
2	4.00	4.1089E-02	.187	26.7	4.50	4.0203E-02	.178	25.4
2	5.00	3.9201E-02	.170	24.4	5.62	3.7891E-02	.162	23.4

0

					****EXTRAPOLATED WINDS****			
STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
3	2.00	4.2811E-02	.408	38.1	2.34	4.3896E-02	.369	34.8
3	2.50	4.4206E-02	.355	33.5	2.92	4.4554E-02	.324	30.9
3	3.00	4.4560E-02	.320	30.5	3.51	4.4277E-02	.295	28.3
3	4.00	4.3630E-02	.276	26.7	4.68	4.2404E-02	.258	25.0
3	5.00	4.1742E-02	.251	24.4	5.85	3.9907E-02	.236	23.1
3	7.00	3.7385E-02	.221	21.8	8.18	3.4936E-02	.211	20.9
3	10.00	3.1590E-02	.200	19.9	11.69	2.8912E-02	.193	19.2
3	12.00	2.8468E-02	.191	19.1	14.03	2.5817E-02	.185	18.5
3	15.00	2.4708E-02	.183	18.3	17.54	2.2186E-02	.178	17.9

0

					****EXTRAPOLATED WINDS****			
STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
4	.50	1.2498E-02	3.180	106.5	.61	1.5338E-02	2.521	90.3
4	.80	1.9905E-02	1.783	72.3	.97	2.3547E-02	1.409	62.2
4	1.00	2.4082E-02	1.364	60.9	1.22	2.7946E-02	1.092	52.8
4	1.50	3.1589E-02	.971	45.7	1.82	3.3937E-02	.831	40.3
4	2.00	3.4876E-02	.776	38.1	2.43	3.6427E-02	.675	34.0
4	2.50	3.6593E-02	.662	33.5	3.04	3.7358E-02	.584	30.3
4	3.00	3.7330E-02	.589	30.5	3.65	3.7398E-02	.525	27.8
4	4.00	3.7170E-02	.500	26.7	4.86	3.6162E-02	.453	24.7
4	5.00	3.5966E-02	.447	24.4	6.08	3.4238E-02	.411	22.8
4	7.00	3.2676E-02	.389	21.8	8.51	3.0185E-02	.364	20.7
4	10.00	2.7942E-02	.347	19.9	12.16	2.5115E-02	.329	19.0
4	12.00	2.5306E-02	.330	19.1	14.59	2.2473E-02	.316	18.4
4	15.00	2.2077E-02	.314	18.3	18.24	1.9352E-02	.303	17.8
4	20.00	1.8122E-02	.300	17.6	24.32	1.5642E-02	.297	17.2

0

					****EXTRAPOLATED WINDS****			
STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
5	2.00	1.5954E-02	1.762	48.3	2.53	1.4352E-02	1.620	45.8
5	2.50	1.4427E-02	1.627	45.9	3.16	1.2938E-02	1.499	43.6
5	3.00	1.3259E-02	1.526	44.1	3.79	1.1860E-02	1.409	42.0
5	4.00	1.1558E-02	1.384	41.5	5.06	1.0295E-02	1.281	39.5
5	5.00	1.0354E-02	1.285	39.6	6.32	9.1918E-03	1.192	37.8

0

					****EXTRAPOLATED WINDS****			
STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
6	2.00	1.6481E-02	2.838	42.7	2.53	1.4867E-02	2.591	40.6
6	2.50	1.4943E-02	2.602	40.7	3.16	1.3432E-02	2.381	38.8
6	3.00	1.3760E-02	2.428	39.2	3.79	1.2332E-02	2.227	37.4
6	4.00	1.2023E-02	2.184	37.0	5.06	1.0724E-02	2.010	35.4
6	5.00	1.0785E-02	2.018	35.5	6.32	9.5461E-03	2.000	34.0

0 (1) NO COMPUTATION WAS ATTEMPTED AS THE DISTANCE TO THE POINT OF MAXIMUM CONCENTRATION IS SO GREAT THAT THE SAME STABILITY IS NOT LIKELY TO PERSIST LONG ENOUGH FOR THE PLUME TO TRAVEL THIS FAR.

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

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

LINES 91

0?

1 PTPLU VERSION 80021, TOM PIERCE AND BRUCE TURNER : ENVIRONMENTAL OPERATIONS BRANCH

Iron Bridge 6-9-83

West Stack

IRON BRIDGE

0 OPTIONS 1=YES USE THE OPTION 0=NO DO NOT USE THE OPTION

IOPT(1) = 0 (COMPUTE GRADUAL PLUME RISE)

IOPT(2) = 0 (COMPUTE STACK DOWNWASH)

IOPT(3) = 0 (COMPUTE INITIAL PLUME SIZE)

IF =1 USE PASQUILLS RECOMMENDATION

AMBIENT AIR TEMP = 293.00(DEG.K)

WIND EXPONENTS = .10 .15 .20 .25 .30 .30

ANEMOMETER HT = 7.00 (METERS)

0 SOURCE PARAMETERS

EMISSION RATE = 237.50(G/SEC)

STACK TEMP = 326.00(DEG.K)

STACK DIAM = 1.28(METERS)

MIXING HT = 1500.0(METERS)

PHYSICAL STACK HEIGHT = 15.30(METERS)

STACK EXIT VELOCITY = 9.10(M/SEC)

VOLUME FLOW = 11.71(CU M/SEC)

RECEPTOR HT = 0.00(METERS)

ANALYSIS OF CONCENTRATION AS A FUNCTION OF STABILITY AND WIND SPEED

0

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	****EXTRAPOLATED WINDS**** WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
1	.50	5.9488E-03	.509	129.6	.54	6.0907E-03	.482	121.0
1	.80	6.8370E-03	.387	86.7	.87	7.0180E-03	.370	81.4
1	1.00	7.3364E-03	.341	72.5	1.08	7.4968E-03	.326	68.2
1	1.50	8.1284E-03	.267	53.4	1.62	8.2586E-03	.255	50.5
1	2.00	8.6189E-03	.221	43.9	2.16	8.7219E-03	.211	41.7
1	2.50	8.8623E-03	.194	38.2	2.70	8.9123E-03	.186	36.4
1	3.00	8.9419E-03	.176	34.4	3.24	8.9355E-03	.169	32.9

0

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	****EXTRAPOLATED WINDS**** WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
2	.50	4.5660E-03	.890	129.6	.56	4.8935E-03	.810	117.0
2	.80	5.9208E-03	.617	86.7	.90	6.2655E-03	.565	78.8
2	1.00	6.5720E-03	.523	72.5	1.12	6.9020E-03	.481	66.1
2	1.50	7.6540E-03	.385	53.4	1.69	7.9699E-03	.354	49.2
2	2.00	8.3677E-03	.316	43.9	2.25	8.5905E-03	.292	40.7
2	2.50	8.7504E-03	.274	38.2	2.81	8.8775E-03	.255	35.6
2	3.00	8.9241E-03	.246	34.4	3.37	8.9632E-03	.231	32.2
2	4.00	8.9155E-03	.211	29.6	4.50	8.8151E-03	.197	28.0
2	5.00	8.6941E-03	.187	26.7	5.62	8.5082E-03	.178	25.5

0

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	****EXTRAPOLATED WINDS**** WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
3	2.00	8.5541E-03	.476	43.9	2.34	8.9193E-03	.427	39.7
3	2.50	9.0483E-03	.409	38.2	2.92	9.2798E-03	.370	34.9
3	3.00	9.3080E-03	.364	34.4	3.51	9.4134E-03	.332	31.6
3	4.00	9.4139E-03	.309	29.6	4.68	9.3096E-03	.286	27.5
3	5.00	9.2313E-03	.277	26.7	5.85	8.9740E-03	.258	25.1
3	7.00	8.5626E-03	.240	23.5	8.18	8.1228E-03	.227	22.3
3	10.00	7.4772E-03	.213	21.0	11.69	6.9314E-03	.203	20.2
3	12.00	6.8388E-03	.202	20.1	14.03	6.2738E-03	.195	19.4
3	15.00	6.0319E-03	.192	19.1	17.54	5.4710E-03	.186	18.6

0

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	****EXTRAPOLATED WINDS**** WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
4	.50	2.0310E-03	4.409	129.6	.61	2.5521E-03	3.322	109.3
4	.80	3.4024E-03	2.369	86.7	.97	4.0941E-03	1.852	74.1
4	1.00	4.1979E-03	1.789	72.5	1.22	4.9671E-03	1.414	62.3
4	1.50	5.8413E-03	1.112	53.4	1.82	6.5948E-03	.996	46.6
4	2.00	6.8465E-03	.924	43.9	2.43	7.3124E-03	.794	38.8
4	2.50	7.3695E-03	.777	38.2	3.04	7.6997E-03	.676	34.1
4	3.00	7.6818E-03	.683	34.4	3.65	7.8779E-03	.600	31.0
4	4.00	7.9165E-03	.568	29.6	4.86	7.8809E-03	.508	27.1
4	5.00	7.8632E-03	.501	26.7	6.08	7.6524E-03	.454	24.7
4	7.00	7.4149E-03	.426	23.5	8.51	6.9867E-03	.394	22.0
4	10.00	6.5663E-03	.372	21.0	12.16	6.0019E-03	.350	20.0
4	12.00	6.0412E-03	.351	20.1	14.59	5.4467E-03	.333	19.2
4	15.00	5.3616E-03	.331	19.1	18.24	4.7622E-03	.316	18.4
4	20.00	4.4849E-03	.310	18.2	24.32	3.9186E-03	.300	17.7

0

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	****EXTRAPOLATED WINDS**** WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
5	2.00	3.5687E-03	1.970	51.8	2.53	3.2233E-03	1.806	49.0
5	2.50	3.2396E-03	1.814	49.2	3.16	2.9173E-03	1.666	46.6
5	3.00	2.9870E-03	1.698	47.2	3.79	2.6831E-03	1.562	44.8
5	4.00	2.6175E-03	1.534	44.3	5.06	2.3417E-03	1.415	42.1
5	5.00	2.3546E-03	1.421	42.2	6.32	2.0997E-03	1.314	40.2

0

STABILITY	WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)	****EXTRAPOLATED WINDS**** WIND SPEED (M/SEC)	MAX CONC (G/CU M)	DIST OF MAX (KM)	PLUME RISE (M)
6	2.00	3.6578E-03	3.000	45.6	2.53	3.3267E-03	2.915	43.3
6	2.50	3.3430E-03	2.928	43.4	3.16	3.0194E-03	2.670	41.3
6	3.00	3.0897E-03	2.725	41.7	3.79	2.7826E-03	2.490	39.8
6	4.00	2.7160E-03	2.441	39.3	5.06	2.4347E-03	2.238	37.5
6	5.00	2.4479E-03	2.247	37.6	6.32	2.1863E-03	2.066	35.9

0 (1) NO COMPUTATION WAS ATTEMPTED AS THE DISTANCE TO THE POINT OF MAXIMUM CONCENTRATION IS SO GREAT THAT THE SAME STABILITY IS NOT LIKELY TO PERSIST LONG ENOUGH FOR THE PLUME TO TRAVEL THIS FAR.

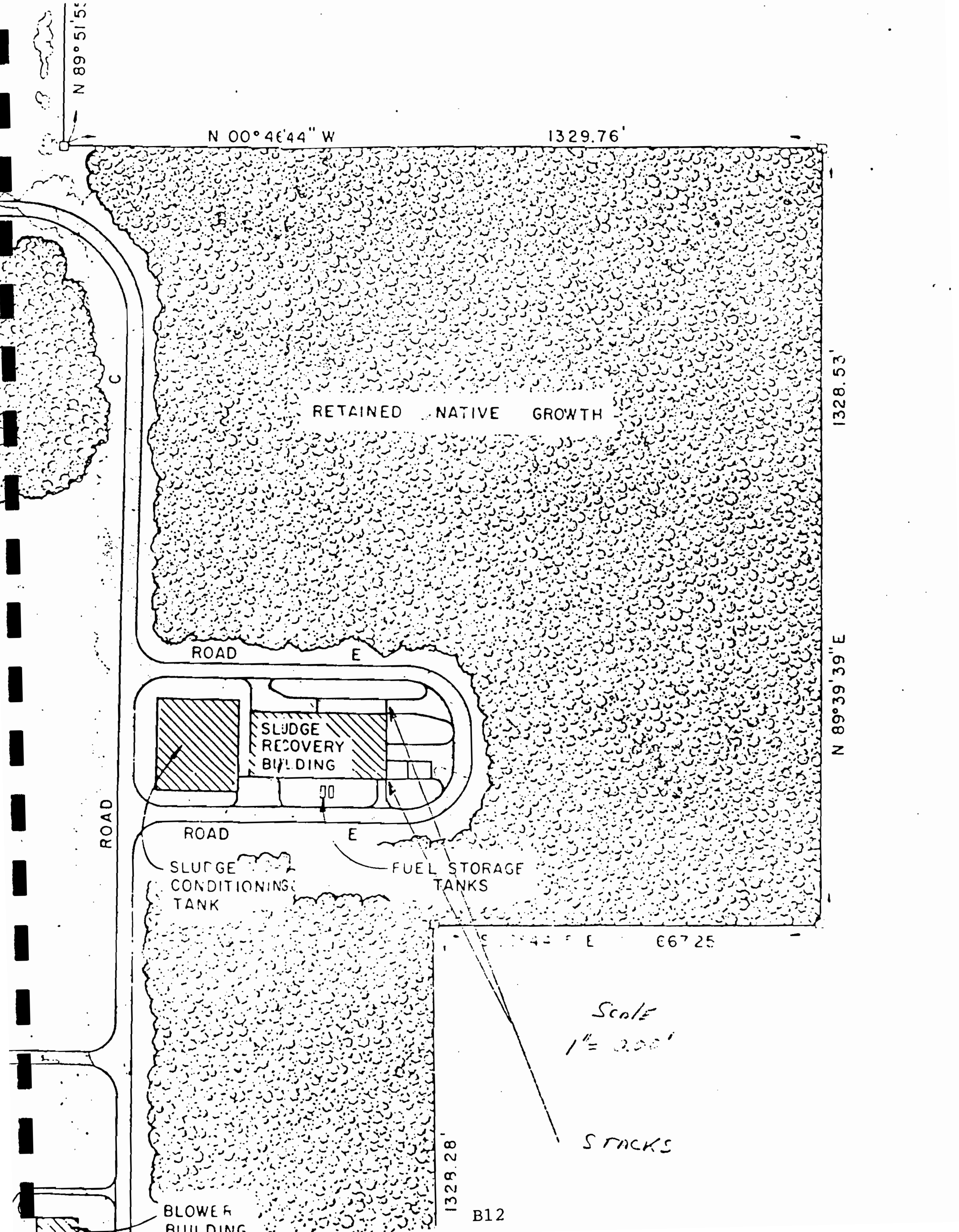
0 (2) THE PLUME IS OF SUFFICIENT HEIGHT THAT EXTREME CAUTION SHOULD BE USED IN INTERPRETING THIS COMPUTATION AS THIS STABILITY TYPE MAY NOT EXIST TO THIS HEIGHT. ALSO WIND SPEED VARIATIONS WITH HEIGHT MAY EXERT A DOMINATING INFLUENCE.

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

LINES 91

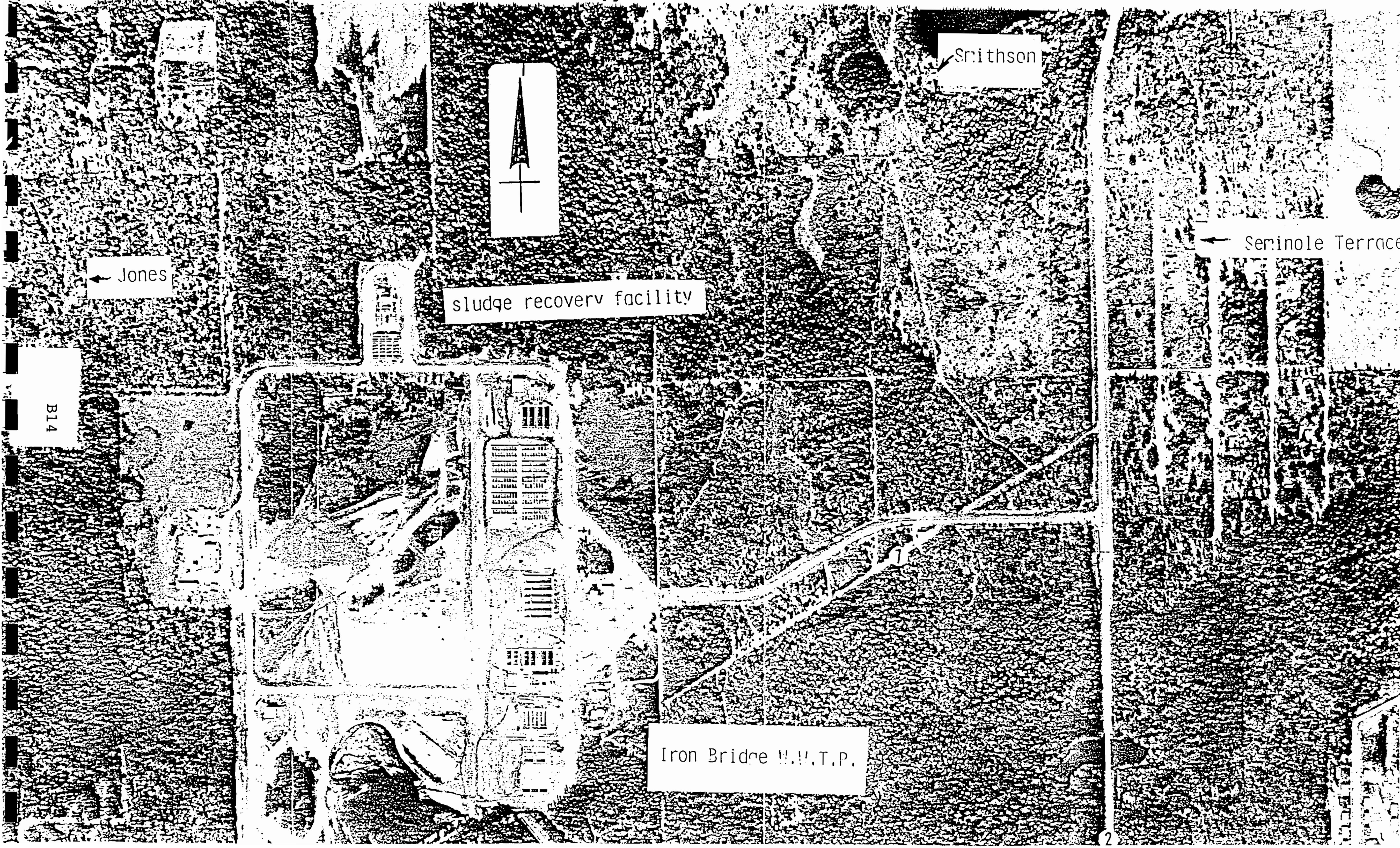
0?

B-5 Sketch of stack location in facility


N 89° 51' 5
N 00° 46' 44" W
1329.76'
1328.53'
N 89°39'39" E
RETAINED NATIVE GROWTH
ROAD
C
ROAD E
SLUDGE RECOVERY BUILDING
ROAD E
SLUDGE CONDITIONING TANK
FUEL STORAGE TANKS
Scale
STACKS
1328.28'
BLOWER BUILDING

B-6 Sketch depicting location of facility in region

Best Available Copy



B14

B-7 Odor Panel Introduction Letter

ODOR PANEL. Monday, May 23, 1983. Quality Inn-University,
11731 E. Colonial Avenue
(corner Alifiya Trail)

Come any time between 1pm and 5pm -- whatever works best with your schedule. Go to desk in lobby and ask for odor panel. You will be directed to correct room.

Do not eat, drink, chew gum or smoke from at least 30 minutes before reporting to the motel. Wear no make-up, lipstick, moisturizer, perfume, sun tan lotion, after shave lotion, or anything that would interfere with your sense of smell. This is very important in qualifying.

The payment for coming to qualify is $15. It does not take a long period of time. The payment for serving on the odor panel, if selected, is $25. The panel will be Wednesday or Friday.

If you have any questions, call 851-1484 and ask for Mickey or Joe. Either one can answer your questions.

In non-office hours, call Mickey at 277-9687 or Joe at 299-9251.

APPENDIX C

Topic 5.0 "System Operating Parameters"

C-1 Other Measured-Calculated Data (Howard E. Hesketh, Ph.D., P.E.)

C-2 Check on Packed Tower Recycle Liquid Flow Using Orifice (Howard E. Hesketh, Ph.D., P.E.)

C-3 Notes of Howard E. Hesketh, Ph.D., P.E.

C-1 Other Measured-Calculated Data

Other Measured-Calculated Data with Conditions:

Gas Composition

Dry Gas Analysis - approximate stack orsat measurements:

1.5% CO_2

19.5% O_2

79.0% N_2

Exhaust Gas Analysis- (from dryer and to scrubber) based on dry gas analysis and wet/dry bulb temperatures:

13.6% H_2O

1.3% CO_2

16.9% O_2

68.2% N_2

molecular weight of 27.4

Stack Gas Analysis - based on dry gas and assumed saturation at 126°F "same as exhaust gas"

Gas Volumetric Flow Rate

Stack Gas - assume 25,000 acfm at 126°F based on preliminary velocity data (use stack test data for actual values)

Packed Tower Volume

9ft. diameter X 8ft. packing = $509 ft^3$

Packed Tower Gas Residence Time

$$\frac{509}{25,000}(60) = 1.2 \text{ sec}$$

Packed Tower Recycle Liquid Volume

Assume 1750 gallon liquid based on tank size, liquid level and tower liquid holdup.

Packed Tower Recycle Holdup Time

$$\frac{1750}{150;\ 230;\ 235\text{gpm}} = 11.7,\ 7.6,\ 7.5 \text{ min respectively}$$

C-2 Check on Packed Tower Recycle Liquid Flow Using Orifice

Check on Packed Tower Recycle Liquid Flow Using Orifice

Calculation: ΔP across orifice = 3psig = 6.11"Hg

Orifice dia = d_o = 2.613"

Pipe dia = d_1 = 4"

$$\frac{d_o}{d_1} = 0.65$$

Orifice area = S_o = 5.3625 in^2

Pipe area = S_1 = 12.5664 in^2

$$\frac{S_o}{S_1} = 0.4267$$

Assume liquid density = P = 62.4 lb/ft^3

Use orifice coeff. = C_o = 0.61

$$Hv = \frac{(6.11)(13.6)}{(12)} = 6.925 \text{ ft } H_2O$$

$$\text{Approx. Orifice velocity} = U_o = \frac{(0.61)\sqrt{2\ (32.174)\ (6.925)}}{\sqrt{1-(0.4267)^2}}$$

$$= 14.24 \text{ ft/sec}$$

$$\text{Reynolds no} = \frac{2.613\ (14.24)\ 62.4}{12\ (6.72 \times 10^{-4})} = 2.90 \times 10^5$$

$\therefore C_o = 0.61$

$$\text{Water rate} = \left(\frac{14.24 \text{ ft}}{\text{Sec}}\right)\left(\frac{5.3625 \text{ ft}^2}{144}\right)\left(\frac{60 \text{sec}}{\text{min}}\right)\left(\frac{7.48 \text{gal}}{\text{ft}^3}\right) = 238 \text{ gpm}$$

Note: flow meter reading = 160 gpm

Conclusion: liquid meter flow is at least as high as indicated by these rough measurements, but more accurate readings would be desired.

C-3 Notes of Howard E. Hesketh, Ph.D., P.E.

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested West Date May 24, 83

PRODUCTION DATA (Sheet A- 1)

Time	Raw Feed	Dryer °F in	Dryer °F out	Fan Current Amps	Production Rate	Cyclone in ("H_2O)	Cyclone out ("H_2O)	Cyclone ΔP ("H_2O)		
11:30	~~X5~~ ~~229,870~~ ~~252,670~~									
11:30	@ pm 2202+60	850	180	158						
3:00		900	175	160						
3:30				163						
3:50		840	175							
4:15		800	175	160		-4¼	-9½	5¼	hopper plugged	
4:40		800	175	163		-4½	-9	4½		
~~[illegible]~~		~~820~~	~~175~~	~~160~~						

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested West Date 5/24/83

PRODUCTION DATA (Sheet A- 2)

Time	Raw Feed ~~IN~~ ~~OUT~~	Dryer °F IN OUT	Fan Current Amps	~~Production Rate~~ Combustion Blower, Amps	Cyclone, "H_2O in	out	ΔP		
5:30	~~780~~	780 172	163		-4¼	-9½	5¼		
6:10		780 [illegible]	165		~~4½~~				
6:40		830 175	165	8	-4½	-9½	5		
7:45		860 170	160	9	-4¼	-9¾	5½		
mean av		800 175	163	8½		-9½	5¼		

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested West Date May 24, 83

VENTURI SCRUBBER DATA (Sheet B- 1)

Time	Gas Inlet °F dry	Gas Inlet °F wet	ΔP "H_2O	~~Recycle~~ Liquid gpm	Liquid psig	Liquid °F	Liquid pH	Liquid Conc	Liquid Holdup, Min	Feed gpm	Bleed gpm	"P_1," "H_2O	P_2, "H_2O	Gas out, °F
			(mfg gauge shows 10") also = 10" at no operation											
@11:35						~~123~~								
3:00	173	138				~~124~~								
3:20	166	137	8½	205 ~~220~~	24	~~123~~			0			14	5½	122
3:50	145	137				~~123~~								
4:15			8½	205	~~24~~							14	5½	121
4:40	175	137	8¾									14	5¼	121

Gauge reads 9 psig @ no oper.

