**Memorandum**

Florida Department of
Environmental Protection

TO: Howard L. Rhodes

THRU: Trina Vielhauer
Al Linero

FROM Syed Arif

DATE: June 17, 2003

SUBJECT: Georgia-Pacific Palatka Mill
PSD-FL-264A; No. 3 Bleach Plant

Attached for approval and signature is a PSD permit modification to increase the Carbon Monoxide (CO) emission rate and to reduce the daily maximum production rate for the No. 3 Bleach Plant located in Putnam County. Based on initial test data from the new bleach plant, G-P believes that the CO emission limit needs to be revised to adequately reflect process variability of the bleach plant.

The initial construction permit was issued on June 30, 1999. This modification will allow an increase of 123 tons per year of CO emissions, while reducing the maximum daily production rate from 1,702 to 1,440 tons per day of air-dried bleached pulp.

A Best Available Control Technology determination was required for carbon monoxide pursuant to Rule 62-212.400, F.A.C. CO emissions will be controlled through efficient bleaching operations.

The Public Notice was published on May 6, 2003 in the Palatka Daily News. The applicant submitted minor comments on the Technical Evaluation and Preliminary Determination. The Department has taken the comments into consideration and recommended changes will be made to the Technical Evaluation and Preliminary Determination.

I recommend your approval and signature.

/sa

Attachments

Department of
Environmental Protection

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

Jeb Bush
Governor

David B. Struhs
Secretary

June 17, 2003

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Theodore D. Kennedy
Vice President, Operations
Georgia-Pacific Corporation
P.O. Box 919
Palatka, Florida 32178-0919

Re: DEP File No. 1070005-019-AC; PSD-FL-264A
Palatka Mill
No. 3 Bleach Plant

Dear Mr. Kennedy:

The Department has reviewed your (application) request of November 1, 2002, to increase the Carbon Monoxide (CO) emission rate and to reduce the daily maximum production rate for the No. 3 Bleach Plant. Based on initial test data from the new bleach plant, G-P believes that the CO emission limit needs to be revised to adequately reflect process variability of the bleach plant. This request is acceptable to the Department. For the proposed change, greater than significant increases will occur for CO. As such, this pollutant was reviewed under the PSD permitting program.

Based on the above, the Department will modify PSD-FL-264, previously issued on June 30, 1999, as follows:

**SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS**

3. The production rate of the No. 3 Bleach Plant shall not exceed 1,350 tons per day (TPD) of air-dried bleached pulp (ADBP) as a maximum monthly average, nor ~~1,702~~ 1,440 TPD ADBP as a daily maximum. **[Rule 62-210.200, F.A.C.]**

5. Carbon monoxide emissions from the No. 3 Bleach Plant shall be minimized to the extent practicable by efficient bleaching operations. Carbon monoxide emissions from the No. 3 Bleach Plant wet scrubber shall not exceed ~~46~~ 100 pounds per hour and ~~201~~ 324 tons per year. Initial and annual compliance tests will be conducted to demonstrate compliance with this emission limit while processing 100 percent softwood. Initial performance test shall be completed by October 31, 2003. For the duration of all tests the emission units shall be operating at permitted capacity. Permitted capacity is defined as at least 90 percent of the maximum operating rate (1,440 TPD ADBP) allowed by the permit. If it is impracticable to test at permitted capacity, then the emission unit may be tested at less than permitted capacity (i.e., 90% of the maximum operating rate allowed by the permit); in this case, subsequent emission unit operation is limited to 110 percent of the test load until a new test is conducted. Once the emission unit is so limited, then operation at higher capacities is allowed for no more than 15 consecutive days for the purposes of additional compliance testing to regain the

permitted capacity in the permit. If additional physical modification is required to attain 1,440 TPD ADBP, the permittee shall submit an application for Department approval. **[Rules 62-212.400 and 62-297.310, F.A.C.]**

A copy of this letter shall be filed with the referenced permit and shall become part of the permit. This permitting decision is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order (permit modification) has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

Howard L. Rhodes, Director
Division of Air Resources
Management

**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy agency clerk hereby certifies that this PERMIT MODIFICATION was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 6/24/03 to the person(s) listed:

Mr. Theodore D. Kennedy, G-P*
Ms. Myra Carpenter, G-P
Mr. Chris Kirts, DEP-NED
Ms. Jeaneanne Gettle, EPA Region IV
Mr. John Bunyak, NPS
Mr. David Buff, P.E., Golder Associates, Inc.