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested West Date 5/24/83

VENTURI SCRUBBER DATA (Sheet B- 2)

Time	Gas Inlet °F dry	Gas Inlet °F wet	ΔP "H_2O	~~Recycle~~ Liquid gpm	psig	°F	pH	Conc	Holdup, Min	Feed gpm	Bleed gpm	"P_1" "H_2O	"P_2" "H_2O	Gas Out °F
5:30	175	137	8 1/4"	220	24							14	5 3/4	121
6:00														
6:40	176	139	8 5/8	220	24							13 3/4	5 1/8	121
7:45	179	137	8"	220	24							13 3/4	5 3/4	119
~~initial mean~~ ss	175	137	8 1/2	215	15							14		121

$H = \frac{0.12 \text{ lb } H_2O}{\text{lb bda}}$

Dry Gas: $CO_2 = 1\frac{1}{2}\%$
$O_2 = 19\frac{1}{2}\%$
$\therefore N_2 = 79$

Wet Gas: $CO_2 =$
$O_2 =$
$N_2 =$
$H_2O = 68.2$

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested West Date May 24, 83

PACKED TOWER DATA (Sheet C- 1)

Time	Gas Out °F	Gas ~~Vel, ft/sec~~	Gas Holdup sec.	ΔP "H_2O	Recycle Liquid gpm	Recycle Liquid psig	Recycle Liquid °F	Recycle Liquid pH	ORP MV	ORP Conc ppm	Agit.	Holdup min.	Oxidant Feed gpm	Oxidant Feed conc	Acid/Base Feed gpm	Acid/Base Feed conc	Bleed gpm	P3 "H_2O	
11:35	120						123	6.7	720	~100									
														10%					
3:00		~23000			3 psi		124	6.8	90	150			~6 gal		~			0	
3:10	128			5½			123										12		
3:30							123											0	
3:50				~~2400~~				8.0	810								12		
4:15	122			5½				8.0	800									0	
4:40	126			5¼															

C11

at end ... drained ... 180 gpm ... 100 gpm OK!

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested West Date 5/24/83

PACKED TOWER DATA (Sheet C- 2)

Time	Gas Out °F	Gas Vel, ft/sec	Gas Holdup, sec.	ΔP "H_2O	Recycle Liquid gpm	Recycle Liquid psig	Recycle Liquid °F	Recycle Liquid pH	ORP MV	ORP Cond ppm Cl_2	Agit.	Holdup, min.	Oxidant Feed gpm	Oxidant Feed conc	Acid/Base Feed gpm	Acid/Base Feed conc	Bleed gpm	"P_3" in H_2O	tower discharge Cl_2 ppm
5:30	129			5 3/4	150	31	121	7.3	810	100								0	
6:00					150	32	121	7.6	810										
6:40				5 1/8	150	32	121	7.3	800	120							12	0	
7:45	123			5 3/4	150	32	120	7.2	820	110							← (@5 ppm 12	Cl_2 on	tower return)
corrected																			
mean av	124			5 1/2	150	21	122	7.0	810	100			4 gal/hr	10%		0.1 gal/hr	12		~~[illegible]~~ 20

C12

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested East Date May 26, 83

PRODUCTION DATA (Sheet A- 1)

Time	Raw Feed Primary	Raw Feed Secondary	Dryer °F in	Dryer °F out	Fan Current Amps	~~Production Rate~~ Combustion Blower Current, Amps	Cyclone, "H_2O in	Cyclone, "H_2O Out	Cyclone, "H_2O ΔP		
2:45P							-4½	-9¼	4¾	very little stack "rain" but some throughout entire test	
3:30	0	0	660	175	166	8½	-5	-9	~~4~~		
4:00	65	60	660	175	166	7½	-5	-9¼	4¼		
4:30	60	60	700	174	166	7½	-4½	-9½	5		
5:15	65	65	720	172	167	7½	-4¼	-9¼	5		
6:00	140	140	720	171	168	7½	-4½	-9¼	4¾		
6:45	140	115	730	170	168	7½	-4	-9¼	5¼		
orrected,											
average			700	172	166	7½		-9¼	4¾	"	

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested East Date May 26, 83

VENTURI SCRUBBER DATA (Sheet B- 1)

@ shutoff gauge reads 200 gpm

passing ok

0" I do not use this gauge

Time	Gas Inlet °F dry	Gas Inlet °F wet	ΔP "H_2O	~~Pressure~~ Liquid gpm	Liquid psig	Liquid °F	Liquid pH	Liquid Conc	Liquid Holdup, Mix	Feed gpm	Bleed gpm	"P_1" "H_2O	"P_2" "H_2O	Gas Out °F
2:45P	174	129	10 1/4	265	17							14 3/4	4 1/2	115
3:15	174	128	8 1/4	265	18							14 3/4	6 1/4	117
4:00	174	129	9 3/4	260	18							14 1/2	5 3/4	115
4:30	173	131	8 1/4	265	18							14 1/2	6	117
5:15	173	131	8 1/2	265	18							14 1/2	6	116
6:00	174	131	8	265	18							14 1/4	6 1/4	116
6:45	172	130	8 1/2	260	17							14 1/2	6	116
corrected														
mean av	174	129	8 1/2	245	18							14 1/2	~~6~~	116

H = 0.096

θ/0760 = 13.4

C14

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested East Date May 26, 83

PACKED TOWER DATA (Sheet C- 1)

Time	Gas Out °F	Gas Vel, ft/sec	Gas Holdup, sec.	ΔP "H_2O	Recycle Liquid gpm	psig (@ no flow vents 11 psi)	°F	pH	ORP MV ([illegible])	ORP Cond (ppm Cl_2)	Agit.	Holdup, min.	Oxidant Feed gpm	Oxidant Feed conc	Acid/Base Feed gpm	Acid/Base Feed conc	Bleed gpm	"P_3" "H_2O	ppm Cl_2 return from tower
2:45P	110			4½	230	37	111	6.9	670	65							20	0	65
3:15	106			6¼	230	37	111	6.9	660	48							10	0	25
[illegible]:00	109			5¾	230	37	113	7.0	670	45							[illegible]	0	15
4:30	106			6	230	37	114	6.9	650	45							[illegible]	0	16
5:15	110			6	230	27	114	6.9	670	65							10½	0	35
6:00	108			6¼	230	27	114	7.0	670	73							4½	0	35
6:45	108			6	230	27	114	7.0	670	same							7½	0	25
vented																			
on air	108			6	230	27	114	7.0	840	65							10		30

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested East Date 5/27/83

PRODUCTION DATA (Sheet A- 2)

Time	Raw Feed Primary	Raw Feed Secondary	Dryer °F in	Dryer °F out	Fan Current Amps	~~Production Rate~~ Combustion Blower Current, Amps	Cyclone, "H_2O in	Cyclone, "H_2O out	ΔP		
7:30 A	1	1	710	170	162	7	-5½	-10	4½		

C16

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested East Date 5/27/83

VENTURI SCRUBBER DATA (Sheet B- 2)

Time	Gas Inlet °F dry	Gas Inlet °F wet	ΔP "H_2O	Liquid gpm	Liquid psig	Liquid °F	Liquid pH	Liquid Conc	Liquid Holdup, Min	Feed gpm	Bleed gpm	"P_1" "H_2O	"P_2" "H_2O	Gas Out, °F
				reads 200 @ 0 flow										
7:30A	174	132	7 3/4	265	15							13	5 1/4	114
	H = .107													
	% H_2O = 14.7													

C17

BEST AVAILABLE COPY

Howard E. Hesketh, P.E. — Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested: East — Date: 5/27/83

PACKED TOWER DATA (Sheet C-2)

Time	Gas Out °F	Gas Vel, ft/sec	Gas Holdup, sec.	ΔP "H_2O	Recycle Liquid gpm	Recycle Liquid psig	Recycle Liquid °F	Recycle Liquid pH	ORP MV	ORP Conc ppm Cl_2	Agit.	Holdup, min.	Oxidant Feed gpm	Oxidant Feed conc	Acid/Base Feed gpm	Acid/Base Feed conc	Bleed gpm	"P_3" "H_2O	ppm Cl_2 return
									+ 140										
:30A				5 1/4	235	27	110	7.1	650									0	
7:50	113				235	27	110	7.4	620	40+							10	0	18
								7.3	640	60									20
								[illegible] =											
av								7.3	780	60							10		20

C18

BEST AVAILABLE COPY

Howard E. Hesketh, P.E.   Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested West   Date May 27, 1983

PRODUCTION DATA (Sheet A- 1)

Time	Raw Feed Primary	Raw Feed Secondary	Dryer °F in	Dryer °F out	Fan Current Amps	~~Production Rate~~ Combustion Blower Current, Amps	Cyclone, "H2O in	Cyclone, "H2O Out	ΔP	~~Dryer~~
2:05 P	0	0	680	170	170	9	-4 3/4	-10 1/4	5 1/2	Cold start up @ 1:28; fan current = 200 amp; dropped to 172 amp in 15 min (dryer out 755°F on my thermom.)
2:30	130	125	700	170	168	8	-5	-10 1/4	5 1/4	
3:00	130	110	675	170	165	8 1/2	-5	-10 1/4	5 1/4	
3:45	125	125	740	175	167	9	-4 1/2	-10	5 1/2	
4:15	130	130	810	173	167	9	-4 3/4	-9 1/2	4 3/4	
5:00										
corrected										
mean av			750	173	168	8 1/2		-10	5 1/4	

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested West Date May 27, 1983

VENTURI SCRUBBER DATA (Sheet B-1)

Time	Gas Inlet °F dry	Gas Inlet °F wet	ΔP "H_2O	~~Recycle~~ Liquid gpm	Liquid psig	Liquid °F	Liquid pH	Liquid Conc	Liquid Holdup, Min	Feed gpm	Bleed gpm	"P_1" "H_2O	"P_2" "H_2O	Gas Out °F
			(10" I beat we this gauge)	@ shut off gauge reads 0 gpm (read bottom)	↓ 4 psig			~~ppm~~						
2:05P	171	131	9½	218	26							13½	4	117
2:30	174	131	9	210	25						~~10~~	13	4	115
3:00	175	131	9¼	215	25						~~10~~	13¼	4	115
3:45	179	132	9	215	25						~~8~~	13¼	4¼	118
4:45	178	136	8¾	215	25							13	4¼	120
5:00											~~10~~			
corrected														
mean av	175	131	9	215	16							13¼		117
	$H = 0.104$													
	$\%H_2O = 14.3$													

Howard E. Hesketh, P.E. Test Data

City of Orlando, Iron Bridge WWTP - hypochlorite scrubbing tests

System Tested West Date May 27, 1983

PACKED TOWER DATA (Sheet C- 1)

Time	Gas Out °F	Gas Vel, ft/sec	Gas Holdup, sec.	ΔP "H_2O	Recycle Liquid gpm (pump current = 13 amp; Gauges ok (read top))	Recycle Liquid psig	Recycle Liquid °F	pH	ORP MV	ORP Cond (ppm Cl_2)	Agit.	Holdup, min.	Oxidant Feed gpm	Oxidant Feed conc	Acid/Base Feed gpm	Acid/Base Feed conc	Bleed gpm	"P_3" "H_2O"	ppm Cl_2 returns from tower
2:05P	117			4	230	22	112	7.4	880	None measured								0	[illegible]
2:30	117			4	230	22	116	7.4	750								10	0	
3:00	120			4	230	22	114	7.0	670								10	0	
3:45	123			4¼	230	22	116	6.9	670								8	0	
4:15	123			4¼	230	22	120	7.0	750								8	0	
5:00					230	22		6.8	670								10		
Rounded																			
mean av	120			4	230	22	116	7.0	750	/							10		/

APPENDIX D

D-1 Summary of Mercury Emission Calculations

Mercury (Hg) Emission Test Results

Dryer	Date	Run	Hg (lbs/hr)
West	5/24/83	1	0.003117
West	5/24/83	2	0.004636
West	5/24/83	3	0.002546
West	5/27/83	1	0.000976
West	5/27/83	2	0.000448
West	5/27/83	3	0.000842
		Average =	0.002094
East	5/26/83	1	0.001005
East	5/26/83	2	0.000698
East	5/26/83	3	0.000861
		Average =	0.000855

Daily Emissions

West Dryer

$$Hg\ \left(\frac{\text{grams}}{\text{24-hr}}\right) = (0.002094)\ \frac{\text{lb}}{\text{hr}} \times (454)\ \frac{\text{g}}{\text{lb}} \times (24)\ \frac{\text{hr}}{\text{day}}$$

$$= 22.82\ \frac{\text{grams}}{\text{24-hr}}$$

West Dryer

$$Hg\ \left(\frac{\text{grams}}{\text{24-hr}}\right) = (0.000855)\ \frac{\text{lb}}{\text{hr}} \times (454)\ \frac{\text{g}}{\text{lb}} \times (24)\ \frac{\text{hr}}{\text{day}}$$

$$= 9.32\ \frac{\text{grams}}{\text{24-hr}}$$

D-2 Calculation of Sulfur Dioxide (SO_2) Emission Rates

Calculation of Sulfur Dioxide (SO_2) Emission Rates

West Dryer

Date	Fuel Oil Consumed (gal)	Hours	Rate (gal/hr)
5-24-83	405.5	4.1	98.9
5-27-83	528.0	5.5	96.0

Average Consumption = 97.2 gal/hr

SO_2 Emissions

% S = 0.20

Density = 7.097 lb/gal

SO_2 Emissions = (97.2) $\frac{gal}{hr}$ x (7.097) lb/gal x (0.002) x (2) = 2.76 lb/hr

Best Available Copy

Gulf Refining and Marketing Company

FLORIDA DISTRICT OFFICE

R. G. Zelsner
Manager
Industrial & Commercial Sales

June 29, 1983

P. O. Drawer 38
Maitland, FL 32751

Iron Bridge Water Pollution Control
Facility
Post Office Box 1418
Oviedo, FL 32765-1418

Attention: Linda Lackey

Dear Ms. Lackey:

Relative to our telephone conversation today, certain specifications for Gulf No. 2 Fuel Oil are listed below:

<u>Typical Specifications</u>

Sulfur, %	0.20
Density, lb./gal., 60°F	7.097
Gross BTU	
per lb.	19,575
per gal.	139,100
Net BTU	
per lb.	18,375
per gal.	130,600
Ash, %	0.002
Nitrogen, PPM	61

Yours truly,

Lee T. Daughtridge

Lee T. Daughtridge
Account Manager

LTD:rr

4 JUN 1983
City of Orlando
Iron Bridge Facility

D6

Gulf

D-3 Summary of Production Rate Data

Summary of Production Rate Data

IRON BRIDGE RWPCF SLUDGE DRYERS

Dried Sludge Pellets Production Rate

Date	Production Rate (Tons/hour)	
5-24-83	0.98	(West)
5-26-83	0.95	(East)
5-27-83	1.10	(West)
Average	1.01	

CROSS/TESSITORE & ASSOCIATES, P.A.

PROCESS DATA SHEET

DATE 5-24-83 SAMPLING TIME: FROM ______ TO ______ *

STATEMENT OF PROCESS WEIGHT:

COMPANY NAME Iron Bridge Road RWPCF

MAILING ADDRESS ______

SOURCE IDENTIFICATION West Scrubber/Sludge Drying Facility

SOURCE LOCATION ______

DATE ON OPERATING CYCLE TIME:

START OF OPERATION, TIME ______

END OF OPERATION, TIME ______

ELAPSED TIME ______

IDLE TIME DURING CYCLE ______

DESIGN PROCESS RATING:

PROCESS WEIGHT RATE (INPUT) ______ PRODUCT (OUTPUT) 1.3

DATE ON ACTUAL PROCESS RATE DURING OPERATION CYCLE:

(Include specifications on fossil fuels)

MATERIAL Dry Sludge Product RATE ______

MATERIAL ______ RATE ______

MATERIAL ______ RATE ______

TOTAL PROCESS WEIGHT RATE* 0.98 Tons per hr. (Ta)

PRODUCT ______ RATE** ______

I certify that the above statement is true to the best of my knowledge and belief.

*Daily operating production rate.

Signature Charles Thompson
Title Chief Operator

CROSS/TESSITORE & ASSOCIATES, P.A.

PROCESS DATA SHEET

DATE 5-26-83 SAMPLING TIME: FROM ______ TO ______ *

STATEMENT OF PROCESS WEIGHT:

COMPANY NAME Iron Bridge Road RWPCF

MAILING ADDRESS ______

SOURCE IDENTIFICATION East Scrubber/Sludge Drying Facility

SOURCE LOCATION ______

DATE ON OPERATING CYCLE TIME:

START OF OPERATION, TIME ______

END OF OPERATION, TIME ______

ELAPSED TIME ______

IDLE TIME DURING CYCLE ______

DESIGN PROCESS RATING:

PROCESS WEIGHT RATE (INPUT) ______ PRODUCT (OUTPUT) 1.3

DATE ON ACTUAL PROCESS RATE DURING OPERATION CYCLE:

(Include specifications on fossil fuels)

MATERIAL Dry Sludge Product RATE ______

MATERIAL ______ RATE ______

MATERIAL ______ RATE ______

TOTAL PROCESS WEIGHT RATE* 0.95 Tons per hour CT

PRODUCT ______ RATE** ______

I certify that the above statement is true to the best of my knowledge and belief.

*Daily operating production rate.

Signature Charles Thompson
Title Chief Operator

CROSS/TESSITORE & ASSOCIATES, P.A.

PROCESS DATA SHEET

DATE 5-27-83 SAMPLING TIME: FROM ______ TO ______ *

STATEMENT OF PROCESS WEIGHT:

COMPANY NAME Iron Bridge Road RWPCF

MAILING ADDRESS ______

SOURCE IDENTIFICATION West Scrubber/Sludge Drying Facility

SOURCE LOCATION ______

DATE ON OPERATING CYCLE TIME:

START OF OPERATION, TIME ______

END OF OPERATION, TIME ______

ELAPSED TIME ______

IDLE TIME DURING CYCLE ______

DESIGN PROCESS RATING:

PROCESS WEIGHT RATE (INPUT) ______ PRODUCT (OUTPUT) 1.3

DATE ON ACTUAL PROCESS RATE DURING OPERATION CYCLE:

(Include specifications on fossil fuels)

MATERIAL Dry Sludge Product RATE ______

MATERIAL ______ RATE ______

MATERIAL ______ RATE ______

TOTAL PROCESS WEIGHT RATE* 1.1 Tons per hour TC

PRODUCT ______ RATE** ______

I certify that the above statement is true to the best of my knowledge and belief.

*Daily operating production rate.

Signature Charles Thompson
Title Chief Operator

5-24-83

Gal sludge dewatered	50960
% solids sludge	2.57%
% solids filtrate	.021%
Gal. Wash Water	59400 gal
Hr. furnace ran	5.5

50960 + 59400 X 8.34 X .00021 = lbs returned to plant influent

50960 + 59400 X 8.34 X .00021 = 193 lbs

50960 X 8.34 X .0257 − 193 = lbs to furnace during Test Period

50960 X 8.34 X .0257 − 193 = 10729.66448 lbs or 5.3648 Tons

5.3648 ÷ hr. furnace Ran = Tons per hr.

5.3648 ÷ 5.5 = 0.98 Tons per hr.

5-26-83

Gal sludge dewatered	48,960
% Solids sludge	2.09%
% Solids filtrate	.023%
Gal Wash Water	51480
Hr. furnace Ran	4.4hr.

48960 + 51480 X 8.34 X .00023 = lbs solid returned to Plant influent

48960 + 51480 X 8.34 X .00023 = 193 lbs

48960 X 8.34 X .0209 − 193 = lbs to furnace during Test Period

48960 X 8.34 X .0209 − 193 = 8341.02176 lbs or 4.1705 Tons

4.1705 ÷ hr. furnace Ran = Tons / hr.

4.1705 ÷ 193 = 0.95 Tons per hr.

5-27-83

Gal sludge dewatered	58,665
% Solids sludge	1.94 %
% Solids filtrate	.042 %
Gal wash Water	63,960
Hr. furnace Ran	4.1 hrs.

(58,665 + 63,960) X 8.34 X .00042 = lbs solid returned to plant influent

(58665 + 63,960) X 8.34 X .00042 = 430 lbs.

58665 X 8.34 X .0194 − 430 = lbs to furnace during test period

58665 X 8.34 X .0194 − 430 = 9061.76234 lbs OR 4.53 Tons

4.53 Tons ÷ hrs furnace ran during test = Tons per hr.

4.53 ÷ 4.1 = 1.1 Tons per hour

No. 0157019

RECEIPT FOR CERTIFIED MAIL

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

SENT TO Mr. Robert C. Haven		
STREET AND NO. P. O. Box 1418		
P.O., STATE AND ZIP CODE Oviedo, FL 32765		
POSTAGE		$
CONSULT POSTMASTER FOR FEES	CERTIFIED FEE	¢
OPTIONAL SERVICES	SPECIAL DELIVERY	¢
	RESTRICTED DELIVERY	¢
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED	¢
	SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	¢
	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY	¢
	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY	¢
TOTAL POSTAGE AND FEES		$
POSTMARK OR DATE 10/26/83		

PS Form 3800, Apr. 1976

PS Form 3811, Jan. 1979

RETURN RECEIPT, REGISTERED, INSURED AND CERTIFIED MAIL

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

1. The following service is requested (check one.)
- [X] Show to whom and date delivered.............. ¢
- [ ] Show to whom, date and address of delivery..... ¢
- [ ] RESTRICTED DELIVERY
  Show to whom and date delivered.............. ¢
- [ ] RESTRICTED DELIVERY.
  Show to whom, date, and address of delivery.$

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
Mr. Robert C. Haven
P. O. Box 1418
Oviedo, FL 32765

3. ARTICLE DESCRIPTION:

REGISTERED NO.	CERTIFIED NO.	INSURED NO.
	0157019	

(Always obtain signature of addressee or agent)

I have received the article described above.

SIGNATURE ☐Addressee ☐Authorized agent

Linda L. Lackey

4. DATE OF DELIVERY

POSTMARK

5. ADDRESS (Complete only if requested)

6. UNABLE TO DELIVER BECAUSE:

CLERK'S INITIALS

☆GPO : 1979-300-459

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

October 26, 1983

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. Robert C. Haven
Director of Public Works
City of Orlando
P. O. Box 1418
Oviedo, Florida 32765

RE: Air Construction Permit Applications
AC 59-76662 & AC 59-76663

Dear Mr. Haven:

The Bureau of Air Quality Management has reviewed your applications for permits to construct a sludge dryer facility in Orlando, Florida. We have determined the applications incomplete. The data listed below is needed to complete the applications.

1. Please submit a copy(s) of the stack and odor test reports.

2. How will the fugitive emissions from the material handling operation be controlled? (Excess amounts of fugitive emissions were noticed by Charles Collins of the Department's Orlando office).

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

Sincerely,

for DH Thomas

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

CHF/TH/s

cc: Charles Collins

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

INTEROFFICE MEMORANDUM

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

ST. JOHNS RIVER DISTRICT

TO: Bill Thomas J   OSJ-83-2700

THROUGH: A. Senkevich

THROUGH: T. Hunnicutt JH

FROM: C. Collins cmc

DATE: October 4, 1983

SUBJECT: Seminole County - AP
City of Orlando, Iron Bridge
Major Source Permit Applications

DER
OCT 07 1983
BAQM

These two sources have potential particulate emission of 152.3 tons/yr. and should have been sent to you.

The original construction permits issued by CAPS had expired and our legal section stated they had to reapply. They also have made extensive changes and had a bad fugitive emission problem when they were loading the trucks. Please insist upon an enclosed loading building. Dan Williams has a good type he used in the phosphate industry.

They tested this but never sent us the results - many breakdowns.