Clerk Stamp

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

Victoria Gibson June 24, 2003
(Clerk) (Date)

# FINAL DETERMINATION

## Georgia-Pacific Corporation
## No. 3 Bleach Plant, Palatka Mill
## DEP File No. 1070005-019-AC, PSD-FL-264A

An Intent to Issue PSD Permit Modification for Georgia-Pacific Corporation Palatka mill, located north of County Road 216 and west of US 17, Putnam County, Florida, was distributed on April 11, 2003. The Public Notice of Intent to Issue PSD Permit Modification was published in the Palatka Daily News on May 6, 2003. Copies of the draft construction permit were available for public inspection at the Department offices in Jacksonville and Tallahassee.

The Department received no comments from the public, the EPA Region 4 office or the Fish and Wildlife Service. The applicant submitted minor comments on the Technical Evaluation and Preliminary Determination. The Department has taken the comments into consideration and recommended changes will be made to the Technical Evaluation and Preliminary Determination.

The final action of the Department is to issue the PSD Permit Modification with the change noted above.

# APPENDIX BD
## BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

**Georgia-Pacific Corporation**
**No. 3 Bleach Plant**
**PSD-FL-264A / 1070005-019-AC**
**Palatka, Putnam County**

In 1999, G-P applied for a construction permit for the elemental chlorine-free (ECF) three-stage bleach plant. On June 30, 1999, the Department issued a PSD permit to construct the No. 3 Bleach Plant. The No. 3 Bleach Plant was constructed to replace the No. 1 and the No. 2 Bleach Plants and to aid G-P in meeting the Maximum Achievable Control Technology (MACT) Standards promulgated for the pulp and paper industry (40 CFR Part 63) by converting the bleaching system to a totally elemental chlorine-free (ECF) process. Construction for the No. 3 Bleach Plant was completed by February 15, 2001. Based on initial test data from the new bleach plant, G-P believes that the CO emission limit need to be revised to adequately reflect process variability of the bleach plant.

The bleach plant consists of bleaching towers, washers, tanks, and associated equipment. The No. 3 Bleach Plant will be capable of bleaching up to 1,440 tons per day (TPD) of air-dried bleached pulp (ADBP) as a daily maximum and 1,350 TPD ADBP as a maximum monthly average.

The proposed project will result in an increase in carbon monoxide (CO) emissions. PSD review is required for CO since the increase in emissions, per the application, is more than the PSD significance level per Table 62-212.400-2, F.A.C.

The project is subject to Prevention of Significant Deterioration (PSD) review for CO in accordance with Rule 62-212.400, Florida Administrative Code (F.A.C.). A Best Available Control Technology (BACT) determination is part of the review required by Rules 62-212.400 and 62-296, F.A.C. Air pollution control equipment will consist of efficient operation to minimize CO emissions from the No. 3 Bleach Plant.

**PROCESS EMISSIONS**

The applicant proposes the following emissions:

| POLLUTANT | EXISTING EMISSIONS (No. 3 Bleach Plant) | PROPOSED EMISSIONS (No.3 Bleach Plant) | NET CHANGE IN EMISSIONS |
|---|---|---|---|
| CO | 201 TPY | 324 TPY | 123 TPY |

**DATE OF RECEIPT OF COMPLETE BACT APPLICATION:**

March 7, 2003

## BACT DETERMINATION PROCEDURE:

In accordance with Chapter 62-212.400, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case-by-case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically infeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

## BACT EMISSION LIMITS PROPOSED BY APPLICANT:

| POLLUTANT | EMISSION LIMIT | LIMIT BASIS | CONTROL TECHNOLOGY |
|---|---|---|---|
| CO | 100 lb/hr and 324 TPY | Actual test data | Efficient bleaching operations |

## BACT ANALYSIS

### CARBON MONOXIDE (CO)

CO is a byproduct that is formed from the bleaching of Kraft pulp. CO is formed in the chlorine, caustic extraction, and chlorine dioxide bleaching sequences of the bleaching process. Until recently, it was not known how much CO formation could be expected from bleaching using up to 100% $ClO_2$ substitution (NCASI TB 760, 1998). Based on studies performed by NCASI, it has been postulated that CO formation from $ClO_2$ substitution occurs as a result of the synergistic reaction between $ClO_2$ and the lignin in the pulp. The results of the studies do not show a correlation between CO formation and percent $ClO_2$ substitution. However, when using 100% $ClO_2$ substitution, CO emissions appear to increase linearly with

the total percent $ClO_2$ applied on the pulp. Therefore, it would appear that when bleaching using an ECF bleaching process (*i.e.*, 100% $ClO_2$ substitution), reducing the amount of $ClO_2$ applied to the pulp could reduce CO formation. This would suggest that CO emissions from the ECF bleaching process could be "controlled" by maintaining the percentage of $ClO_2$ applied to the pulp at minimum levels that would ensure proper bleaching of the pulp. Thus, ensuring efficient use of $ClO_2$ and efficient operation of the bleaching process will minimize CO emissions.