Enclosed are two checks for $100.00 each which were included with the applications. You will have to enter these on your computor since our's is not working at this time.
ours

CMC:rce RC

Enclosures: Applications and 2 checks

City of Orlando

400 S. ORANGE AVENUE
ORLANDO, FLORIDA
32801

PUBLIC WORKS
DEPARTMENT

TELEPHONE
(305) 849-2266

September 19, 1983

Mr. Charles M. Collins, P.E.
Air Engineering
Florida Department of Environmental Regulation
St. Johns River District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803

Subject: Iron Bridge Regional WPCF
Construction Permit Application

Dear Mr. Collins:

Enclosed for your review are three copies of the construction permit application for the east side and west side air pollution control systems at the Iron Bridge Plant. Also enclosed is a check for $200.00 to cover the application fees. Please contact Mr. Michael Hanlon, Project Manager, if you need any additional information or have any questions.

Sincerely,

Robert C. Haven
Director of Public Works

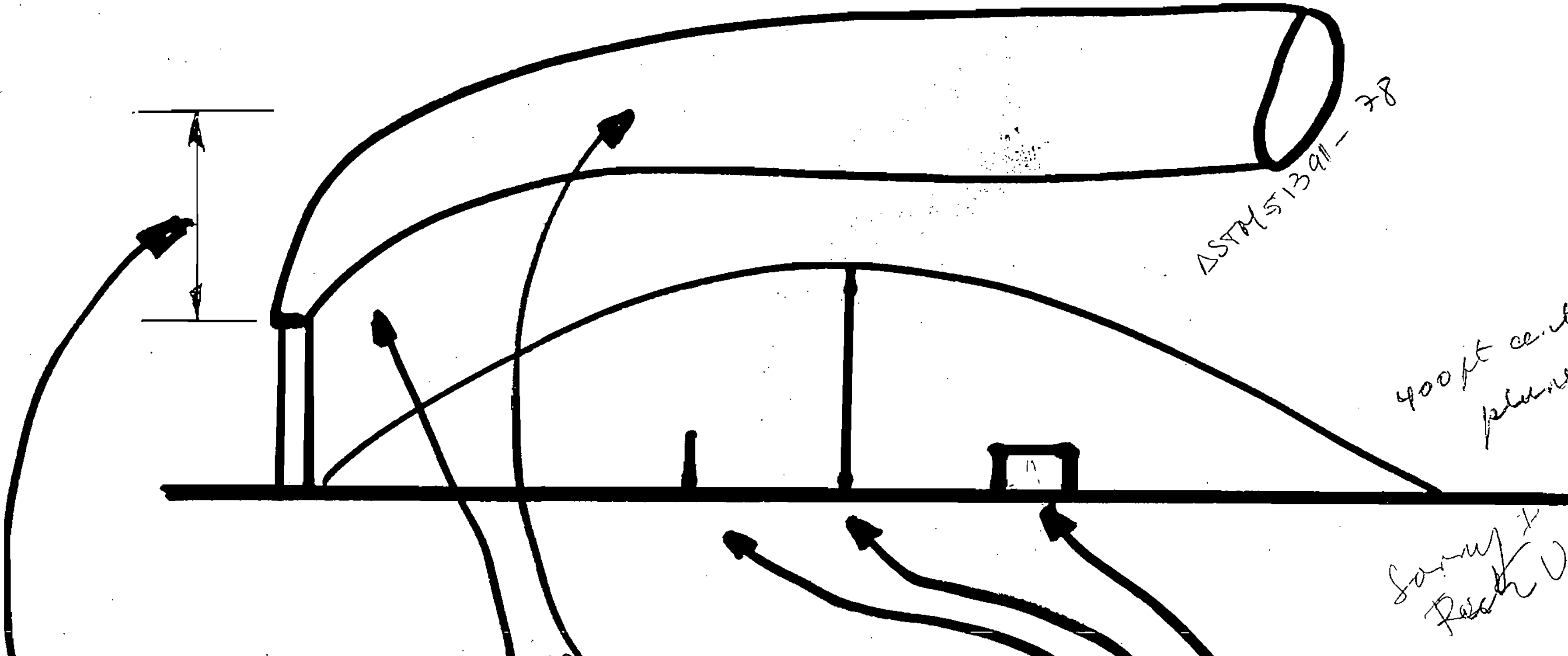
RECEIVED
SEP 1983
Saint Johns River
District

RCH/ws

Enclosure

cc: P. Feeney
H. Jewett
J. Tessitore
File

SAVE - CONSERVE WATER AND REDUCE WASTE WATER



ASTM 51391-78

400 ft centerline of the plume

Sonny & Ruth V.

WHICH STACK RISE EQUATION? mpeggs

WHICH DISPERSION EQUATION?

Dispersion equation

Point plume
PTPLU model

Meteorological Conditions

Emission

OU/sec - Total ☑

OU/sec - Obnoxious ☐

OU/sec - other ☐

(4)
-wind speed ___________ m/s

d -stability class(es) _____

(c)

TERRAIN

Interested in receptor elevation ___________ ☐

Impacts of Interest

Residences ☑

Max GLC ☐

Property Line ☐

Downwash ISC code ☐ — an on

Other ☐ max residence

____

____

Chemical scrubbing odor

Cross/Tessitore & Associates, P.A.
4759 South Conway Road
Orlando, Florida 32812
(305) 851-1484

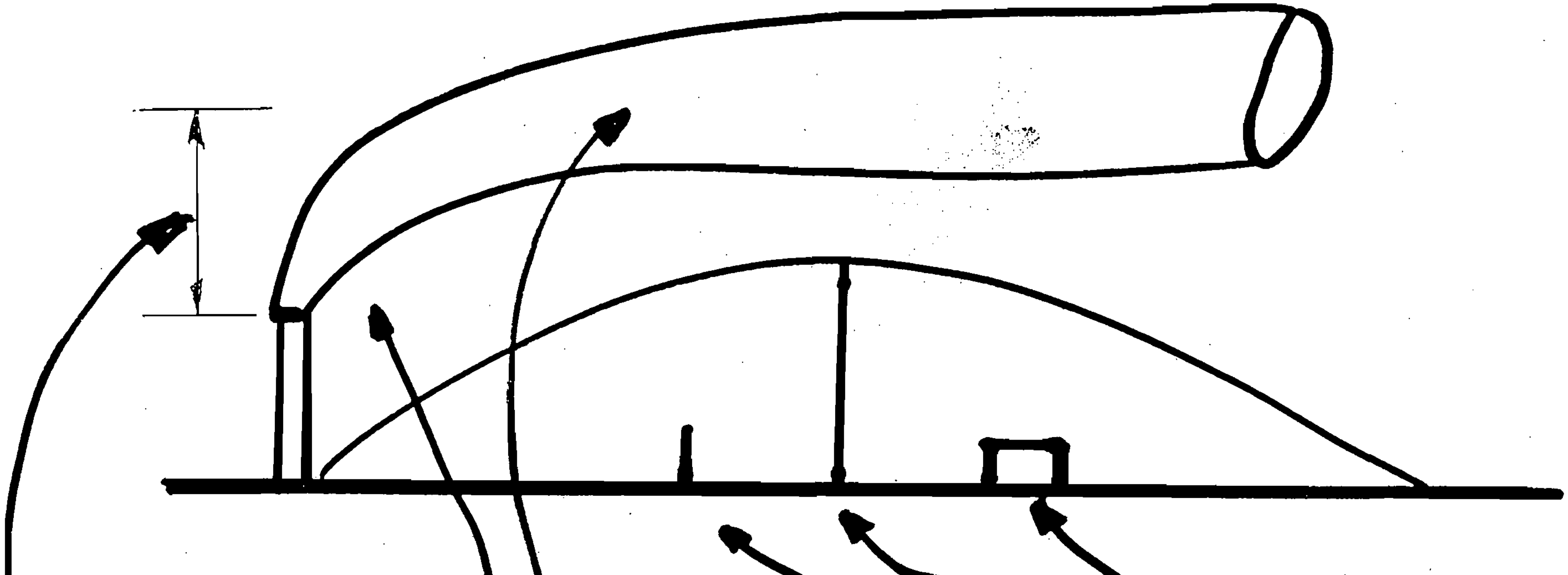
IRON BRIDGE WWTP
Sludge Drying Facility
Air Pollution Control System
(understanding FDER permit conditions for odor)

ISTIL

mpeggs
Hellen give higher conc. mpeggs

Where to put? max ground level concentration

Sodium hydrochloride



WHICH STACK RISE EQUATION?

WHICH DISPERSION EQUATION?

Briggs

Impacts of Interest

- Residences ☐
- Max GLC ☐
- Property Line ☐
- Downwash ☐
- Other ☐

Emission

- OU/sec - Total ☒
- OU/sec - Obnoxious ☐
- OU/sec - other ☐

Meteorological Conditions

-wind speed 4 m/s

-stability class(es) C

TERRAIN

Interested in receptor elevation ☐

Cross/Tessitore & Associates, P.A.
4759 South Conway Road
Orlando, Florida 32812
(305) 851-1484

IRON BRIDGE WWTP
Sludge Drying Facility
Air Pollution Control System
(understanding FDER permit conditions for odor)

ASTM - method
m '78

Copy

Please provide reasonable assurance that material handling is not causing fugitive emission

How is the particulate matter problem

operating facility, Some careful sprinkled sand is packed

BEST AVAILABLE COPY

avail of emission
[illegible] Please

2700

To Bill Thomas
Thru AS
Thru TP
From Chuck Collins
Date 10-3-83
Subject Major Source Permit Application at a

capability application

Recording of tremendous [illegible] amounts of PM emission

These two sources have potential particulate emission of 152.3 Tons/yr. and should have been sent to you.

~~These permits had expired~~

the original ~~t~~ construction permits issued by CAPs had expired and our legal section stated they had to reapply. they also have ~~t~~ made extensive changes and had a bad fugitive emission problem when they were loading the trucks. Please insist upon an enclosed loading building. ~~[illegible]~~ Don Williams has a good type he used in Phosphate Industry,

APCA

They tested this but never sent us the results - [illegible]

records are being checked for $100.00 each.

AC - 76662) 26323

PAID
DER SEP 26 1983
100

OCT 7 1983 SAINT JOHNS RIVER DISTRICT
BAQM

RECEIVED SEP 1983 Saint Johns River District

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Sludge Drying Facility [X] New[1] [ ] Existing[1]

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

COMPANY NAME: City of Orlando COUNTY: Seminole

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) West Line with cyclone + Venturi scrubber + packed tower ~~mlas~~ contactor

SOURCE LOCATION: Street Iron Bridge City Oviedo

UTM: East 478250 North 3166500

Latitude 28 ° 37 ' 20 "N Longitude 81 ° 13 ' 10 "W

APPLICANT NAME AND TITLE: City of Orlando

APPLICANT ADDRESS: P. O. Box 1418, Oviedo, Florida 32765

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of The City of Orlando (Florida)

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:

Robert C. Haven, Director of Public Works
Name and Title (Please Type)

Date: 9/21/83 Telephone No. (305) 849-2266

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

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

JOSEPH L. TESSITORE CERTIFICATE NO. 23374 STATE OF FLORIDA
(Affix Seal)

Signed: Joseph L. Tessitore

Joseph L. Tessitore, P.E.
Name (Please Type)

Cross/Tessitore & Associates, P.A.
Company Name (Please Type)

4759 South Conway Road, Orlando FL 32812
Mailing Address (Please Type)

Florida Registration No. 23374 Date: ____ Telephone No. (305) 851-1484

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

SECTION II: GENERAL PROJECT INFORMATION

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

This is an air pollution control system to clean the air from a sewage sludge dryer at the Iron Bridge Road Regional Water Pollution Control Facility. The system consists ~~of cyclone(s) followed by a Venturi scrubber for particulate removal and a packed~~ column using a hypochlorite solution for odor removal. This project will result in full compliance with the FDER air pollution control regulations.

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

Start of Construction July 1980 Completion of Construction March 1982

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.)

Ducts	$ 25,000.00	
Fan	50,000.00	
Scrubber	250,000.00	
Stack	25,000.00	Total $350,000.00

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

N/A

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

F. Normal equipment operating time: hrs/day 16 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr N/A ;

if seasonal, describe: N/A

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

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied? N/A
   b. If yes, has "Lowest Achievable Emission Rate" been applied? N/A
   c. If yes, list non-attainment pollutants. N/A
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) requirements apply to this source? If yes, see Sections VI and VII. No
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

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

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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:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Conditioned Sewage	Particulate	100	25,480	Item #6
Sludge +			(Dry Solids)	Total Input into Dryer
Recycled Product				

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

1. Total Process Input Rate (lbs/hr): 36,400 (25,480 dry solids)

2. Product Weight (lbs/hr): 2,100 (90% solids)

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
Particulates	7.7 7.0	20.4	Process Weight Table 610-1	17.4	121	264.3	Item 6
SO_2	4.77 4.76	10.40	Not Applicable	N/A	4.76	10.4	
NO_x	2.0 2.02	4.42	Not Applicable	N/A	2.02	4.42	
CU H AC	0.1 0.09	0.20	Not Applicable	N/A	0.09	0.02	
Visible Emissions	10%		17-2.610(2)(a)	20%			

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Ducon Venturi Scrubber	Particulate	97%	86%>10µ	Test Data
with Packed Tower			3% <3µ	Item 5

[1]See Section V, Item 2.

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

[3]Calculated from operating rate and applicable standard

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

[5]If Applicable

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 2 oil	92 gal/hr	1,365 gal/hr	18.72
		1365	

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

Fuel Analysis:

Percent Sulfur: 0.36 Percent Ash: 0.01

Density: 7.162 lbs/gal Typical Percent Nitrogen: 0.012

Heat Capacity: 19,400 BTU/lb 137,158 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.

Solid and liquid wastes go back into waste water treatment plant.

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

Stack Height: 50 ft. Stack Diameter: 4.25 ft.

Gas Flow Rate: 25,600 ACFM Gas Exit Temperature: 120-130 °F.

Water Vapor Content: ~10-13 % Velocity: 30 FPS

SECTION IV: INCINERATOR INFORMATION

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

Description of Waste ______

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

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

Manufacturer ______

Date Constructed ______ Model No. ______

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 2 oil	92 gal/hr	1,365 gal/hr	18.72
		136.5	

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

Fuel Analysis:

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Lbs/hr Incinerated							

Description of Waste

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

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

Manufacturer

Date Constructed ______ Model No. ______

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

Stack Height: ______________ ft. Stack Diameter ______________ Stack Temp. ______________

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

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

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) ______________

Brief description of operating characteristics of control devices: ______________

____

____

____

____

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

____

____

____

____

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight — show derivation.

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

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

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

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

6. An 8½" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8½" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8½" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

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

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

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

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

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

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy*: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy**: h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

*Explain method of determining efficiency.

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

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

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

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

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

1. Control Device:

2. Efficiency*: 3. Capital Cost:

4. Life: 5. Operating Cost:

6. Energy: 7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a.

(1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City: (4) State:

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

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

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

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. ________ no sites ________ TSP ________ ( ) 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.

2. Instrumentation, Field and Laboratory

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

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

B. Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location) ________________________________

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

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

C. Computer Models Used

1. ________________________________ Modified? If yes, attach description.

2. ________________________________ Modified? If yes, attach description.

3. ________________________________ Modified? If yes, attach description.

4. ________________________________ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	________ grams/sec
SO^{2}	________ grams/sec

E. Emission Data Used in Modeling

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

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

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

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

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

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

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

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

Other data recorded ____________________

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

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

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

B. Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location) ____________________

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

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

C. Computer Models Used

1. ____________________ Modified? If yes, attach description.

2. ____________________ Modified? If yes, attach description.

3. ____________________ Modified? If yes, attach description.

4. ____________________ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate
TSP	____________ grams/sec
SO2	____________ grams/sec

E. Emission Data Used in Modeling

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

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

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

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

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

SLUDGE RECOVERY SYSTEM DESCRIPTION/ SPECIFICATIONS

In addition, the system shall have the capability (with required increases or decreases in polymer feeds) to dewater and process aerobically digested sludge separately or in combination with the above sludge, or undigested waste secondary sludge separately, or undigested raw sludge separately, or sludge in different combinations from that stated above. For the waste secondary sludge or the aerobically digested sludge, or a combination of the two, the system shall be capable of providing a dewatered cake with not less than 18% solids (dry weight basis) and an average filtrate suspended solids of not over 100 mg/l. The finished product shall have a moisture content not exceeding 5% for bagging and 10% moisture content for bulk operations.

SLUDGE PUMPING FACILITIES

Sludge Metering Pumps

There shall be furnished and installed sludge metering pumps as shown. Pumps shall be progressive cavity, positive displacement type with infinitely variable speed control. Each pump shall produce 10-35 gpm at 60' TDH (min.) with 5 HP motor and 6-inch diameter suction and 4-inch diameter discharge lines. The pump shall include electric motor slide rail and fabricated steel base. Control shall be at the Automatic Control panels. The pump shall be equipped with a helical rotor of hard chrome overlay coated tool steel and a stator of Buna N or approved equal. Suction and discharge openings shall be suitable for connection to 125 lb. standard flanges. The pump shall be cradle mounted to permit the suction part to be rotated to any desired angle. Hand holes shall be provided in each side of the pump's suction housing. Pumps shall be equipped with gear-type sealed universal joints. The pumps shall be mounted on a fabricated steel base which will accommodate the electric motor and the required accessories. Pumps shall be suitable for handling sewage sludge from 1% to 10%. Provide one uninstalled spare pump with motor and accessories. Pumps shall be Moyno Type SWG Model 1EOES1, as manufactured by Robbins and Myer, Inc., of Springfield, Ohio, or approved equal.

POLYMER SOLUTION STORAGE AND PUMPING FACILITIES

Polymer Solution Storage Tanks

There shall be furnished and installed, as shown on the plans, two (2) polymer storage tanks. Each tank shall be 15,000 gallon capacity, and shall be suitable fiberglass construction, and enclosed with an access manhole and drain for cleaning purposes. Each tank shall be provided with a 5" flanged nozzle 4" long located at the drain elevation for location of a level instrument and a 6" flange in the top for location of a float switch.

Polymer Solution Metering Pumps

There shall be polymer solution metering pumps furnished and installed as shown on the plans. Each pump shall have a capacity to pump from 0.7 to 7.0 gpm at 40' TDH with a ½ H.P., direct current, variable speed drive motor. The pump shall be bronze body with stainless steel shaft and neoprene impellers. Each pump shall deliver a continuous flow of polymer solution to each sludge mixing unit at each filter press. Polymer feed rates shall be continuously adjustable by means of infinitely variable speed controls. All functions of the polymer metering pumps shall be controlled and indicated at the automatic control panel. Provide one extra uninstalled spare pump with motor and accessories.

MECHANICAL SLUDGE DEWATERING AND SLUDGE HANDLING SYSTEM

General

The mechanical sludge dewatering and sludge handling system specified in this section shall include all polymer solution mixing and flocculating components, filter belt presses, controllers, and a belt conveyor to receive dewatered sludge cake and transport it to the sludge cake storage bin, all as shown on the plans.

Dewatering Presses

There shall be provided as shown automatic filter belt presses complete with all accessories and controls to reduce the water content of the liquid sludge from maximum influent concentration of 98.0% water to a maximum cake effluent concentration of 82% water. Each press shall have the capacity to receive 2,000 gallons per hour of the liquid sludge at 98.0% water, and reduce the moisture content to 82% water in the quantity of 2,000 lbs per hour of dry solids.

Each press shall be optimized for dewatering by polymers, by employing filter screens with principal openings no smaller than 0.2 mm, and shall avoid floc destruction by gradually and continuously increasing filtration force as the cake dryness increases--including at least three zones of different filtration principle; a gravity zone, a pressure zone, and a shear/pressure zone. The equipment must utilize the basic physics of dewatering--i.e., the drier the cake, the more pressure and shear it will support; and frequent adjustable, small increases in pressure on the cake are required to produce maximum results and maximum adaptability to future changes in sludge characteristics and polymers available.

In order to achieve this process performance requirement, the machine shall include separately and independently adjustable pressure and shear/pressure steps. Also, because similar appearing sludges can have greatly different pressure and shear resistance characteristics, these steps shall be constructed so all can be adjusted as pressure steps, all as shear/pressure steps, or any combination in between. All of these adjustments shall be possible without interrupting sludge dewatering operations. Presses shall be manufactured by the Ralph B. Carter Co., Model 15/31, or Parkson Corp., or Komline-Sanderson or approved equal.

Routine maintenance shall be possible without taking the dewatering systems out of service. In addition, when replacement of the dewatering belt media is required, either belt shall be easily and quickly replaceable, without requiring removal of machine components, or changes in pressure and shear/pressure adjustments.

All directly wetted parts ahead of the gravity zones shall be of non-corrosive materials; all structural steel members shall be properly prepared by sandblasting and coated with high grade two-part epoxy finish. All motors shall be totally enclosed, forced circulation or non-ventilated. Minimum corrosion protection on all sheet metal parts shall be heavy coat, hot dipped galvanized.

Each press shall be provided with an individual control, monitored through the master control, all as specified in Section 525, Subsection 11 of these specifications.

Sludge Cake Belt Conveyor

One (1) 36-inch wide belt conveyor shall be installed at the location shown on the plans. The conveyor belt is to have a capacity of 42-cubic ft. per minute at 60 ft. per minute belt speed. The conveyor belt is to have two-ply nylon carcass belting with 1/8-inch by 1/32-inch thick, smooth black rubber conveyors of a working tension of 210 lbs. per inch of width. Unit to be designed to have horizontal runs without material transfer points. 2½-inch diameter carbon steel idlers mounted on carbon steel rectangular steel conveyor flange. Pulleys 10-inch diameter and suitably center lagged. Belt support on return run shall be 8-inch diameter wheels mounted on shafting and operating in ball bearing flanged blocks. Adjustable steel belt scraper to be mounted near discharge pulley. Complete drive assembly to operate the belt at 60 ft. per minute to be mounted over discharge end consisting of a motor direct coupled to a worm gear reducer. Out-put shaft of reducer drive shaft of conveyor through chain and sprockets complete with OSHA approved guard.

SLUDGE DRYING AND PELLETIZING SYSTEM

General

The sludge drying systems shall be installed in the location shown on the plans. Each shall consist of a rotary-type dryer and a dual fuel furnace (natural gas and No. 2 fuel oil), complete with controls and accessories.

Sludge Dryers

The sludge dryer shall conform to the following: (1) Evaporation Capacity: 12,000 lbs/ H_2O/hr. Three cylinder with compound showering flights formed with drum shell. Heavy duty chain drive powered from pinion sprocket mounted on simplified counter shaft to monolithic ring sprocket bolted to drum. Outer cylinder insulated. Drum rotates on machined steel running bands. (2) Drum Bases: Fabricated steel with nickel alloy iron rollers carried on Timken roller bearings. Drive base is equipped with counter shaft, drive and idler sprockets, speed reduction unit and double flanged rollers for fixed drum alignment. Idler base is equipped with flat rollers for drum expansion.

Input product shall be a mixture of wet sludge cake and recycled previously dried material. The rate must be set in such a way that a uniform pelletized material is produced without addition of chemicals.

Output product shall be sludge grains of less than 5 percent water content and 4 mm on a maximum diagonal.

Product residence time shall be at least 20 minutes.

Product temperature shall be at least 150^{o} but less than 230^{o}F, upon discharge from the dryer.

The furnace shall be equipped with replaceable abrasion resistant refractory plates.

Dryer shall be Model 105-32, rotary type with multiple-pass, co-current product flow sludge dryer, as manufactured by the Heil Company, of Milwaukee, Wisconsin, or approved equal.

Heat Source

The sludge dryer shall be equipped with directly connected end-fired furnace housing with dual fuel low pressure air atomizing burner and pressure blower. Unit shall be piped for either oil or gas. Dual fuel piping shall be furnished. Piping shall include throttling fuel valves, safety shut-off valves, oil relief valve, pressure gauges, throttling air valve, gas/electric ignition and standard pipe fittings between burner and furnace fuel connection.

Maximum oil consumption is 180 gph. Oil pump and filters furnished. All grades of fuel oil can be utilized; however, heavy grades must be pre-heated.

Maximum natural gas consumption is 28,000 CFH. Natural gas for main fuel line must be supplied to furnace connections at a minimum of 5 PSIG pressure.

Electric/Gas Ignitor is operative on all types of gas at pressures not to exceed 1 psig.

Fuel supply piping to furnace connections, oil tank, oil pre-heater, furnace refractory and gas pressure regulators capable of holding desired pressure through complete firing range. Multiple installations shall have individual regulators. The fuel lines connecting the tank and the pump shall be under 30-inches of cover.

Controls: Temperature: Electronically operated, includes temperature regulator, thermocouple, T/C wire and reversing motor operator for mechanical connection to fuel and air valves.

Safety/safety shut-off valves, fan draft pressure switch, flame failure protection, recording thermometer with Hi-Limit Switch and furnace pyrometer.