EPA's BACT Clearinghouse database shows three other determinations besides G-P's original BACT determination. The determinations were made for two different Weyerhaeuser facilities, located in North Carolina and Mississippi. There were no add-on control technologies associated with these BACT determinations. The Mississippi Weyerhaeuser facility's BACT determination was to control CO emissions by ensuring efficient operations of the bleach plant.

At the Department's request, G-P addressed additional control techniques for the reduction of bleach plant CO emissions. Specifically, G-P performed a feasibility and cost analysis for 1) a stand-alone regenerative thermal oxidizer (RTO) and 2) on-site boilers. Cost for other thermal oxidizers types (e.g., catalytic oxidizers) are similar to an RTO and have similar destruction efficiencies.

**Thermal Oxidation**

Thermal incineration generally consists of an auxiliary fuel-fired burner and a combustion chamber. The principle of destruction is to raise the exhaust gases to a sufficiently high temperature, for an adequate retention time, so that oxidation occurs. RTO's are built on the principle of thermal oxidation, but with enhanced fuel efficiency. An RTO consists of two or more heat exchangers connected by a common combustion zone. The heat exchangers use beds of ceramic beads to store and release heat recovered from the oxidation process. The Bleach Plant exhaust air stream enters the first heat exchange bed where air stream passes directly through the ceramic media where it is preheated before entering the combustion chamber. In the combustion chamber, a burner is used to supply any heat necessary to reach optimum combustion temperature (usually 1,400 degrees Fahrenheit or higher) and complete the oxidation process.

The cleaned air stream next enters a second heat exchanger where it passes directly through the ceramic media and is cooled, while simultaneously heating the media before the air stream is exhausted to the atmosphere. The airflow through the heat exchange beds is reversed at regular intervals to conserve the heat of combustion within the RTO. The thermal efficiency of the unit can be as high as 95 percent.

A thermal oxidizer is a technically feasible, although unproven, option for reducing CO emissions from bleach plant wet scrubber vent streams. Since thermal oxidation is technically feasible, an economic analysis was performed by G-P for an RTO following the existing No. 3 Bleach Plant. According to G-P, the total estimated capital investment cost for a CO destruction efficiency of 95% is approximately $5.4 million. The total annual cost is $1,250,000/yr. Based on reduction of 187 TPY (197 TPY x 0.95 = 187 TPY) of CO, the total cost effectiveness is $6,638 per ton of CO removed.

The 197 TPY baseline emission rate used by G-P (instead of the maximum annual CO emissions of 324 TPY) is based on their use of guidance presented in Section B.IV.D.2.b of the New Source Review Workshop Manual- Draft (EPA 1990): "*In addition, historic upper bound operating data, typical for the source or industry, may be used in defining baseline emissions in evaluating the cost effectiveness of a control option for a specific source. For example, if for a source or industry, historical upper bound*

*operations call for two shifts a day, it is not necessary to assume full time (8760 hours) operation on an annual basis in calculating baseline emissions."* G-P concludes that an RTO is not cost-effective for this project.

It is noteworthy that EPA required installation of an oxidation catalyst at a combustion turbine in New York (Sithe) following a cost-effectiveness calculation of approximately $6,000 per ton. On the other hand, EPA determined that an RTO is not required as MACT for pulp bleaching.

The Department does not necessarily follow the procedures in the mentioned EPA document or adhere to previous cost-effectiveness thresholds from projects reviewed by EPA. Further, the Department does not necessarily agree with the cost estimates provided by G-P. While the Department has not set a bright-line threshold for cost-effectiveness of CO control, the value will be less than thresholds for $NO_X$ or $SO_2$. Therefore the Department still accepts G-P's conclusion that an RTO unit for this bleach plant is not cost-effective.