Power Requirements: Drip-proof general purpose ball-bearing 3 phase, 60 cycle, 480 volt electric motors furnished standard as follows:

Exhaust	200HP	1800 rpm
Drum Drive	40HP	1800 rpm
Oil Pump	1½HP	1200 rpm
Furnace Blower	10HP	3600 rpm.

GAS SOLIDS SEPARATION SYSTEM

Multiclone*Separators

The smaller pellets and the dust shall be separated from the airstream by cyclone separator. Efficiency shall be at least 86% of particles of 10 microns. The separator core shall be of the same, or equivalent, crucible quality material as that of the interior of the dryer.

Attrition samples and rates as specified for the dryer shall also apply to the separators.

Separator construction and functioning shall be such as to prevent the retention of solids on the walls of the core (less than 20 pounds per year), and prevent any substantial aggregation or deterioration of the dryer output particles. High quality construction materials adequate for the imposed service shall be utilized.

A constant speed (2 hp rated) air lock/debridging mechanism shall be attached between the separator collecting container and the screw conveyor to the recycle material bin.

Blowers-Pellet Removal and Heat Recovery

Product shall be extracted from the dryers and caused to separate in Multiclone* separators under the driving force of non-positive displacement blowers powered by a constant speed motor.

Volumetric air flow shall be at least 32,000 cfm. Decibel level shall be within limits of OSHA standards.

Blower suction shall be connected to the separator: the discharge to the wet scrubber intake. System supplier shall furnish all necessary air intakes, discharges, duct work, expansion-construction devices, dampeners, filters, valves, silencers, and other appurtenances.

The blower motor shall be drip-proof general purpose ball bearing, 3 phase, 60 cycle, 480 volt, 200 hp, and less than 1600 rpm.

Additionally, motors shall meet the requirements of the Section entitled "Electric Motors" of these specifications.

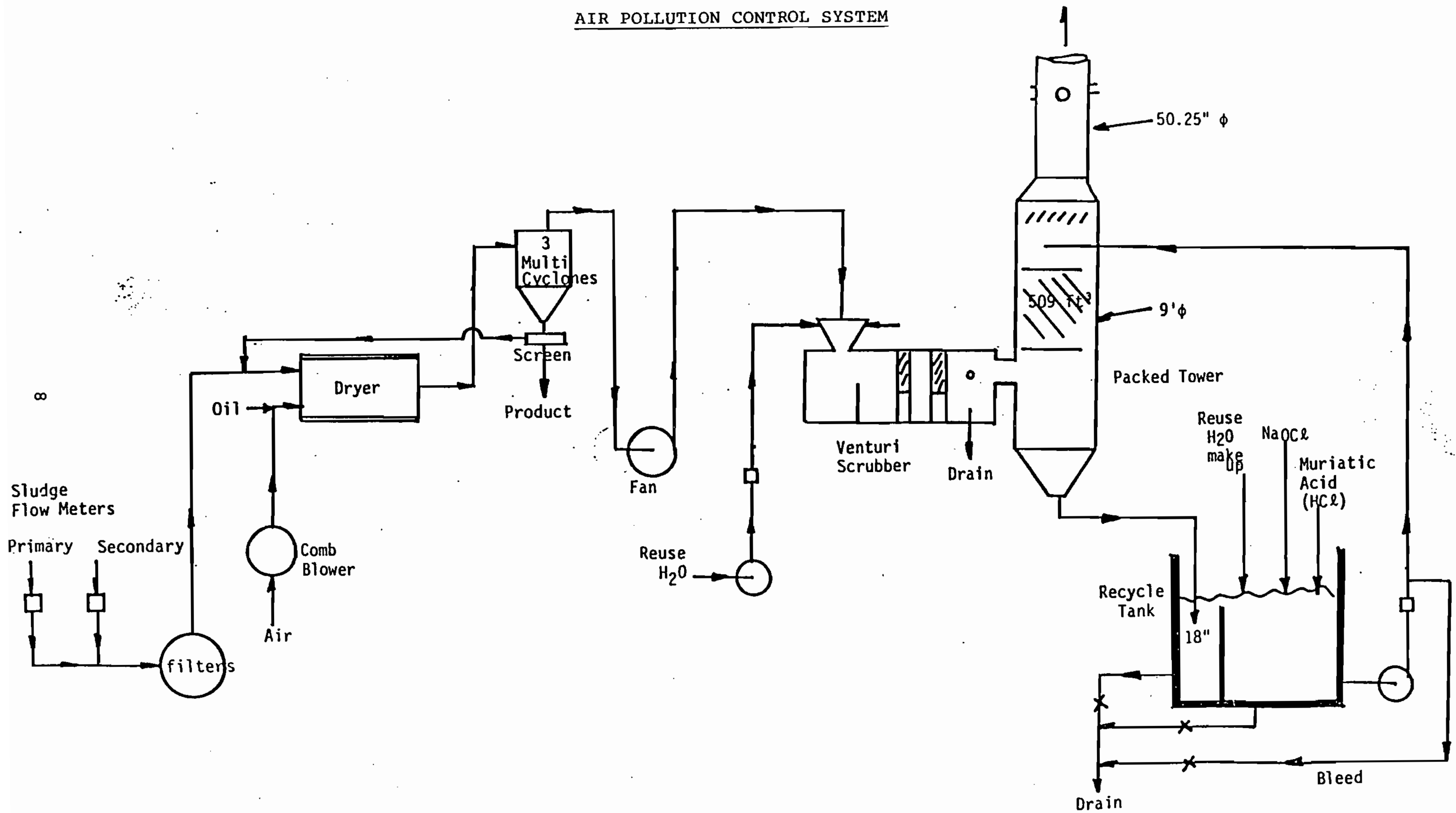
Each blower and motor shall be enclosed in a prefabricated, acoustical, noise reducer enclosure with door, window, and ventilation fan. Preassembled enclosure shall be of the dimensions shown on the plans and as manufactured by the Gal Corporation, of New Brunswick, New Jersey; or Allforce Acoustics, Lord Corporation, or Erie, Pennsylvania, or equal.

*Trademark
Joy Mfg. Co.

1.1 Air Pollution Control System

The attached figure shows a general schematic of the Sludge Recovery System at the Iron Bridge RWPCF. The system is designed to convert primary and secondary waste water sludge to a dry, pelletized product. The APCS consists of three main components as shown in the figure: (1) the cyclones, (2) a horizontal Venturi scrubber, and (3) a vertical packed tower. The cyclones are designed to remove larger dust particles from the air stream, while the horizontal Venturi scrubber removes the finer particles prior to entering the packed tower. The packed tower is designed to remove odorous gases and any remaining particulate from the air stream, by use of a NaOCl scrubbing solution which flows concurrently to the gas stream and reacts chemically with the odorous compound. The packed tower also includes a mist eliminator (mesh packing) which prevents liquid droplets of scrubbing solution from exiting the stack. Detailed performance observations on these APCS components are presented in Section 5.0 of this report.

AIR POLLUTION CONTROL SYSTEM



ITEM 1 PROCESS WEIGHT DERIVATION

Item 1 Process Weight Derivation

The process weight for this facility was based on operation data for the months of April, May, and June in 1983. The operational data is tabulated in attached Table 1-1. Based on this operational data and the mass balance shown in Figure 1-1, the following process design parameters were established.

Solids Input into Dryer

(36,400) lb/hr x (0.70) = 25,480 lbs/hr

Sludge Cake Feed (From Filter Press)

10,000 lb/hr ($\sim$20% Solids)

or $\sim$2000 lb/hr

Dry Product Rate

2100 lb/hr ($\sim$90% Solids)

or $\sim$1890 lbs/hr

Table 1-1

Iron Bridge Sludge Dryer System Operational Data

Month	Press Cake Filter Solids (%)	Press Cake Solids (tons/hr)
April 1983	17.78	0.89
May 1983	18.35	0.90
June 1983	19.08	1.00

	Dryer Production Hours (hrs/day)	Product Rate (tons/day)	tons/hr	lbs/hr
April 1983	20.54	18.50	0.90	1801
May 1983	23.05	22.55	0.978	1957
June 1983	24.79	25.92	1.046	2091

Process Weight Flow Diagram

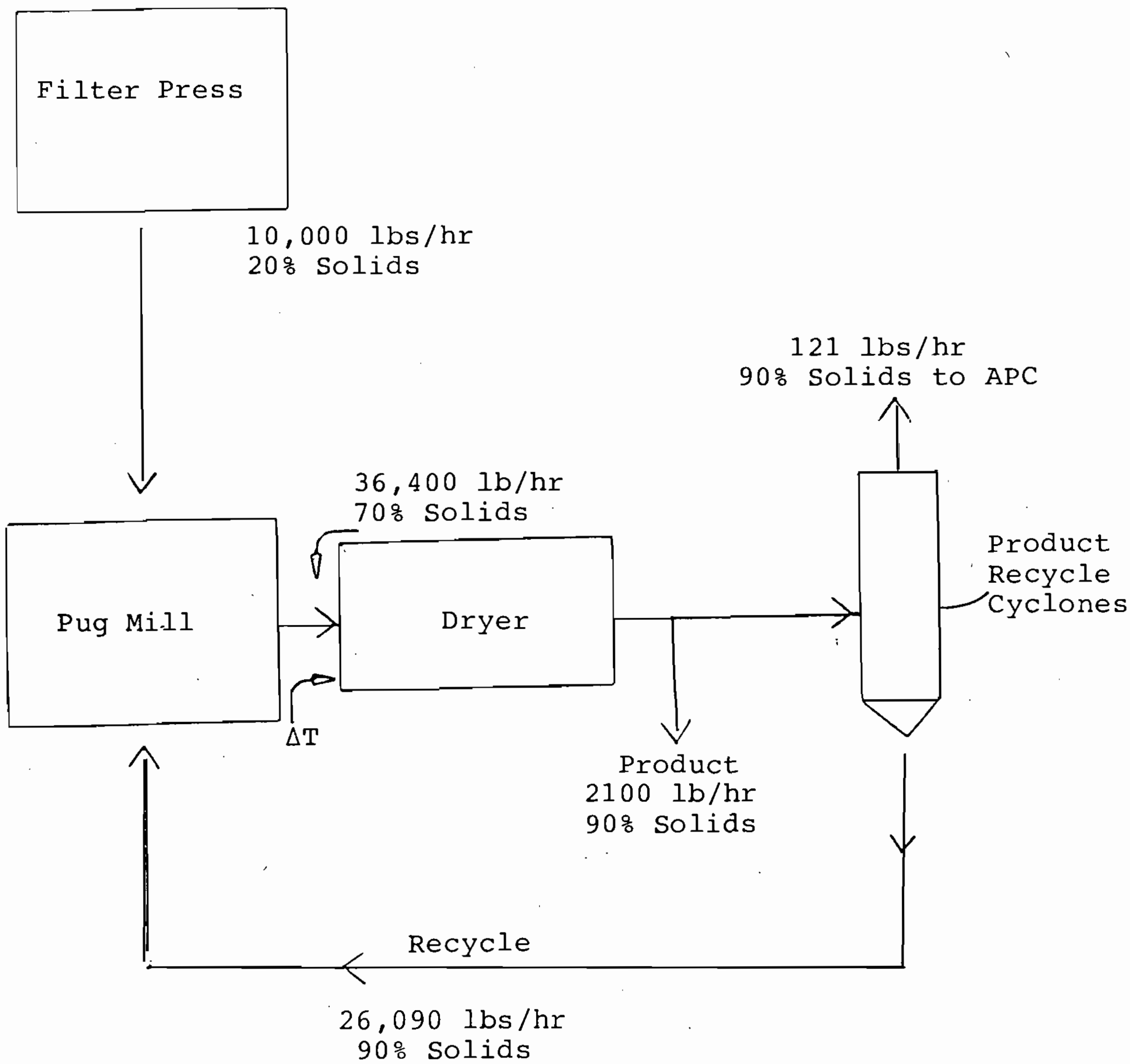


Figure 1-1

Not to Scale

ITEM 2 CONTROLLED EMISSIONS

Item 2 Controlled Emissions

Particulate

Uncontrolled Emissions = 121 lbs/hr

Controlled Emissions = 121 (1-0.97)

= 3.63 lb/hr = 7.93 ton/year

Summary of Controlled Emissions

	lbs/hr	tons/year
Particulate	3.63	7.93
Sulfur Dioxide	4.76	10.40
Nitrogen Oxides	2.02	4.42
Hydrocarbons	0.09	0.20

ITEM 3 POTENTIAL EMISSIONS

Item 3 Potential Emission Calculations*

a) Particulate

From mass flow balance on Process Weight Diagram (Design Conditions)

Uncontrolled Solids = 121 lbs/hr

Annual Emissions = $(121)\ \frac{\text{lbs}}{\text{hr}} \times (12)\ \frac{\text{hrs}}{\text{day}} \times (7)\ \frac{\text{days}}{\text{week}}$

$\times (52)\ \frac{\text{wks}}{\text{yr}} \times (\frac{1}{2000})\ \frac{\text{T}}{\text{lbs}} = 264.3$ T/yr

b) Sulfur Dioxide

From fuel analysis, %S = 0.36

Fuel Consumptioo = 92 gal/hr

Annual Emissions = $(92)\ \frac{\text{gal}}{\text{hr}} \times (7.162)\ \frac{\text{lbs}}{\text{gal}}$

x (2) x (0.0036) x (12) hrs/day

x (7) days/week x (52) weeks/year x $(\frac{1}{2000})$ T/lbs

= 10.4 T/yr

c) Nitrogen Oxides

From AP-42, Table 1.3-1, Distillate Oil (Industrial/Commercial)

$NO_2 = 22\ \text{lbs}/10^3\ \text{gal}$

Annual Emissions = (92) gal/hr x (12) hrs/day

x (7) days/week x (52) weeks/year x $(\frac{22}{1000})$ lbs/gal

x $(\frac{1}{2000})$ T/lbs = 4.42 T/yr

*Revised 9-1-83

d) <u>HC</u>

From AP-42, Table 1.3-1, Distillate

(Industrial/Commercial)

HC = 1 lbs/10^3 gal

<u>Annual Emissions</u> = (92) gal/hr x (12) hrs/day x (7) days/week x (52) weeks/year x $(\frac{1}{1000})$ lbs/gal x $(\frac{1}{2000})$ T/lbs = 0.20 T/yr

*Revised 9-1-83

Summary of Potential Emissions

Pollutant	Emissions	
	lbs/hr	tons/yr
Particulates	121	264.30
Sulfur Dioxide	4.76	10.40
Nitrogen Oxides	2.02	4.42
Hydrocarbons	0.09	0.20

ITEM 4 AIR POLLUTION CONTROL SYSTEM

4.0 Air Pollution Control System Operating Parameters

The original odor control system submitted to the FDER (FDER Permits AC59-59312 and AC59-59313) consists of cyclone collectors, a Venturi scrubber for particle removal, and an absorber (packed tower) for odor control. The odor control unit was operated with recirculated potassium permanganate ($KMnO_4$) as the scrubbing medium. After start-up, the air pollution control systems were modified to accommodate lower system air flows and to correct maintenance problems with the $KMnO_4$ system. At the time of testing, one of the cyclone inlets had been blocked off to achieve a higher efficiency at the lower air flow, and the absorbing solution had been changed from a $KMnO_4$ solution to a hypochlorite solution. The packing in the West Tower (AC59-59313) had been replaced. Also, the test ports and platform had been modified to meet the requirements of FAC Chapter 17.2.

The basic flow diagram for the air pollution control system is illustrated in Figure 4-1. Also, test data recorded during emission testing are presented in Table 4-1. Table 4-2 shows a comparison between measured conditions and design operating conditions.

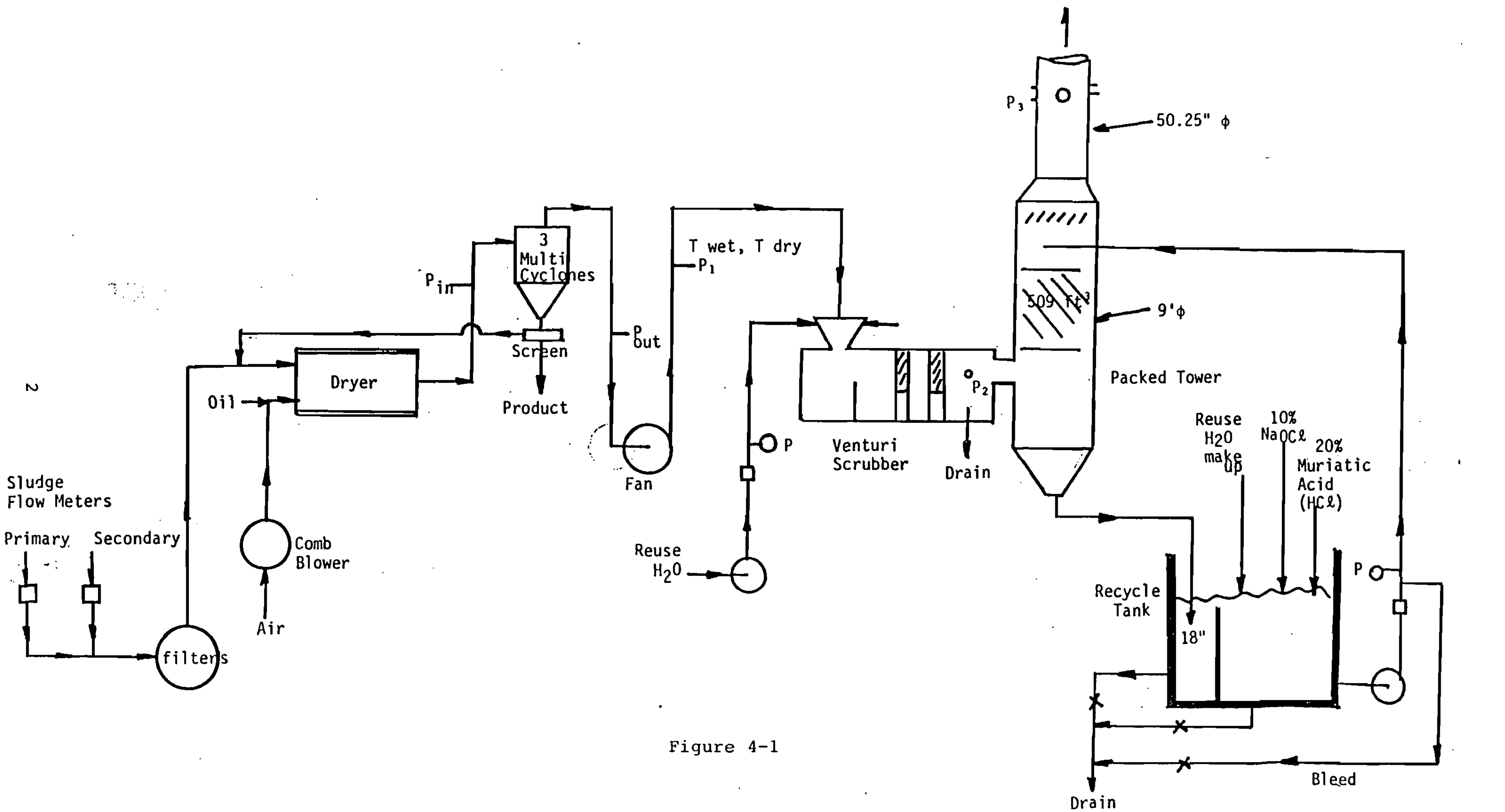


Figure 4-1

H. E. Hesketh, P.E.

Table 4-1

Summary of Weighted Data Representative of Particulate and Odor Test Conditions for City of Orlando, Iron Bridge WWTP Sludge Systems Dust Control Tests

Test Date	5/24/83	5/26/83	5/27/83	5/27/83
Test Side	West	East	East	West
Test For	Partic. & Odor	Partic.	Odor	Partic.
Combustion Blower current, amps	8 1/2	7 1/2	7	8 1/2
Dryer Temp in, °F	800	700	710	750
out, °F	175	172	170	173
Cyclone ΔP, "H_2O	5 1/4	4 3/4	4 1/2	5 1/4
Exhaust Fan current, amps	163	166	162	168
overall static ΔP, "H_2O	23 1/2	23 3/4	23	23 1/4
Venturi Scrubber gas in temp., °F	175	174	174	175
gas out temp., °F	121	116	114	117
water rate, gpm	215	245	245	215
water pump, psig	15	18	15	16
overall ΔP, "H_2O	8 1/2	8 1/2	7 3/4	9
Parked Tower gas in temp, °F	121	116	114	117
gas out temp, °F	124	108	113	120
overall ΔP, "H_2O	5 1/2	6	5 1/4	4
gas residence time, sec.*	1.2	1.2	1.2	1.2
recycle liquid rate, gpm	150	230	235	230
recycle pump, psig	21	27	27	22
recycle liquid ORP, mv	810	840	780	750
recycle liquid acidity, pH	7.0	7.0	7.3	7.0
recycle liquid temp, °F	122	114	110	116
recycle liquid holdup, min*	11.7	7.6	7.5	7.6
recycle liquid conc, ppm Cl_2**	100	65	60	--
tower drain liq.conc,ppm Cl_2**	20	30	20	--
bleed liquid rate, gpm	12	10	10	10
10% NaOCl feed rate, gph**	4	4	4	4
20% muriatic acid feed, gph**	0.1	0.1	0.1	0.1

Note: Data are corrected to account for plant instrument offsets

* Calculated

**See data of Richard J. Kruse, Michigan Science and Engineering Associates for complete values.

Table 4-2

Comparison of Operating Parameters

Location			
(A) Venturi	Design	West (5/27/83)	East (5/26/83)
L/G (Liquid to gas ratio)	8.66 (33700 ACFM)	8.27 (25,557)	9.58 (25,567)
Liquid Rate	Not Specified	215 gpm	245 gpm
ΔP (pressure drop)	20" H_2O	9.0	8 1/2
Pump	20 psig	16 psig	18 psig
Inlet temperature	180°F	175°F	174°F
(B) Packed Tower			
L/G	9.19	8.85	8.99
Liquid rate	310 gpm	230 gpm	230 gpm
Outlet Temperature	119°F	110-130°F	110-130°F
ΔP (pressure drop)	Not Specified	6" H_2O	4" H_2O
Reaction Tank	1000 gal	1000 gal	1000 gal

ITEM 5 DERIVATION OF CONTROL DEVICE EFFICIENCY

Item 5 Derivation of Control Device Efficiency

Based on the emission testing of 26 May 1983 and 27 May 1983, the particulate emissions from the East and West Side scrubbers are as follows:

2.913 lbs/hour

3.013 lbs/hour

4.200 lbs/hour

4.655 lbs/hour

3.074 lbs/hour

Average = 3.570 lbs/hour

7.7 lb/hr

Therefore, a scrubber efficiency can be derived:

$$E_{out} = E_{in}\,[1-\eta] \quad \text{where } \eta = \text{scrubber efficiency}$$

$$[1-\eta] = \frac{E_{out}}{E_{in}}$$

$$\eta = 1 - \frac{E_{out}}{E_{in}} = 1 - \left(\frac{3.57}{121.0}\right) = 0.97$$

ITEM 6 SYSTEM FLOW DIAGRAM

SLUDGE DRYING SYSTEM FLOW DIAGRAM

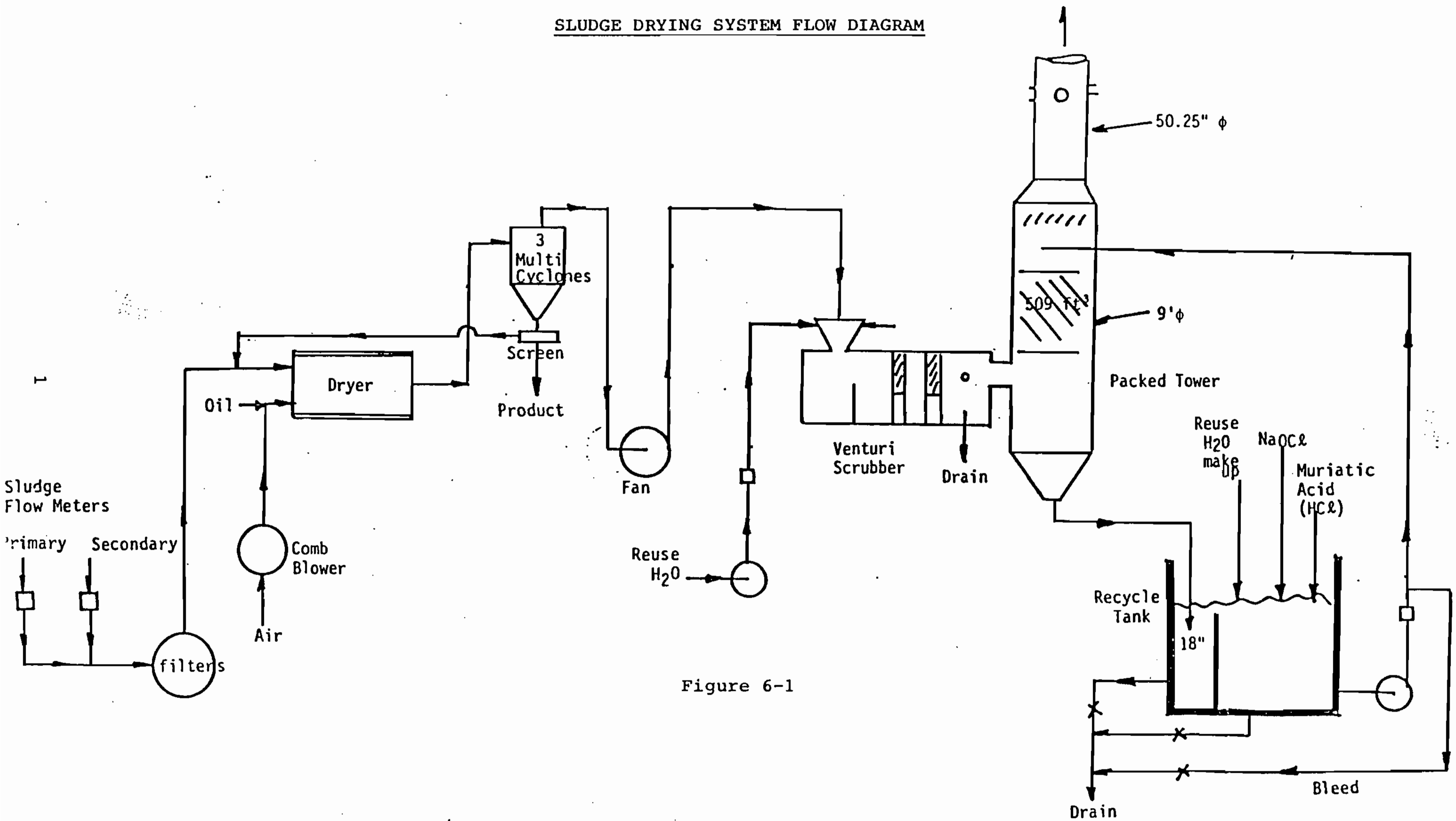


Figure 6-1

PARTS LIST

WET SCRUBBER CHEMICAL SYSTEM

CHEMICAL FLOW DIAGRAM P-224

26

1.	Wet Scrubber	ESP Item No. 28 Ducon Drawing No. K79-2067-3
2.	Chemical Recirculation Tank	ESP Item No. 27 ESP Drawing No. M-201
3.	Chemical Recirculation Pump	ESP Item No. 28 Supplied by Ducon
4.	Chemical Control Panel	ESP Item No. 32 Wiring Diagram, ESP Drawing E-225
5.	pH Control/Indicator	Supplied by Ducon Ducon Items 10-4 and 10-5
6.	ORP Control/Indicator	Supplied by Ducon Ducon Items 10-6 and 10-7
7.	pH Pump	New Wallace & Tiernan Pump same as Item 8
8.	ORP Pump	Supplied by Ducon ESP Item No. 29
9.	ORP Chemical	15 % Solution Sodium Hypochlorite
10.	pH Chemical	31 % Solution Hydrochloric Acid to lower pH 50 % Solution Sodium Hydroxide to raise pH

11. Packing - EAST SIDE, 2" Polypropylene Saddles, original equipment.
WEST SIDE, 4" Spherical Tri-Packs installed as an improvement and agreed upon by Mr. Bill Allman of the City of Orlando and John Glorioso of ESP. Submittal data was sent to the Ducon Company and our consultant, Mr. Dick Kruse, for evaluation prior to purchasing. Both agreed packing would be superior to existing packing.

NOTE: All materials of construction are compatible with the chemicals listed above.

REDESIGN OF PACKED TOWER ODOR CONTROL SYSTEM

BY ESP'S CONSULTANT

MICHIGAN SCIENCE & ENGINEERING ASSOCIATES

Michigan Science & Engineering Associates
P.O. Box 7105 • Ann Arbor, Michigan 48107
Phone: 313-994-0280

May 1, 1983

Mr. John Glorioso
Ecological Services Products, Inc.
Drawer 1137
Dunedin, Florida 33528

Dear Mr. Glorioso,

We have received the design operating conditions of the odor control system at the Iron Bridge site. The system is to be modified for hypochlorite scrubbing of the dryer discharge.

We have tabulated the operating parameters for the packed towers in Table I. Liquid rates are sufficient to thoroughly wet the packing, with good distribution. Gas rates are somewhat high, but are within the operating capabilities of the packings.

Reaction rate data for the system hypochlorite - H_2S is not available directly from the literature. Personal experience in the odor control industry indicates that most systems are modeled after the H_2S - NaOH system for determining efficiencies. Using the H_2S - NaOH experience, the removal efficiencies would be 90% - 99%.

Modifications required to operate the hypochlorite system are minimal. The system requires the addition of a second chemical feed pump and minor plumbing and wiring additions.

We recommend that both chemical feeds enter the recirculation tank on the suction side of the tank baffle within the top 1/3 of the liquid surface.

Operation of the system should follow the recommendations given by Ducon in their letter of April 8, 1983, except for the location of the feed as noted previously.

Overflow should be drawn from the return side of the baffle of the recirculation tank. Industry practices for overflow indicate a range from .01 to 3.0 g.p.m. per 1000 cfm, depending on inlet loadings, solubilities, reaction rates and other factors. We recommend that the overflow be set at 10 g.p.m. as a starting point and adjusted accordingly.

Preliminary tests indicate that the pH should be controlled between 6.5 - 7.5 with a residual chlorine greater than 10 ppm. The ORP control point will be determined by observing the combination of residual chlorine and pH that effects the optimimum odor control.

The ORP of the solution indicates the relative ratios of oxidized to reduced species and not absolute quantities. The exidizing agent (hypochlorous acid) is only one of the species measured.

Operating paramaters from Table II were used to determine flooding characteristics and estimate NTU's using available correlations from the packing suppliers.

East tower is operating at 85% of gas flood at constant liquid rate and 45% of liquid flood at constant gas rate.

West tower flood values cannot be determined from the manufacturer's literature at this time. However, personal communications with Mr. Roelph Jaeger indicate that the column is probably near the 70% - 80% gas flood and 40% - 60% of the liquid flood. We will attempt to verify these parameters and will notify you if there is any important difference.

Sincerely,

Richard J. Kruse

Richard J. Kruse

Chemical Instructions
For
Iron Bridge Road Regional Water Pollution Control Facility
City of Orlando, Florida

OPERATION OF CHEMICAL FEED SYSTEM USING HYPOCHLORITE

Refer to Chemical Flow Diagram P-224 to become acquainted with the components of the system.

Sequence of operation (tanks, scrubbers clean and ORP and pH probes calibrated per Ducon instruction manual).

1. Start filling chemical recirculation tank by turning power on to chemical control panel. Chemical control panel ESP Item 32.

   Note: The level switches in the chemical recirculation tank will not operate without compressed air. Compressed air is supplied to the level switches by the east and west air compressor. The east air compressor supplies compressed air to the east chemical system level switches, the west air compressor supplies the west system. These air compressors are controlled by selector switches mounted on the main control panel.

2. Turn ORP and pH switches on.

3. When chemical recirculation tank is full, start chemical recirculation pump by pushing start button on chemical control panel.

4. After 10 minutes, check ORP and pH indicators.

5. Turn ORP and pH pump control switch to auto. The ORP and pH pumps will start pumping. Adjust the pH and ORP pumps to obtain desired ORP and pH readings.

   See calibration data for these settings. Calibration procedure is listed at the end of calibration data.

   Note: Desired ORP and pH readings can only be determined by experience. The ORP reading, which results in no odor or the least amount of noticable odor, will determine the proper ORP value. If a chlorine odor is detected, reduce pH by 0.5 and re-evaluate ORP setting

6. After correct ORP and pH readings are obtained, open the bleed valve to bleed off 10 GPM of chemical from the chemical recirculation tank.

7. The dryer system can now be started.

8. The level in the chemical recirculation tank will be constantly maintained by the make-up water system.

OPERATION OF CHEMICAL FEED SYSTEM USING HYPOCHLORITE

Continued:

9. The ORP and pH will be constantly maintained by the ORP and pH controllers.
   Note: Be sure there is sufficient Sodium Hypochlorite for ORP control and sufficient Hydrochloric Acid for pH control.

   Also, the stroke of these pumps should be adjusted to minimize the off time of each pump and therefore provide a more continuous feed of chemicals to the system.

10. The chemical recirculation tank should be cleaned and flushed as required. The chemical recirculation tank should be cleaned and flushed out and refilled with clean water, at which time the chemical recirculation pump should be turned on and run for at least 8 hours to clean and flush packing. After packing is flushed, drain and re-flush chemical recirculation tank. While flushing, alternately open and close drain valves of chemical recirculation tank located before baffle and after baffle. Continue opening and closing valves until drain liquid is clear. Experience will dictate this cleaning schedule.

11. See ORP and pH calibration instructions and ORP and pH calibration data.

CHEMICAL SYSTEM

ORP AND pH CALIBRATION PROCEDURE

1. ORP and pH controllers/indicators to be calibrated according to instructions supplied by the Ducon Company, which is included in the Ducon Instruction Manual.

2. The chemical recirculation system to be clean and chemical recirculation tank filled with fresh water.

3. Calibration will be performed with the dryer in normal operation with pH values of 6.5, 7.0 and 7.5 and ORP (Sodium Hypochlorite) concentrations of 0.05%, 0.1%, 0.2% and 0.3%.

   pH will be controlled by using Hypochloric Acid to lower pH or Sodium Hydroxide to raise pH as required.

   Note: Past experience of the operation of the chemical system has indicated the need to lower the pH and, therefore, Hypochloric Acid will be used for initial calibration.
   Hydrochloric

4. Add Sodium Hypochlorite to chemical recirculation to obtain a 0.05% solution.

5. Start dryer system and adjust dryer system for normal operation.

6. After dryer system has operated for at least 1 hour and all temperatures have stabilized, record readings of pH, ORP and temperature chemical recirculation liquid.

7. Repeat Items 4 thru 6 above with solutions of 0.1%, 0.2% and 0.3% Sodium Hypochlorite.

8. Record values of pH, water temperature °F, ORP concentration and ORP meter reading on calibration form. This data sheet will then be used to determine the desired ORP and pH settings.

CHEMICAL SYSTEM CALIBRATION DATA

FOR ____________________ SYSTEM

DATE: ________________________ BY: ______________________________

CHEMICAL RECIRCULATION LIQUID TEMPERATURE: __________ °F

pH READING: __________________

ORP CONCENTRATION:		ORP READING
	0.05%	____________________
	0.10%	____________________
	0.20%	____________________
	0.30%	____________________

pH ADJUSTED BY ADDING: ____

ORP ADJUSTED BY ADDING: ____

TABLE I

TOWER DIMENSIONS AND DESIGN CONDITIONS

Diameter	9 ft.
Packing Depth	8 ft.
Air Rate	30,000 acfm
Liquid Rate	310 g.p.m.
Temperature	120^{o} F
R.H.	100%
Column Pressure	Atmospheric
Molecular Weight of Gas	29.7
East Tower	2" Glitch Saddles
West Tower	4" Jaeger Tri-Packs

CALCULATIONS

Area	63.62 ft^2
Velocity	471.6 ft/min.
Air	69.77 $\frac{\text{lb-m}}{\text{min.}}$
Liquid	144.7 $\frac{\text{lb-m}}{\text{min.}}$
Lm/Gm	2.07
Packing Volume	509 ft^3
Residence Time	1.02 seconds

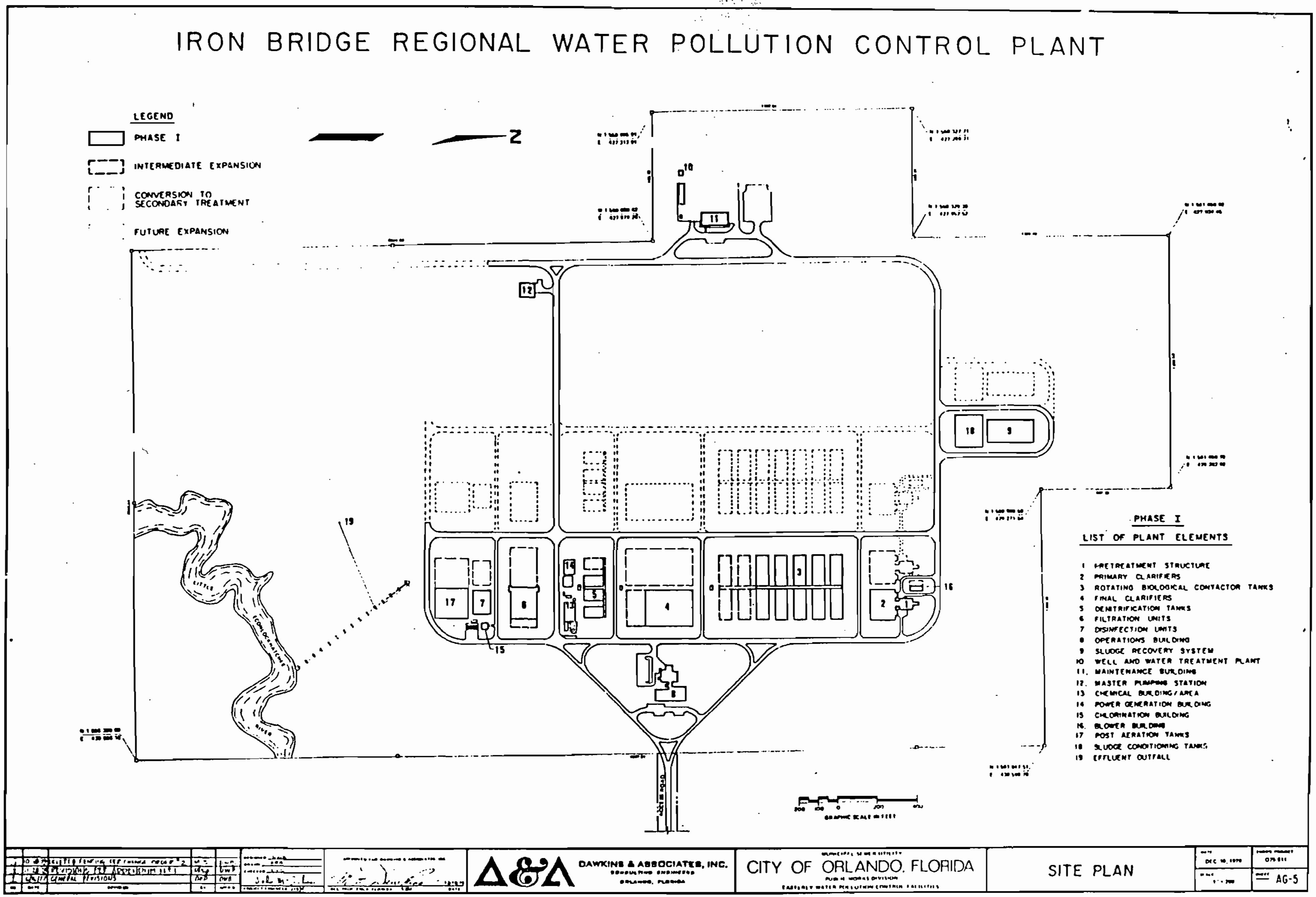
TABLE II

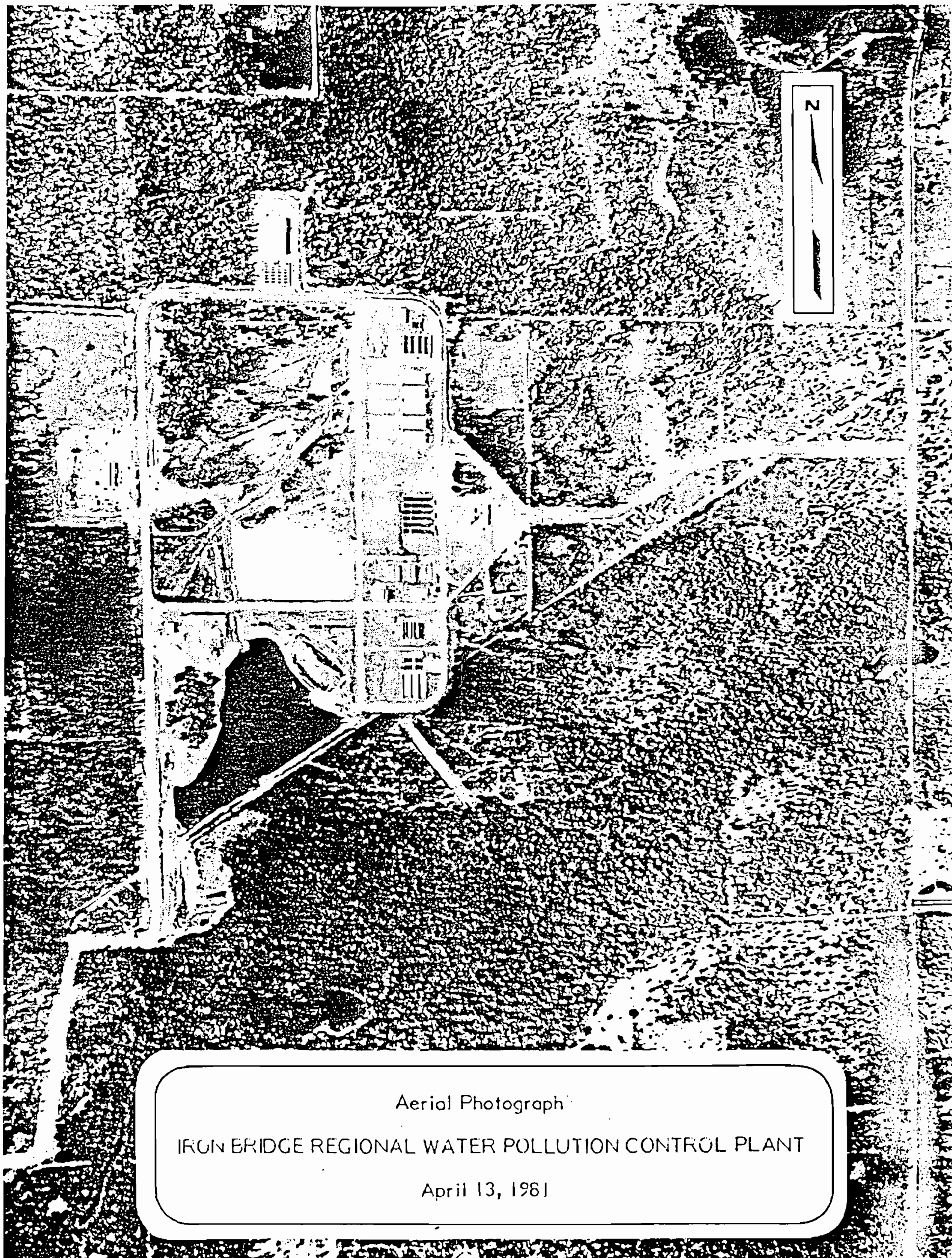
4186.?? lb-m/hr

	lbs/hr	lbs/hr-ft^2	lb-m/hr	lb-m/hr-ft^2
Gas	124,334 (G)	1954 ($\bar{G}$)	1486 (Gm)	65.80 ($\bar{G}$m)
Liquid	156,240 (L)	2456 ($\bar{L}$)	8680 (Lm)	136.44 ($\bar{L}$m)

ITEMS 7 & 8 SITE PLAN AND LOCATION MAPS

Best Available Copy

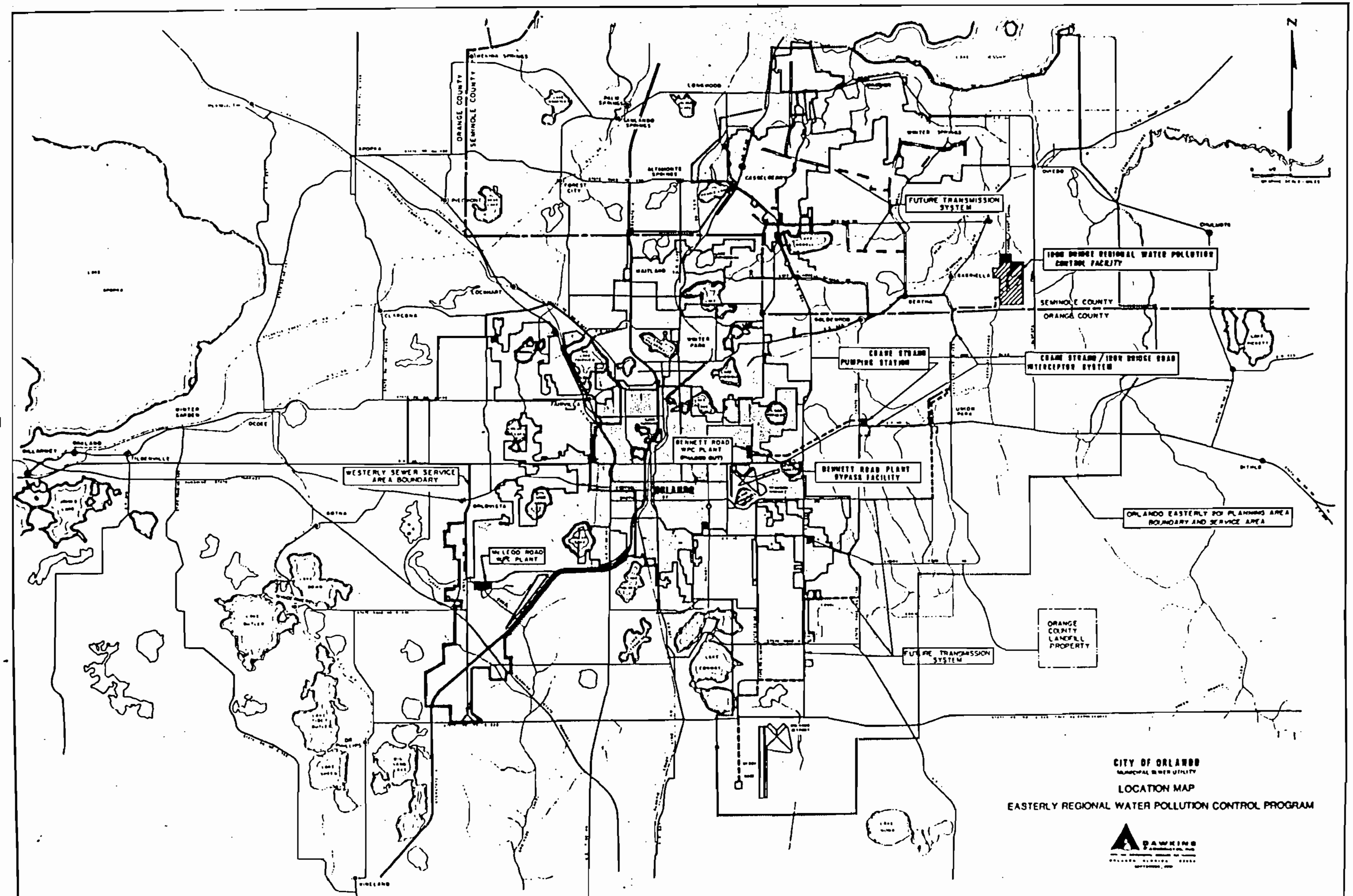


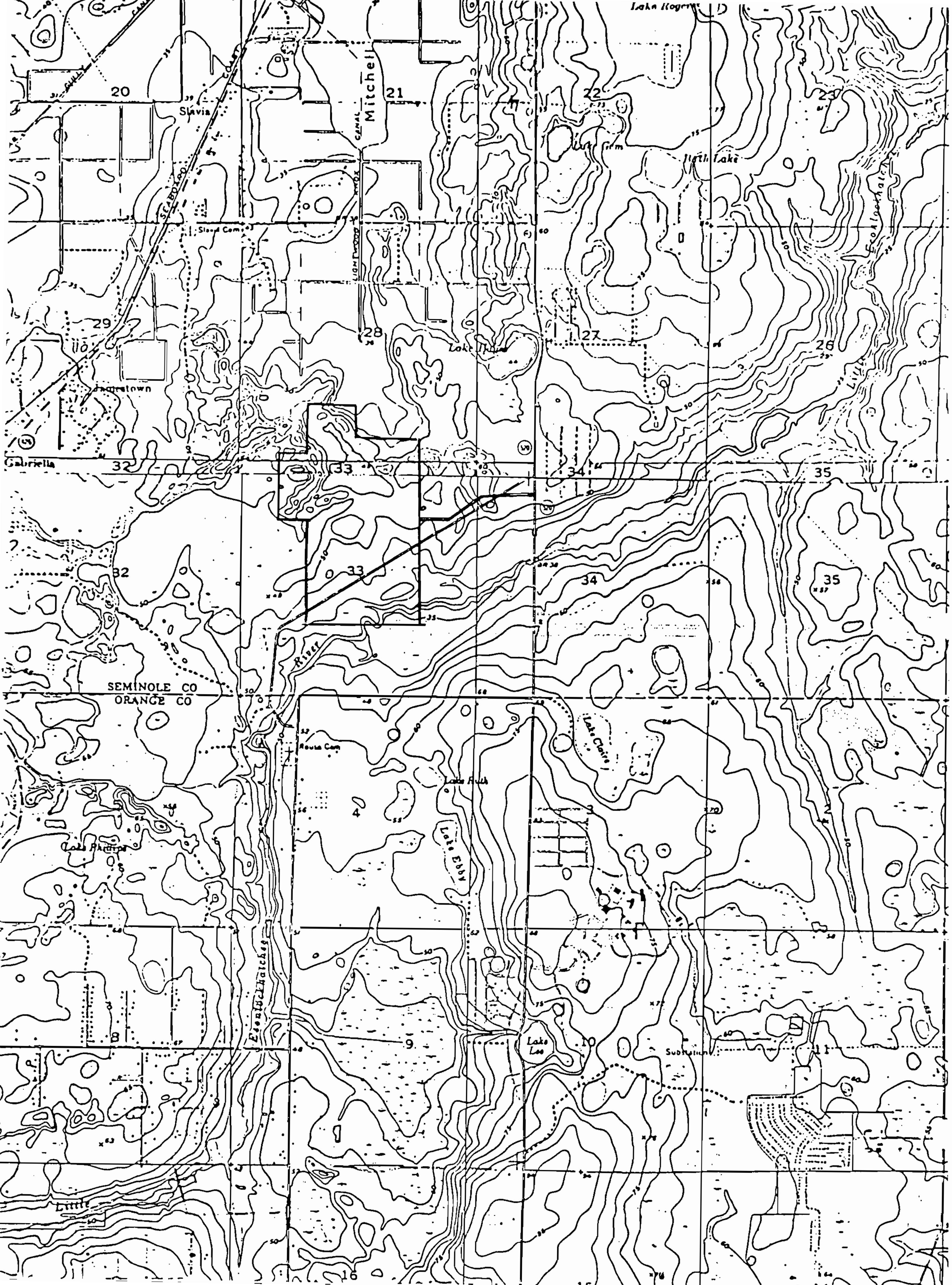


Aerial Photograph

IRON BRIDGE REGIONAL WATER POLLUTION CONTROL PLANT

April 13, 1981


N
ORANGE COUNTY
SEMINOLE COUNTY
FUTURE TRANSMISSION SYSTEM
IRON BRIDGE REGIONAL WATER POLLUTION CONTROL FACILITY
SEMINOLE COUNTY
ORANGE COUNTY
CRANE STRAND PUMPING STATION
CRANE STRAND / IRON BRIDGE ROAD INTERCEPTOR SYSTEM
BENNETT ROAD WPC PLANT (PHASED OUT)
BENNETT ROAD PLANT BYPASS FACILITY
WESTERLY SEWER SERVICE AREA BOUNDARY
ORLANDO
McLEOD ROAD WPC PLANT
ORANGE COUNTY LANDFILL PROPERTY
FUTURE TRANSMISSION SYSTEM
CITY OF ORLANDO
LOCATION MAP
EASTERLY REGIONAL WATER POLLUTION CONTROL PROGRAM


Lake Rogers
20
21
22
23
Mitchell
Slavia
29
28
27
26
Gabriella
32
33
34
35
River
SEMINOLE CO
ORANGE CO
Lake Ruth
Lake Claire
4
3
2
Eeonlockhatchee
Lake Lee
8
9
10
11
Little
16

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SEP 26 1983
SAINT JOHNS RIVER DISTRICT

RECEIVED
SEP 1983
Saint Johns River District

DER
OCT 7 1983
BAQM

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Sludge Drying Facility [X] New[1] [ ] Existing[1]

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

COMPANY NAME: City of Orlando COUNTY: Seminole

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peeking Unit No. 2, Gas Fired) East Line with cyclone + Venturi scrubber + packed tower

SOURCE LOCATION: Street Iron Bridge City Oviedo

UTM: East 478250 North 3166500

Latitude 28 ° 37 ' 20 "N Longitude 81 ° 13 ' 10 "W

APPLICANT NAME AND TITLE: City of Orlando

APPLICANT ADDRESS: P. O. Box 1418, Oviedo, Florida 32765

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of The City of Orlando (Florida)

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:

Robert C. Haven, Director of Public Works
Name and Title (Please Type)

Date: 9/21/83 Telephone No. (305) 849-2266

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

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

(Affix Seal)
JOSEPH L. TESSITORE
PROFESSIONAL ENGINEER
CERTIFICATE NO. 23374
STATE OF FLORIDA

Signed:

Joseph L. Tessitore, P.E.
Name (Please Type)

Cross/Tessitore & Associates, P.A.
Company Name (Please Type)

4759 South Conway Road, Orlando FL 32812
Mailing Address (Please Type)

Florida Registration No. 23374 Date: Telephone No. ~~(305) 851-1484~~

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

SECTION II: GENERAL PROJECT INFORMATION

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

This is an air pollution control system to clean the air from a sewage sludge dryer at the Iron Bridge Road Regional Water Pollution Control Facility. The system consists ~~of cyclone(s) followed by a Venturi scrubber for particulate removal and a packed~~ column using a hypochlorite solution for odor removal. This project will result in full compliance with the FDER air pollution control regulations.

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

Start of Construction July 1980 Completion of Construction March 1982

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.)

Ducts	$ 25,000.00	
Fan	50,000.00	
Scrubber	250,000.00	
Stack	25,000.00	Total $350,000.00

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

N/A

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

F. Normal equipment operating time: hrs/day 16; days/wk 7; wks/yr 52; if power plant, hrs/yr N/A;

if seasonal, describe: N/A

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

1. Is this source in a non-attainment area for a particular pollutant? No
   a. If yes, has "offset" been applied? N/A
   b. If yes, has "Lowest Achievable Emission Rate" been applied? N/A
   c. If yes, list non-attainment pollutants.
   N/A
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) requirements apply to this source? If yes, see Sections VI and VII. No
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

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

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N/A

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

F. Normal equipment operating time: hrs/day 16 ; days/wk 7 ; wks/yr 52 ; if power plant, hrs/yr N/A ;

if seasonal, describe: N/A

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

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

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:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
Conditioned Sewage	Particulate	100	25,480	Item #6
Sludge +			(Dry Solids)	Total Input into Dryer
Recycled Product				

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

1. Total Process Input Rate (lbs/hr): 36,400 (25,480 dry solids)

2. Product Weight (lbs/hr): 2,100 (90% solids) ? 2

C. Airborne Contaminants Emitted:

Name of Contaminant	Emission[1]		Allowed Emission[2] Rate per Ch. 17-2, F.A.C.	Allowable[3] Emission lbs/hr	Potential Emission[4]		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/hr	T/yr	
Particulates	7.0	20.4	Process Weight Table 610-1	17.4	121	264.3	Item 6
SO_2	4.76	10.40	Not Applicable	N/A	4.76	10.4	
NOx	2.02	4.42	Not Applicable	N/A	2.02	4.42	
AC	0.09	0.20	Not Applicable	N/A	0.09	0.02	
Visible Emissions	10%		17-2.610(2)(a)	20%			

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles[5] Size Collected (in microns)	Basis for Efficiency (Sec. V, It[5]
Ducon Venturi Scrubber	Particulate	97%	86%>10μ	Test Data
with Packed Tower			3% <3μ	Item 5

[1]See Section V, Item 2.

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

[3]Calculated from operating rate and applicable standard

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

[5]If Applicable

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 2 oil	92 gal/hr	1,365 gal/hr	18.72

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

Fuel Analysis:

Percent Sulfur: 0.36 Percent Ash: 0.01

Density: 7.162 lbs/gal Typical Percent Nitrogen: 0.012

Heat Capacity: 19,400 BTU/lb 137,158 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.

Solid and liquid wastes go back into waste water treatment plant.

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

Stack Height: 50 ft. Stack Diameter: 4.25 ft.

Gas Flow Rate: 25,600 ACFM Gas Exit Temperature: 120-130 °F.

Water Vapor Content: ~10-13 % Velocity: 30 FPS

SECTION IV: INCINERATOR INFORMATION

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

Description of Waste ______

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

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

Manufacturer ______

Date Constructed ______ Model No. ______

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
No. 2 oil	92 gal/hr	1,365 gal/hr	18.72

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

Fuel Analysis:

Percent Sulfur: 0.36 Percent Ash: 0.01

Density: 7.162 lbs/gal Typical Percent Nitrogen: 0.012

Heat Capacity: 19,400 BTU/lb 137,158 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.

Solid and liquid wastes go back into waste water treatment plant.

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

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Gas Flow Rate: 25,600 ACFM Gas Exit Temperature: 120-130 °F.

Water Vapor Content: ~10-13 % Velocity: 30 FPS

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

Description of Waste ______

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

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

Manufacturer ______

Date Constructed ______ Model No. ______

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

Stack Height: ______________ ft. Stack Diameter ______________ Stack Temp. ______________

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

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

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner [ ] Other (specify) ______________

Brief description of operating characteristics of control devices: ______________

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

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

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

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

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

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

9. An application fee of $20, unless exempted by Section 17-4.05(3), F.A.C. The check should be made payable to the Department of Environmental Regulation.

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

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

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

Contaminant	Rate or Concentration

*Explain method of determining D 3 above.

10. Stack Parameters

a. Height: ft. b. Diameter: ft.

c. Flow Rate: ACFM d. Temperature: °F

e. Velocity: FPS

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

1.

a. Control Device:

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy*:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy**:

h. Maintenance Costs:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

*Explain method of determining efficiency.

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

*Explain method of determining efficiency above.

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device

b. Operating Principles:

c. Efficiency*: d. Capital Cost:

e. Life: f. Operating Cost:

g. Energy: h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

1. Control Device:

2. Efficiency*: 3. Capital Cost:

4. Life: 5. Operating Cost:

6. Energy: 7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a.

(1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City: (4) State:

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

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device

b. Operating Principles:

c. Efficiency*:

d. Capital Cost:

e. Life:

f. Operating Cost:

g. Energy:

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

1. Control Device:

2. Efficiency*:

3. Capital Cost:

4. Life:

5. Operating Cost:

6. Energy:

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

(5) Environmental Manager:

(6) Telephone No.:

*Explain method of determining efficiency above.

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

b.

(1) Company:

(2) Mailing Address:

(3) City:

(4) State:

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

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions*:

Contaminant	Rate or Concentration

(8) Process Rate*:

10. Reason for selection and description of systems:

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

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. ________ no sites ________ TSP ________ ( ) 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.

2. Instrumentation, Field and Laboratory

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

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

B. Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location) ________________________________

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

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

C. Computer Models Used

1. ________________________________ Modified? If yes, attach description.

2. ________________________________ Modified? If yes, attach description.

3. ________________________________ Modified? If yes, attach description.

4. ________________________________ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

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

E. Emission Data Used in Modeling

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

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

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

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

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

SECTION VII – PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. ____________ no sites ____________ TSP ____________ ( ) SO^2* ____________ Wind spd/dir

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

Other data recorded ____

Attach all data or statistical summaries to this application.

2. Instrumentation, Field and Laboratory

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

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

B. Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location) ____

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

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

C. Computer Models Used

1. ____ Modified? If yes, attach description.

2. ____ Modified? If yes, attach description.

3. ____ Modified? If yes, attach description.

4. ____ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

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

E. Emission Data Used in Modeling

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

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

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

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

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

SLUDGE RECOVERY SYSTEM DESCRIPTION/ SPECIFICATIONS

SLUDGE RECOVERY SYSTEM

SYSTEM OPERATING CONDITIONS, DESCRIPTION, DESIGN AND PERFORMANCE

The sludge dewatering and drying system shall meet the following operational parameters:

Kind of Sludge:
- Prethickened to 2% or more solids;
- 21% raw primary sludge;
- 59% waste secondary sludge;
- 20% phosphorus precipitation sludge with alum.

Dry solids per hour:
- 2.6 tons (maximum rate).

Dry solids in filter cake:
- Daily average of not less than 18%.

SS in presses filtrate (initial dewatering section);
- Daily average not over 100 mg/l.

Dry final product:
- Daily average of not over 5% moisture content for bagging.
- 10% moisture for bulk.

Polymer consumption:
- 6.5 lbs/tons dry solids.

Water consumption:
- 80 gpm.

Clean Effluent Water consumption:
- 1100 gpm.

In addition, the system shall have the capability (with required increases or decreases in polymer feeds) to dewater and process aerobically digested sludge separately or in combination with the above sludge, or undigested waste secondary sludge separately, or undigested raw sludge separately, or sludge in different combinations from that stated above. For the waste secondary sludge or the aerobically digested sludge, or a combination of the two, the system shall be capable of providing a dewatered cake with not less than 18% solids (dry weight basis) and an average filtrate suspended solids of not over 100 mg/l. The finished product shall have a moisture content not exceeding 5% for bagging and 10% moisture content for bulk operations.

SLUDGE PUMPING FACILITIES

Sludge Metering Pumps

There shall be furnished and installed sludge metering pumps as shown. Pumps shall be progressive cavity, positive displacement type with infinitely variable speed control. Each pump shall produce 10-35 gpm at 60' TDH (min.) with 5 HP motor and 6-inch diameter suction and 4-inch diameter discharge lines. The pump shall include electric motor slide rail and fabricated steel base. Control shall be at the Automatic Control panels. The pump shall be equipped with a helical rotor of hard chrome overlay coated tool steel and a stator of Buna N or approved equal. Suction and discharge openings shall be suitable for connection to 125 lb. standard flanges. The pump shall be cradle mounted to permit the suction part to be rotated to any desired angle. Hand holes shall be provided in each side of the pump's suction housing. Pumps shall be equipped with gear-type sealed universal joints. The pumps shall be mounted on a fabricated steel base which will accommodate the electric motor and the required accessories. Pumps shall be suitable for handling sewage sludge from 1% to 10%. Provide one uninstalled spare pump with motor and accessories. Pumps shall be Moyno Type SWG Model 1EOES1, as manufactured by Robbins and Myer, Inc., of Springfield, Ohio, or approved equal.

POLYMER SOLUTION STORAGE AND PUMPING FACILITIES

Polymer Solution Storage Tanks

There shall be furnished and installed, as shown on the plans, two (2) polymer storage tanks. Each tank shall be 15,000 gallon capacity, and shall be suitable fiberglass construction, and enclosed with an access manhole and drain for cleaning purposes. Each tank shall be provided with a 5" flanged nozzle 4" long located at the drain elevation for location of a level instrument and a 6" flange in the top for location of a float switch.

Polymer Solution Metering Pumps

There shall be polymer solution metering pumps furnished and installed as shown on the plans. Each pump shall have a capacity to pump from 0.7 to 7.0 gpm at 40' TDH with a ½ H.P., direct current, variable speed drive motor. The pump shall be bronze body with stainless steel shaft and neoprene impellers. Each pump shall deliver a continuous flow of polymer solution to each sludge mixing unit at each filter press. Polymer feed rates shall be continuously adjustable by means of infinitely variable speed controls. All functions of the polymer metering pumps shall be controlled and indicated at the automatic control panel. Provide one extra uninstalled spare pump with motor and accessories.

MECHANICAL SLUDGE DEWATERING AND SLUDGE HANDLING SYSTEM

General

The mechanical sludge dewatering and sludge handling system specified in this section shall include all polymer solution mixing and flocculating components, filter belt presses, controllers, and a belt conveyor to receive dewatered sludge cake and transport it to the sludge cake storage bin, all as shown on the plans.

Dewatering Presses

There shall be provided as shown automatic filter belt presses complete with all accessories and controls to reduce the water content of the liquid sludge from maximum influent concentration of 98.0% water to a maximum cake effluent concentration of 82% water. Each press shall have the capacity to receive 2,000 gallons per hour of the liquid sludge at 98.0% water, and reduce the moisture content to 82% water in the quantity of 2,000 lbs per hour of dry solids.

Each press shall be optimized for dewatering by polymers, by employing filter screens with principal openings no smaller than 0.2 mm, and shall avoid floc destruction by gradually and continuously increasing filtration force as the cake dryness increases--including at least three zones of different filtration principle; a gravity zone, a pressure zone, and a shear/pressure zone. The equipment must utilize the basic physics of dewatering--i.e., the drier the cake, the more pressure and shear it will support; and frequent adjustable, small increases in pressure on the cake are required to produce maximum results and maximum adaptability to future changes in sludge characteristics and polymers available.

In order to achieve this process performance requirement, the machine shall include separately and independently adjustable pressure and shear/pressure steps. Also. because similar appearing sludges can have greatly different pressure and shear resistance characteristics, these steps shall be constructed so all can be adjusted as pressure steps, all as shear/pressure steps, or any combination in between. All of these adjustments shall be possible without interrupting sludge dewatering operations. Presses shall be manufactured by the Ralph B. Carter Co., Model 15/31, or Parkson Corp., or Komline-Sanderson or approved equal.

Routine maintenance shall be possible without taking the dewatering systems out of service. In addition, when replacement of the dewatering belt media is required, either belt shall be easily and quickly replaceable, without requiring removal of machine components, or changes in pressure and shear/pressure adjustments.

All directly wetted parts ahead of the gravity zones shall be of non-corrosive materials; all structural steel members shall be properly prepared by sandblasting and coated with high grade two-part epoxy finish. All motors shall be totally enclosed, forced circulation or non-ventilated. Minimum corrosion protection on all sheet metal parts shall be heavy coat, hot dipped galvanized.

Each press shall be provided with an individual control, monitored through the master control, all as specified in Section 525, Subsection 11 of these specifications.

Sludge Cake Belt Conveyor

One (1) 36-inch wide belt conveyor shall be installed at the location shown on the plans. The conveyor belt is to have a capacity of 42-cubic ft. per minute at 60 ft. per minute belt speed. The conveyor belt is to have two-ply nylon carcass belting with 1/8-inch by 1/32-inch thick, smooth black rubber conveyors of a working tension of 210 lbs. per inch of width. Unit to be designed to have horizontal runs without material transfer points. 2½-inch diameter carbon steel idlers mounted on carbon steel rectangular steel conveyor flange. Pulleys 10-inch diameter and suitably center lagged. Belt support on return run shall be 8-inch diameter wheels mounted on shafting and operating in ball bearing flanged blocks. Adjustable steel belt scraper to be mounted near discharge pulley. Complete drive assembly to operate the belt at 60 ft. per minute to be mounted over discharge end consisting of a motor direct coupled to a worm gear reducer. Out-put shaft of reducer drive shaft of conveyor through chain and sprockets complete with OSHA approved guard.

SLUDGE DRYING AND PELLETIZING SYSTEM

General

The sludge drying systems shall be installed in the location shown on the plans. Each shall consist of a rotary-type dryer and a dual fuel furnace (natural gas and No. 2 fuel oil), complete with controls and accessories.

Sludge Dryers

The sludge dryer shall conform to the following: (1) Evaporation Capacity: 12,000 lbs/ H_2O/hr. Three cylinder with compound showering flights formed with drum shell. Heavy duty chain drive powered from pinion sprocket mounted on simplified counter shaft to monolithic ring sprocket bolted to drum. Outer cylinder insulated. Drum rotates on machined steel running bands. (2) Drum Bases: Fabricated steel with nickel alloy iron rollers carried on Timken roller bearings. Drive base is equipped with counter shaft, drive and idler sprockets, speed reduction unit and double flanged rollers for fixed drum alignment. Idler base is equipped with flat rollers for drum expansion.

Input product shall be a mixture of wet sludge cake and recycled previously dried material. The rate must be set in such a way that a uniform pelletized material is produced without addition of chemicals.

Output product shall be sludge grains of less than 5 percent water content and 4 mm on a maximum diagonal.

Product residence time shall be at least 20 minutes.

Product temperature shall be at least 150^{0} but less than $230^{0}F$, upon discharge from the dryer.

The furnace shall be equipped with replaceable abrasion resistant refractory plates.

Dryer shall be Model 105-32, rotary type with multiple-pass, co-current product flow sludge dryer, as manufactured by the Heil Company, of Milwaukee, Wisconsin, or approved equal.

Heat Source

The sludge dryer shall be equipped with directly connected end-fired furnace housing with dual fuel low pressure air atomizing burner and pressure blower. Unit shall be piped for either oil or gas. Dual fuel piping shall be furnished. Piping shall include throttling fuel valves, safety shut-off valves, oil relief valve, pressure gauges, throttling air valve, gas/electric ignition and standard pipe fittings between burner and furnace fuel connection.

Maximum oil consumption is 180 gph. Oil pump and filters furnished. All grades of fuel oil can be utilized; however, heavy grades must be pre-heated.

Maximum natural gas consumption is 28,000 CFH. Natural gas for main fuel line must be supplied to furnace connections at a minimum of 5 PSIG pressure.

Electric/Gas Ignitor is operative on all types of gas at pressures not to exceed 1 psig.

Fuel supply piping to furnace connections, oil tank, oil pre-heater, furnace refractory and gas pressure regulators capable of holding desired pressure through complete firing range. Multiple installations shall have individual regulators. The fuel lines connecting the tank and the pump shall be under 30-inches of cover.

Controls: Temperature: Electronically operated, includes temperature regulator, thermocouple, T/C wire and reversing motor operator for mechanical connection to fuel and air valves.

Safety/safety shut-off valves, fan draft pressure switch, flame failure protection, recording thermometer with Hi-Limit Switch and furnace pyrometer.

Power Requirements: Drip-proof general purpose ball-bearing 3 phase, 60 cycle, 480 volt electric motors furnished standard as follows:

Exhaust	200HP	1800 rpm
Drum Drive	40HP	1800 rpm
Oil Pump	1½HP	1200 rpm
Furnace Blower	10HP	3600 rpm.

GAS SOLIDS SEPARATION SYSTEM

Multiclone*Separators

The smaller pellets and the dust shall be separated from the airstream by cyclone separator. Efficiency shall be at least 86% of particles of 10 microns. The separator core shall be of the same, or equivalent, crucible quality material as that of the interior of the dryer.

Attrition samples and rates as specified for the dryer shall also apply to the separators.

Separator construction and functioning shall be such as to prevent the retention of solids on the walls of the core (less than 20 pounds per year), and prevent any substantial aggregation or deterioration of the dryer output particles. High quality construction materials adequate for the imposed service shall be utilized.

A constant speed (2 hp rated) air lock/debridging mechanism shall be attached between the separator collecting container and the screw conveyor to the recycle material bin.

Blowers-Pellet Removal and Heat Recovery

Product shall be extracted from the dryers and caused to separate in Multiclone* separators under the driving force of non-positive displacement blowers powered by a constant speed motor.

Volumetric air flow shall be at least 32,000 cfm. Decibel level shall be within limits of OSHA standards.

Blower suction shall be connected to the separator: the discharge to the wet scrubber intake. System supplier shall furnish all necessary air intakes, discharges, duct work, expansion-construction devices, dampeners, filters, valves, silencers, and other appurtenances.

The blower motor shall be drip-proof general purpose ball bearing, 3 phase, 60 cycle, 480 volt, 200 hp, and less than 1600 rpm.

Additionally, motors shall meet the requirements of the Section entitled "Electric Motors" of these specifications.

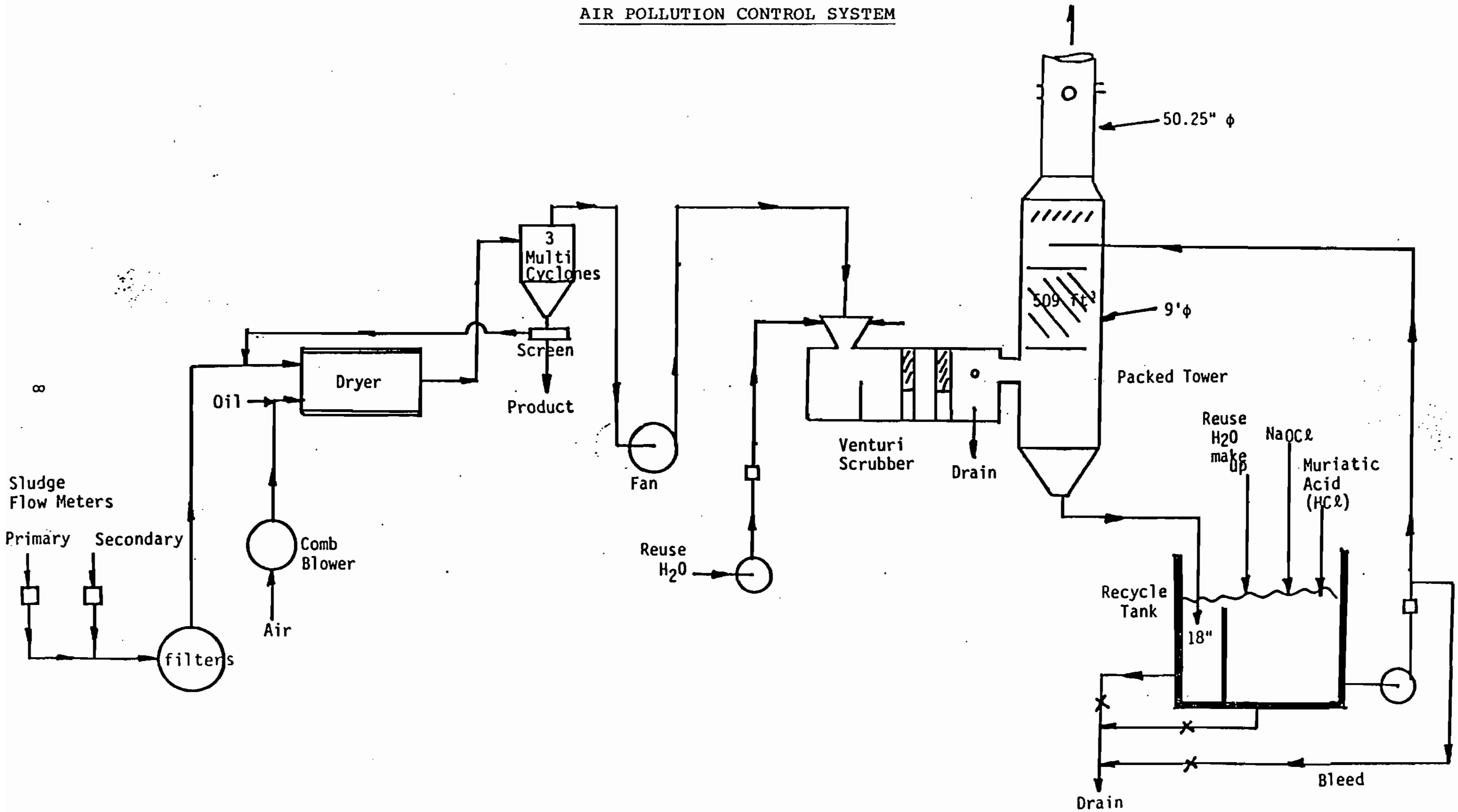
Each blower and motor shall be enclosed in a prefabricated, acoustical, noise reducer enclosure with door, window, and ventilation fan. Preassembled enclosure shall be of the dimensions shown on the plans and as manufactured by the Gal Corporation, of New Brunswick, New Jersey; or Allforce Acoustics, Lord Corporation, or Erie, Pennsylvania, or equal.

*Trademark
Joy Mfg. Co.

1.1 Air Pollution Control System

The attached figure shows a general schematic of the Sludge Recovery System at the Iron Bridge RWPCF. The system is designed to convert primary and secondary waste water sludge to a dry, pelletized product. The APCS consists of three main components as shown in the figure: (1) the cyclones, (2) a horizontal Venturi scrubber, and (3) a vertical packed tower. The cyclones are designed to remove larger dust particles from the air stream, while the horizontal Venturi scrubber removes the finer particles prior to entering the packed tower. The packed tower is designed to remove odorous gases and any remaining particulate from the air stream, by use of a NaOCl scrubbing solution which flows concurrently to the gas stream and reacts chemically with the odorous compound. The packed tower also includes a mist eliminator (mesh packing) which prevents liquid droplets of scrubbing solution from exiting the stack. Detailed performance observations on these APCS components are presented in Section 5.0 of this report.

AIR POLLUTION CONTROL SYSTEM



ITEM 1 PROCESS WEIGHT DERIVATION

Item 1 Process Weight Derivation

The process weight for this facility was based on operation data for the months of April, May, and June in 1983. The operational data is tabulated in attached Table 1-1. Based on this operational data and the mass balance shown in Figure 1-1, the following process design parameters were established.

Solids Input into Dryer

(36,400) lb/hr x (0.70) = 25,480 lbs/hr

Sludge Cake Feed (From Filter Press)

10,000 lb/hr ($\sim$ 20% Solids)

or $\sim$ 2000 lb/hr

Dry Product Rate

2100 lb/hr ($\sim$ 90% Solids)

or $\sim$ 1890 lbs/hr

Table 1-1

Iron Bridge Sludge Dryer System Operational Data

Month	Press Cake Filter Solids (%)	Press Cake Solids (tons/hr)
April 1983	17.78	0.89
May 1983	18.35	0.90
June 1983	19.08	1.00

	Dryer Production Hours (hrs/day)	Product Rate (tons/day)	tons/hr	lbs/hr
April 1983	20.54	18.50	0.90	1801
May 1983	23.05	22.55	0.978	1957
June 1983	24.79	25.92	1.046	2091

16 hrs per day

5824 hours per year

Process Weight Flow Diagram

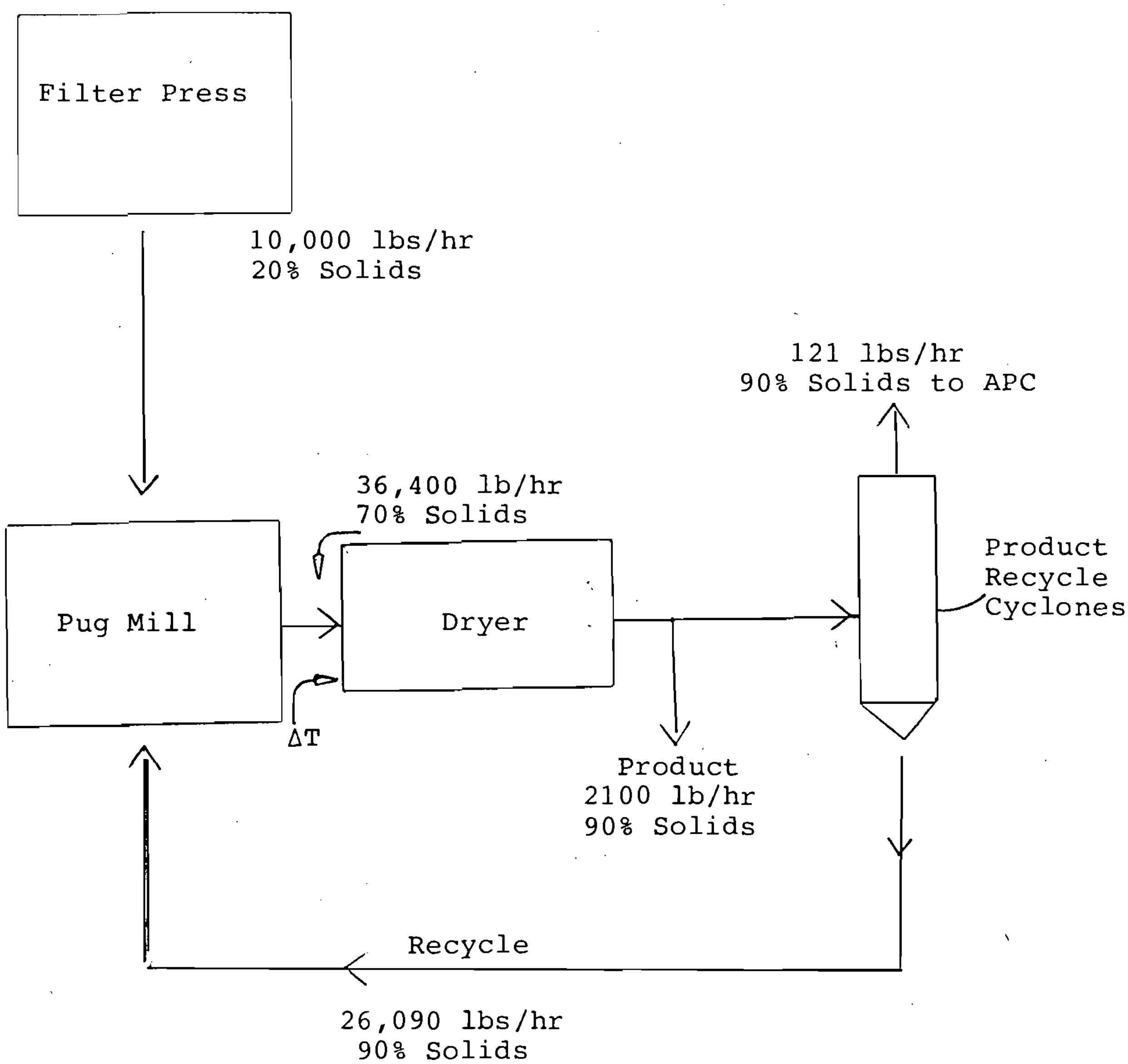


Figure 1-1

Not to Scale

ITEM 2 CONTROLLED EMISSIONS

Item 2 Controlled Emissions

Particulate

Uncontrolled Emissions = 121 lbs/hr

Controlled Emissions = 121 (1-0.97)

= 3.63 lb/hr = 7.93 ton/year

Summary of Controlled Emissions

	lbs/hr	tons/year
Particulate	3.63	7.93
Sulfur Dioxide	4.76	10.40
Nitrogen Oxides	2.02	4.42
Hydrocarbons	0.09	0.20

ITEM 3 POTENTIAL EMISSIONS

Item 3 Potential Emission Calculations*

a) Particulate

From mass flow balance on Process Weight Diagram

(Design Conditions)

Uncontrolled Solids = 121 lbs/hr

Annual Emissions = $(121)\ \frac{lbs}{hr} \times (12)\ \frac{hrs}{day} \times (7)\ \frac{days}{week}$

$\times (52)\ \frac{wks}{yr} \times (\frac{1}{2000})\ \frac{T}{lbs}$ = 264.3 T/yr

b) Sulfur Dioxide

From fuel analysis, %S = 0.36

Fuel Consumption = 92 gal/hr

Annual Emissions = $(92)\ \frac{gal}{hr} \times (7.162)\ \frac{lbs}{gal}$

x (2) x (0.0036) x (12) hrs/day

x (7) days/week x (52) weeks/year x $(\frac{1}{2000})$ T/lbs

= 10.4 T/yr

c) Nitrogen Oxides

From AP-42, Table 1.3-1, Distillate Oil

(Industrial/Commercial)

NO_2 = 22 lbs/10^3 gal

12 hrs/day

Annual Emissions = (92) gal/hr x (12) hrs/day

x (7) days/week x (52) weeks/year x $(\frac{22}{1000})$ lbs/gal

x $(\frac{1}{2000})$ T/lbs = 4.42 T/yr

*Revised 9-1-83

d) <u>HC</u>

From AP-42, Table 1.3-1, Distillate

(Industrial/Commercial)

$HC = 1 \text{ lbs}/10^3 \text{ gal}$

<u>Annual Emissions</u> = (92) gal/hr x (12) hrs/day

x (7) days/week x (52) weeks/year x $(\frac{1}{1000})$ lbs/gal

x $(\frac{1}{2000})$ T/lbs = 0.20 T/yr

*Revised 9-1-83

Summary of Potential Emissions

Pollutant	Emissions	
	lbs/hr	tons/yr
Particulates	121	264.30
Sulfur Dioxide	4.76	10.40
Nitrogen Oxides	2.02	4.42
Hydrocarbons	0.09	0.20

ITEM 4 AIR POLLUTION CONTROL SYSTEM

4.0 Air Pollution Control System Operating Parameters

The original odor control system submitted to the FDER (FDER Permits AC59-59312 and AC59-59313) consists of cyclone collectors, a Venturi scrubber for particle removal, and an absorber (packed tower) for odor control. The odor control unit was operated with recirculated potassium permanganate ($KMnO_4$) as the scrubbing medium. After start-up, the air pollution control systems were modified to accommodate lower system air flows and to correct maintenance problems with the $KMnO_4$ system. At the time of testing, one of the cyclone inlets had been blocked off to achieve a higher efficiency at the lower air flow, and the absorbing solution had been changed from a $KMnO_4$ solution to a hypochlorite solution. The packing in the West Tower (AC59-59313) had been replaced. Also, the test ports and platform had been modified to meet the requirements of FAC Chapter 17.2.

The basic flow diagram for the air pollution control system is illustrated in Figure 4-1. Also, test data recorded during emission testing are presented in Table 4-1. Table 4-2 shows a comparison between measured conditions and design operating conditions.

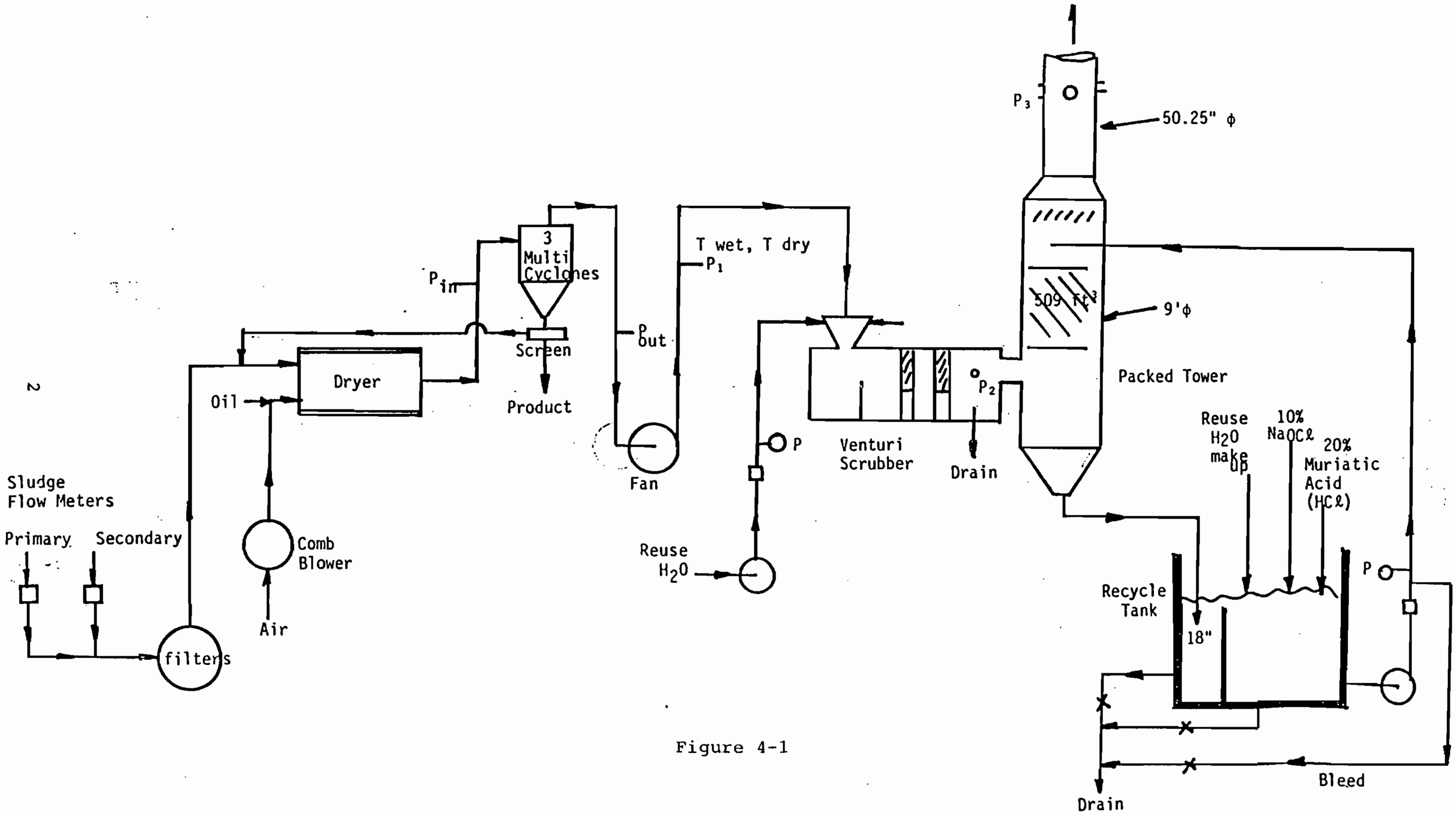


Figure 4-1

H. E. Hesketh, P.E.

Table 4-1

Summary of Weighted Data Representative of Particulate and Odor Test Conditions for City of Orlando, Iron Bridge WWTP Sludge Systems Dust Control Tests

Test Date	5/24/83	5/26/83	5/27/83	5/27/83
Test Side	West	East	East	West
Test For	Partic. & Odor	Partic.	Odor	Partic.
Combustion Blower current, amps	8 1/2	7 1/2	7	8 1/2
Dryer Temp in, °F	800	700	710	750
out, °F	175	172	170	173
Cyclone ΔP, "H_2O	5 1/4	4 3/4	4 1/2	5 1/4
Exhaust Fan current, amps	163	166	162	168
overall static ΔP, "H_2O	23 1/2	23 3/4	23	23 1/4
Venturi Scrubber gas in temp., °F	175	174	174	175
gas out temp., °F	121	116	114	117
water rate, gpm	215	245	245	215
water pump, psig	15	18	15	16
overall ΔP, "H_2O	8 1/2	8 1/2	7 3/4	9
Parked Tower gas in temp, °F	121	116	114	117
gas out temp, °F	124	108	113	120
overall ΔP, "H_2O	5 1/2	6	5 1/4	4
gas residence time, sec.*	1.2	1.2	1.2	1.2
recycle liquid rate, gpm	150	230	235	230
recycle pump, psig	21	27	27	22
recycle liquid ORP, mv	810	840	780	750
recycle liquid acidity, pH	7.0	7.0	7.3	7.0
recycle liquid temp, °F	122	114	110	116
recycle liquid holdup, min*	11.7	7.6	7.5	7.6
recycle liquid conc, ppm Cl_2**	100	65	60	--
tower drain liq.conc,ppm Cl_2**	20	30	20	--
bleed liquid rate, gpm	12	10	10	10
10% NaOCl feed rate, gph**	4	4	4	4
20% muriatic acid feed, gph **	0.1	0.1	0.1	0.1

Note: Data are corrected to account for plant instrument offsets

* Calculated

**See data of Richard J. Kruse, Michigan Science and Engineering Associates for complete values.

Table 4-2

Comparison of Operating Parameters

Location			
(A) Venturi	Design	West (5/27/83)	East (5/26/83)
L/G (Liquid to gas ratio)	8.66 (33700 ACFM)	8.27 (25,557)	9.58 (25,567)
Liquid Rate	Not Specified	215 gpm	245 gpm
ΔP (pressure drop)	20" H_2O	9.0	8 1/2
Pump	20 psig	16 psig	18 psig
Inlet temperature	180°F	175°F	174°F
(B) Packed Tower			
L/G	9.19	8.85	8.99
Liquid rate	310 gpm	230 gpm	230 gpm
Outlet Temperature	119°F	110-130°F	110-130°F
ΔP (pressure drop)	Not Specified	6" H_2O	4" H_2O
Reaction Tank	1000 gal	1000 gal	1000 gal

ITEM 5 DERIVATION OF CONTROL DEVICE EFFICIENCY

Test results

Item 5 Derivation of Control Device Efficiency

Based on the emission testing of 26 May 1983 and 27 May 1983, the particulate emissions from the East and West Side scrubbers are as follows:

	2.913 lbs/hour
	3.013 lbs/hour
	4.200 lbs/hour
	4.655 lbs/hour
	3.074 lbs/hour
Average =	3.570 lbs/hour

Therefore, a scrubber efficiency can be derived:

$$E_{out} = E_{in}\ [1-\eta] \quad \text{where } \eta = \text{scrubber efficiency}$$

$$[1-\eta] = \frac{E_{out}}{E_{in}}$$

$$\eta = 1 - \frac{E_{out}}{E_{in}} = 1 - \left(\frac{3.57}{121.0}\right) = 0.97$$

ITEM 6 SYSTEM FLOW DIAGRAM

SLUDGE DRYING SYSTEM FLOW DIAGRAM

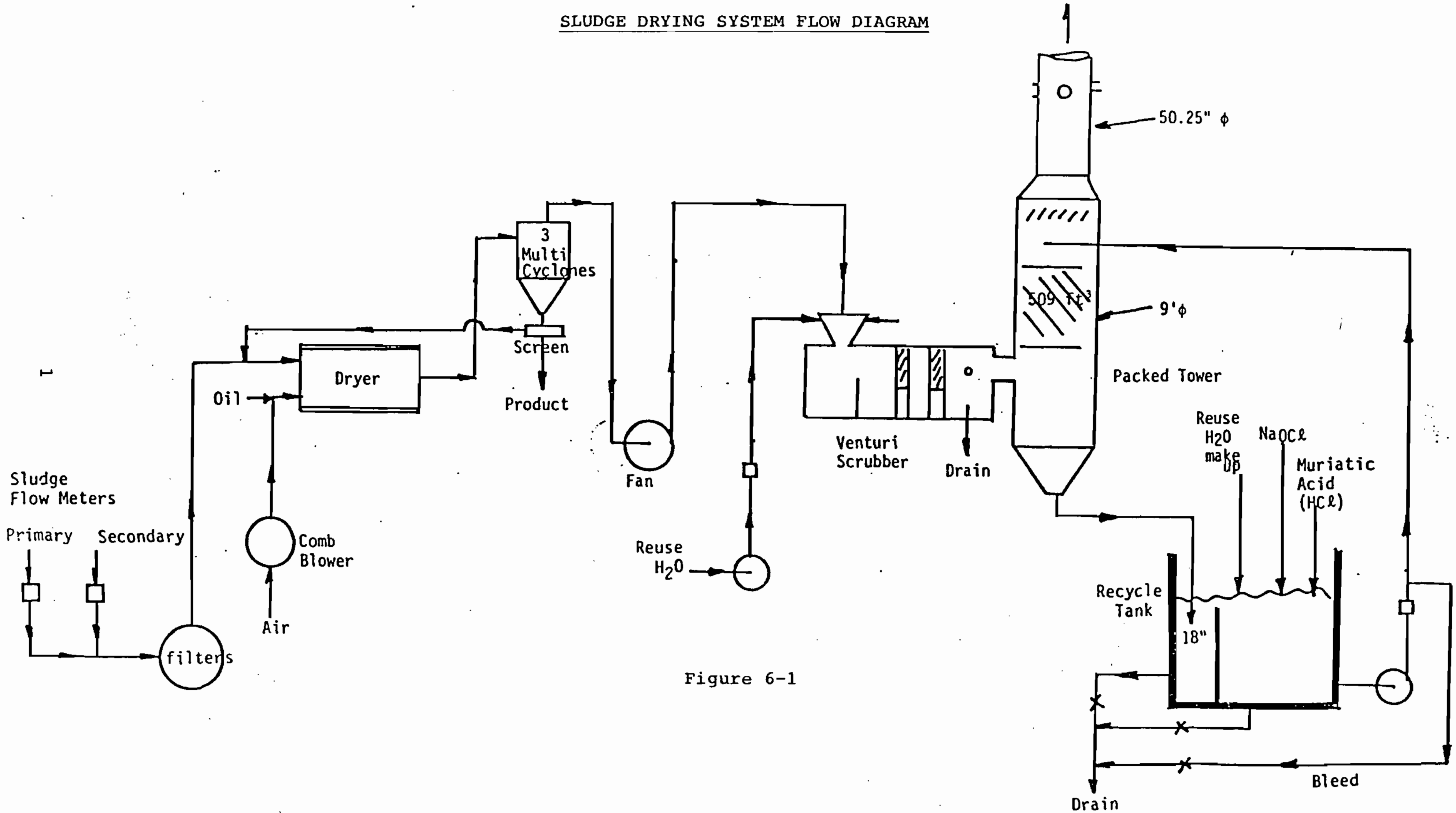


Figure 6-1

PARTS LIST

WET SCRUBBER CHEMICAL SYSTEM

CHEMICAL FLOW DIAGRAM P-224

1.	Wet Scrubber	ESP Item No. 28 Ducon Drawing No. K79-2067-3
2.	Chemical Recirculation Tank	ESP Item No. 27 ESP Drawing No. M-201
3.	Chemical Recirculation Pump	ESP Item No. 28 Supplied by Ducon
4.	Chemical Control Panel	ESP Item No. 32 Wiring Diagram, ESP Drawing E-225
5.	pH Control/Indicator	Supplied by Ducon Ducon Items 10-4 and 10-5
6.	ORP Control/Indicator	Supplied by Ducon Ducon Items 10-6 and 10-7
7.	pH Pump	New Wallace & Tiernan Pump same as Item 8
8.	ORP Pump	Supplied by Ducon ESP Item No. 29
9.	ORP Chemical	15 % Solution Sodium Hypochlorite
10.	pH Chemical	31 % Solution Hydrochloric Acid to lower pH 50 % Solution Sodium Hydroxide to raise pH

11. Packing - EAST SIDE, 2" Polypropylene Saddles, original equipment.
WEST SIDE, 4" Spherical Tri-Packs installed as an improvement and agreed upon by Mr. Bill Allman of the City of Orlando and John Glorioso of ESP. Submittal data was sent to the Ducon Company and our consultant, Mr. Dick Kruse, for evaluation prior to purchasing. Both agreed packing would be superior to existing packing.

NOTE: All materials of construction are compatible with the chemicals listed above.

REDESIGN OF PACKED TOWER ODOR CONTROL SYSTEM

BY ESP'S CONSULTANT

MICHIGAN SCIENCE & ENGINEERING ASSOCIATES

Michigan Science & Engineering Associates
P.O. Box 7105 • Ann Arbor, Michigan 48107
Phone: 313-994-0280

May 1, 1983

Mr. John Glorioso
Ecological Services Products, Inc.
Drawer 1137
Dunedin, Florida 33528

Dear Mr. Glorioso,

We have received the design operating conditions of the odor control system at the Iron Bridge site. The system is to be modified for hypochlorite scrubbing of the dryer discharge.

We have tabulated the operating parameters for the packed towers in Table I. Liquid rates are sufficient to thoroughly wet the packing, with good distribution. Gas rates are somewhat high, but are within the operating capabilities of the packings.

Reaction rate data for the system hypochlorite - H_2S is not available directly from the literature. Personal experience in the odor control industry indicates that most systems are modeled after the H_2S - NaOH system for determining efficiencies. Using the H_2S - NaOH experience, the removal efficiencies would be 90% - 99%.

Modifications required to operate the hypochlorite system are minimal. The system requires the addition of a second chemical feed pump and minor plumbing and wiring additions.

We recommend that both chemical feeds enter the recirculation tank on the suction side of the tank baffle within the top 1/3 of the liquid surface.

Operation of the system should follow the recommendations given by Ducon in their letter of April 8, 1983, except for the location of the feed as noted previously.

Overflow should be drawn from the return side of the baffle of the recirculation tank. Industry practices for overflow indicate a range from .01 to 3.0 g.p.m. per 1000 cfm, depending on inlet loadings, solubilities, reaction rates and other factors. We recommend that the overflow be set at 10 g.p.m. as a starting point and adjusted accordingly.

Preliminary tests indicate that the pH should be controlled between 6.5 - 7.5 with a residual chlorine greater than 10 ppm. The ORP control point will be determined by observing the combination of residual chlorine and pH that effects the optimimum odor control.

The ORP of the solution indicates the relative ratios of oxidized to reduced species and not absolute quantities. The exidizing agent (hypochlorous acid) is only one of the species measured.

Operating paramaters from Table II were used to determine flooding characteristics and estimate NTU's using available correlations from the packing suppliers.

East tower is operating at 85% of gas flood at constant liquid rate and 45% of liquid flood at constant gas rate.

West tower flood values cannot be determined from the manufacturer's literature at this time. However, personal communications with Mr. Roelph Jaeger indicate that the column is probably near the 70% - 80% gas flood and 40% - 60% of the liquid flood. We will attempt to verify these parameters and will notify you if there is any important difference.

Sincerely,

Richard J. Kruse

Richard J. Kruse

Chemical Instructions
For
Iron Bridge Road Regional Water Pollution Control Facility
City of Orlando, Florida

OPERATION OF CHEMICAL FEED SYSTEM USING HYPOCHLORITE

Refer to Chemical Flow Diagram P-224 to become acquainted with the components of the system.

Sequence of operation (tanks, scrubbers clean and ORP and pH probes calibrated per Ducon instruction manual).

1. Start filling chemical recirculation tank by turning power on to chemical control panel. Chemical control panel ESP Item 32.

   Note: The level switches in the chemical recirculation tank will not operate without compressed air. Compressed air is supplied to the level switches by the east and west air compressor. The east air compressor supplies compressed air to the east chemical system level switches, the west air compressor supplies the west system. These air compressors are controlled by selector switches mounted on the main control panel.

2. Turn ORP and pH switches on.

3. When chemical recirculation tank is full, start chemical recirculation pump by pushing start button on chemical control panel.

4. After 10 minutes, check ORP and pH indicators.

5. Turn ORP and pH pump control switch to auto. The ORP and pH pumps will start pumping. Adjust the pH and ORP pumps to obtain desired ORP and pH readings.

   See calibration data for these settings. Calibration procedure is listed at the end of calibration data.

   Note: Desired ORP and pH readings can only be determined by experience. The ORP reading, which results in no odor or the least amount of noticable odor, will determine the proper ORP value. If a chlorine odor is detected, reduce pH by 0.5 and re-evaluate ORP setting

6. After correct ORP and pH readings are obtained, open the bleed valve to bleed off 10 GPM of chemical from the chemical recirculation tank.

7. The dryer system can now be started.

8. The level in the chemical recirculation tank will be constantly maintained by the make-up water system.

OPERATION OF CHEMICAL FEED SYSTEM USING HYPOCHLORITE

Continued:

9. The ORP and pH will be constantly maintained by the ORP and pH controllers.
   Note: Be sure there is sufficient Sodium Hypochlorite for ORP control and sufficient Hydrochloric Acid for pH control.

   Also, the stroke of these pumps should be adjusted to minimize the off time of each pump and therefore provide a more continuous feed of chemicals to the system.

10. The chemical recirculation tank should be cleaned and flushed as required. The chemical recirculation tank should be cleaned and flushed out and refilled with clean water, at which time the chemical recirculation pump should be turned on and run for at least 8 hours to clean and flush packing. After packing is flushed, drain and re-flush chemical recirculation tank. While flushing, alternately open and close drain valves of chemical recirculation tank located before baffle and after baffle. Continue opening and closing valves until drain liquid is clear. Experience will dictate this cleaning schedule.

11. See ORP and pH calibration instructions and ORP and pH calibration data.

CHEMICAL SYSTEM

ORP AND pH CALIBRATION PROCEDURE

1. ORP and pH controllers/indicators to be calibrated according to instructions supplied by the Ducon Company, which is included in the Ducon Instruction Manual.

2. The chemical recirculation system to be clean and chemical recirculation tank filled with fresh water.

3. Calibration will be performed with the dryer in normal operation with pH values of 6.5, 7.0 and 7.5 and ORP (Sodium Hypochlorite) concentrations of 0.05%, 0.1%, 0.2% and 0.3%.

   pH will be controlled by using Hypochloric Acid to lower pH or Sodium Hydroxide to raise pH as required.

   Note: Past experience of the operation of the chemical system has indicated the need to lower the pH and, therefore, Hypochloric Acid will be used for initial calibration.
   Hydrochloric

4. Add Sodium Hypochlorite to chemical recirculation to obtain a 0.05% solution.

5. Start dryer system and adjust dryer system for normal operation.

6. After dryer system has operated for at least 1 hour and all temperatures have stabilized, record readings of pH, ORP and temperature chemical recirculation liquid.

7. Repeat Items 4 thru 6 above with solutions of 0.1%, 0.2% and 0.3% Sodium Hypochlorite.

8. Record values of pH, water temperature °F, ORP concentration and ORP meter reading on calibration form. This data sheet will then be used to determine the desired ORP and pH settings.

CHEMICAL SYSTEM CALIBRATION DATA

FOR ____________________ SYSTEM

DATE: ________________________ BY: ______________________________

CHEMICAL RECIRCULATION LIQUID TEMPERATURE: __________°F

pH READING: __________________

ORP CONCENTRATION:		ORP READING
	0.05%	____________________
	0.10%	____________________
	0.20%	____________________
	0.30%	____________________

pH ADJUSTED BY ADDING: ____

ORP ADJUSTED BY ADDING: ____

TABLE I

TOWER DIMENSIONS AND DESIGN CONDITIONS

Diameter	9 ft.
Packing Depth	8 ft.
Air Rate	30,000 acfm
Liquid Rate	310 g.p.m.
Temperature	120^{o} F
R.H.	100%
Column Pressure	Atmospheric
Molecular Weight of Gas	29.7
East Tower	2" Glitch Saddles
West Tower	4" Jaeger Tri-Packs

CALCULATIONS

Area	63.62 ft^2
Velocity	471.6 ft/min.
Air	69.77 $\frac{\text{lb-m}}{\text{min.}}$
Liquid	144.7 $\frac{\text{lb-m}}{\text{min.}}$
Lm/Gm	2.07
Packing Volume	509 ft^3
Residence Time	1.02 seconds

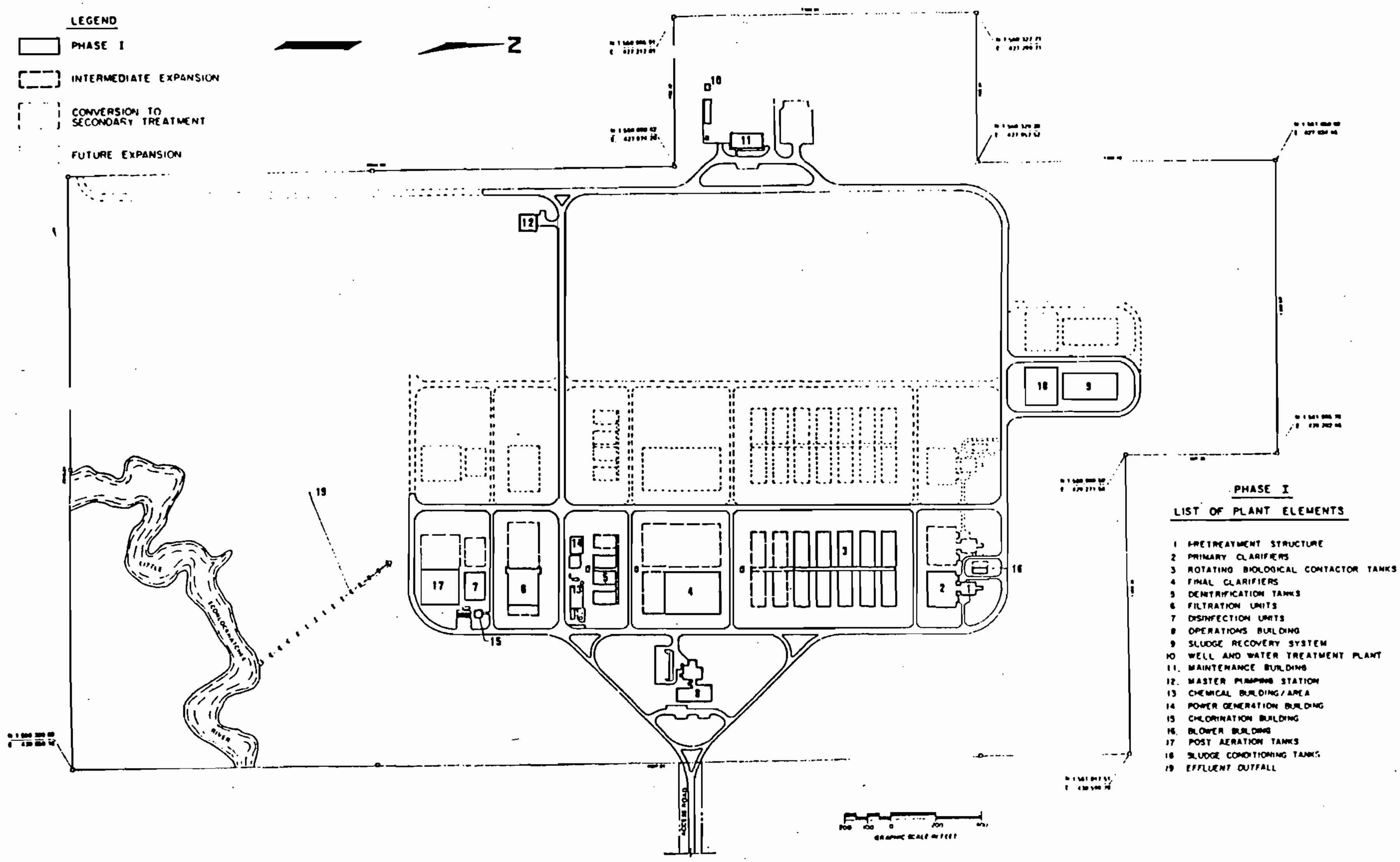
TABLE II

4186.?? lb-m/hr

	lbs/hr	lbs/hr-ft^2	lb-m/hr	lb-m/hr-ft^2
Gas	124,334 (G)	1954 ($\breve{G}$)	1486 (Gm)	65.80 ($\bar{G}m$)
Liquid	156,240 (L)	2456 ($\bar{L}$)	8680 (Lm)	136.44 ($\bar{L}m$)

ITEMS 7 & 8 SITE PLAN AND LOCATION MAPS

IRON BRIDGE REGIONAL WATER POLLUTION CONTROL PLANT

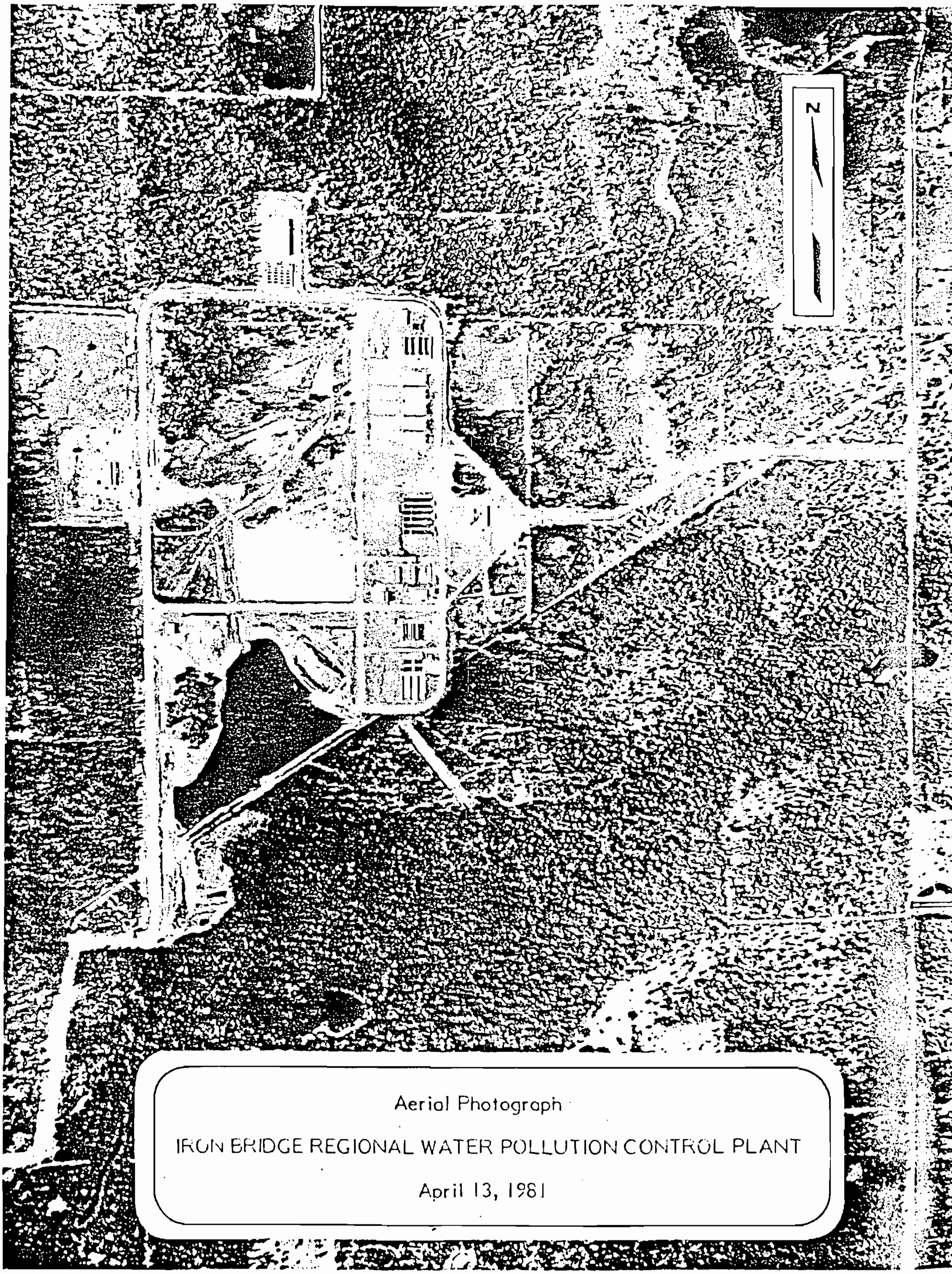


DAWKINS & ASSOCIATES, INC.
CONSULTING ENGINEERS
ORLANDO, FLORIDA

CITY OF ORLANDO, FLORIDA
PUBLIC WORKS DIVISION
EASTERLY WATER POLLUTION CONTROL FACILITIES

SITE PLAN

AG-5

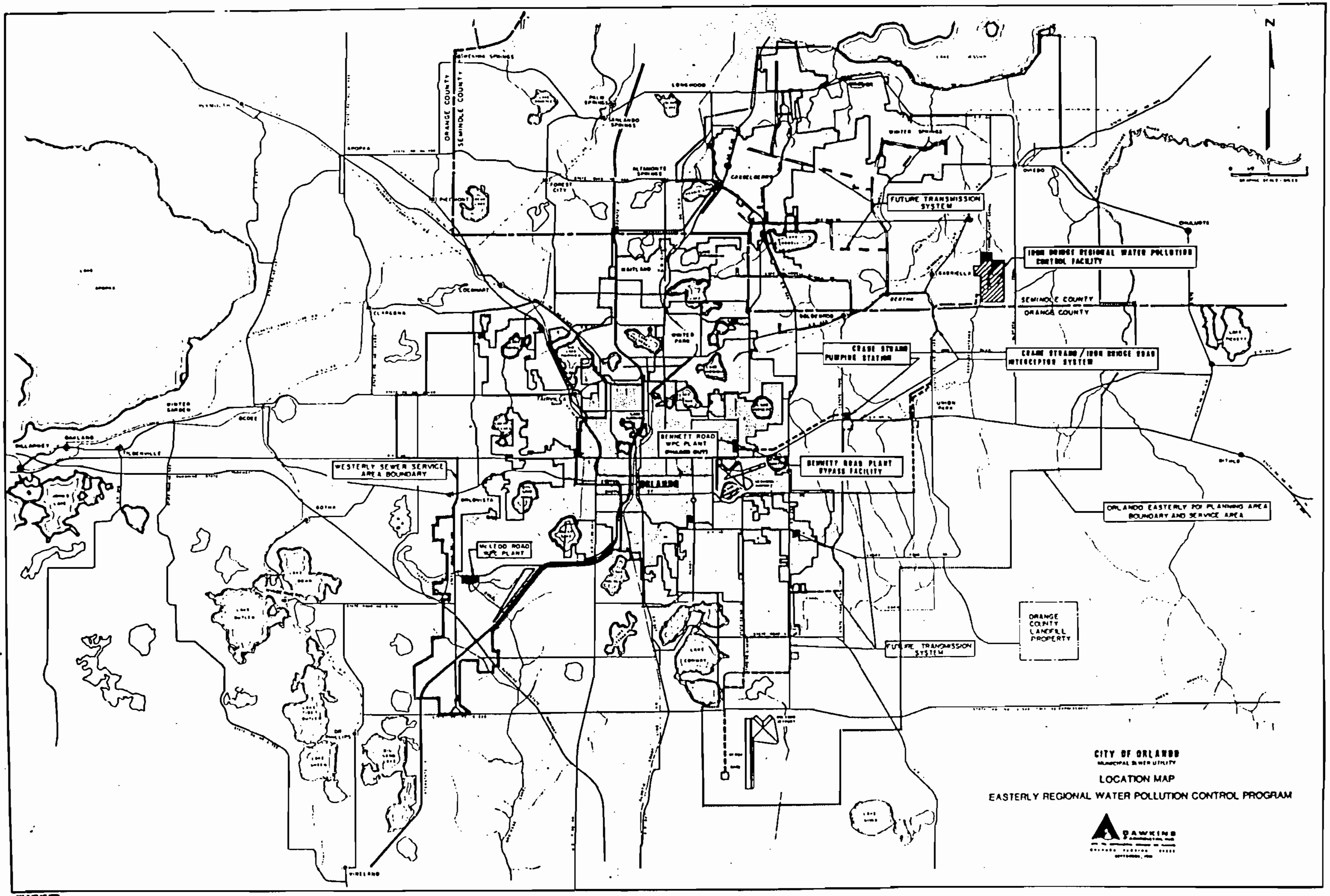


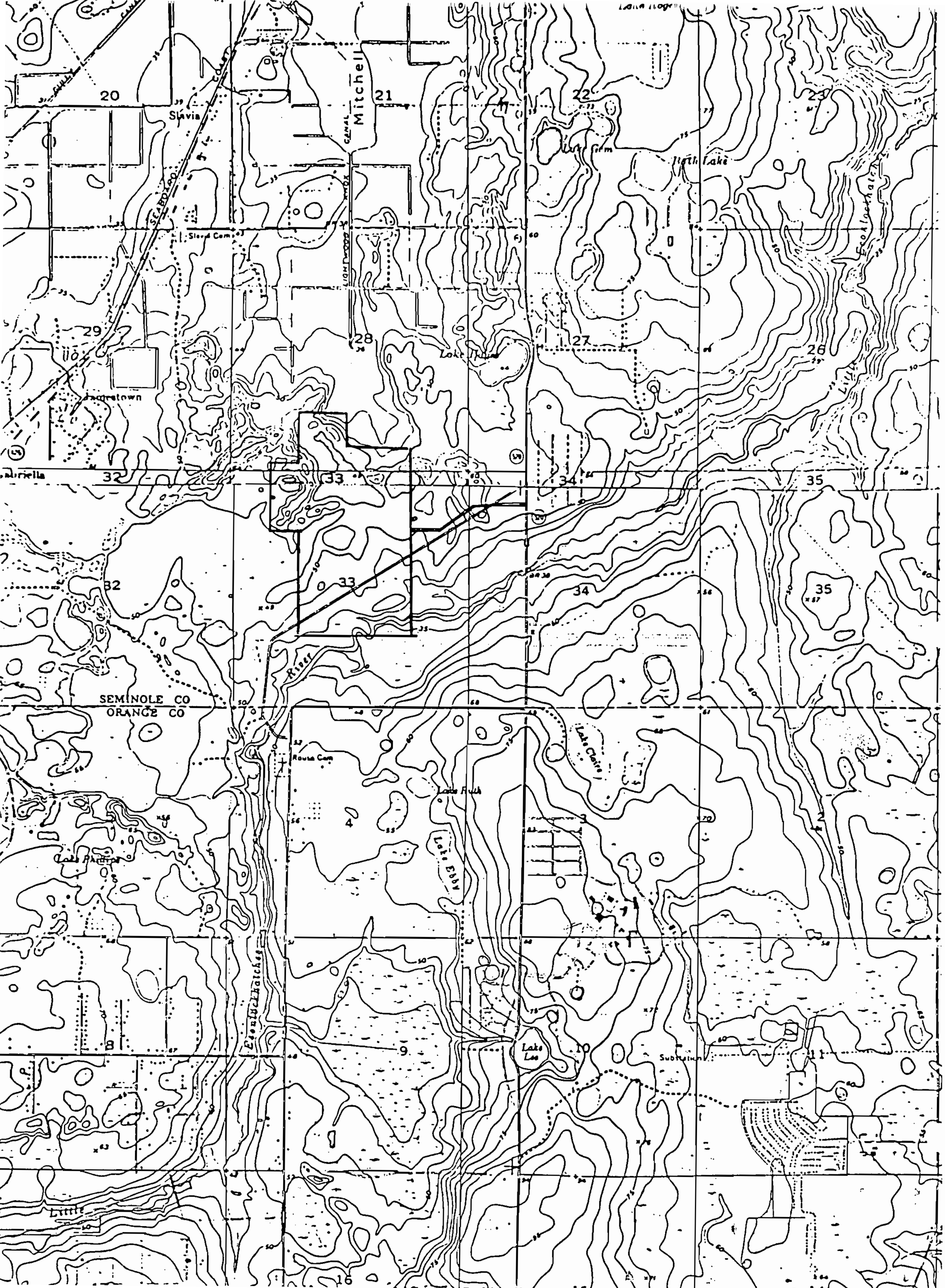
Aerial Photograph

IRON BRIDGE REGIONAL WATER POLLUTION CONTROL PLANT

April 13, 1981

Best Available Copy





Mitchell
Slavia
Little Lake
Little Econlockhatchee
Lake Irma
Lake Tyner
Sanlando
Gabriella
SEMINOLE CO
ORANGE CO
River
Rouse Cem
Lake Ruth
Lake Claire
Lake Ebby
Lake Pickett
Econlockhatchee
Lake Lee
Suburban
Little