**Incineration in a boiler**

External combustion sources, such as a boiler, induct ambient air into the combustion zone of a primary fuel (e.g., oil or bark) to produce heat and steam. The combustion zone of a boiler will oxidize CO to carbon dioxide. Possible combustion sources at the Mill include the Power Boiler and the Combination Boiler. The Recovery Boiler and Lime Kiln at the Mill combust and convert reactants to chemicals used in the Kraft process, and cannot accept chlorine-containing streams. A cost analysis for incineration in an existing boiler was performed by G-P. The total estimated capital investment cost for a CO destruction efficiency of 95% is approximately $4 million. The total annual cost is $1 million/yr. Based on reduction of 187 TPY (197 TPY x 0.95 = 187 TPY) of CO, the total cost effectiveness is $5,339 per ton of CO removed.

The Department does not necessarily accept G-P's values or that destruction in an existing boiler is technically infeasible. However, the Department accepts their conclusion that destruction in an existing boiler is not cost-effective for this project.

**Conclusion**

Based on available information, it appears that RTO has not been demonstrated on bleach plants and would not be cost-effective for the bleach plant at G-P. Incineration in an existing boiler is also considered economically infeasible. The best method to control CO emissions is through the use of best operational practices. This was the control method recommended for the only other bleach plant PSD/BACT evaluation listed in the EPA's BACT/LAER Clearinghouse database.

**BACT DETERMINATION BY THE DEPARTMENT:**

**CARBON MONOXIDE (CO)**

Based on the information provided by the applicant and other information available to the Department, BACT is "efficient bleaching operations" as a work practice to minimize CO emissions from the proposed No. 3 Bleach Plant. The Department does not concur with the applicant in using upper bound operating

data in defining baseline emissions for the evaluation of cost-effectiveness of a control option. The Department believes that by using the maximum annual CO emissions of 324 TPY, use of an RTO or incineration at an existing boiler will not be cost-effective. The following emission limits are established for the No. 3 Bleach Plant:

| POLLUTANT | EMISSION LIMIT | LIMIT BASIS | CONTROL TECHNOLOGY |
|---|---|---|---|
| CO | 100 lb/hr and 324 TPY | Per application | Efficient bleaching operations |

**COMPLIANCE**

An initial and annual stack test of the No. 3 Bleach Plant wet scrubber stack for CO emissions shall be conducted at 1,440 TPD of air-dried bleached pulp while processing 100 percent softwood in accordance with the EPA Reference Method 10 as contained in 40 CFR 60, Appendix A. Compliance with the work practice standard shall be demonstrated by an Operation and Maintenance (O&M) Plan for the No. 3 Bleach Plant submitted by the applicant on August 15, 2001. The O&M Plan sets forth the practices G-P will employ to result in efficient bleaching operations.

**DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:**

Syed Arif, P.E., Permit Engineer
Department of Environmental Protection
Bureau of Air Regulation - MS 5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended By:

Trina Vielhauer, Chief
Bureau of Air Regulation

6/20/03
Date:

Approved By:

Howard L. Rhodes, Director
Division of Air Resources Management

6/23/03
Date:

**SENDER: *COMPLETE THIS SECTION***

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- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. Theodore D. Kennedy
Vice President, Operations
Georgia-Pacific Corporation
Post Office Box 919
Palatka, FL 32178-0919

***COMPLETE THIS SECTION ON DELIVERY***

A. Received by *(Please Print Clearly)* John Alexander B. Date of Delivery 6-26-03

C. Signature x John Alexander ☐ Agent ☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
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☐ Registered ☐ Return Receipt for Merchandise
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PS Form 3811, July 1999 Domestic Return Receipt 102595-00-M-0952

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*Sent To* Theodore D. Kennedy
*Street, Apt. No.; or PO Box No.* PO Box 919
*City, State, ZIP+4* Palatka, FL 32178-0919

PS Form 3800, January 2001 See Reverse for Instructions

DEP ROUTING AND TRANSMITTAL SLIP

TO: (NAME, OFFICE, LOCATION)

1. Syed Arif - DARM
2. MS # 5500
3.
4.
5.

PLEASE PREPARE REPLY FOR:

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____ DIV/DIST DIR SIGNATURE
____ MY SIGNATURE
____ YOUR SIGNATURE
____ DUE DATE _____

ACTION/DISPOSITION

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

COMMENTS:

Proof for GP's No. 3 Black Plant

RECEIVED
MAY 14 2003
BUREAU OF AIR REGULATION

FROM: Rita Smith DATE: 5-9-03 PHONE: SC 801-3237

DEP 15-026 (12/93)

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

May 7, 2003

Mr. Christopher L. Kirts, P.E.
State of Florida
Department of Environmental Protection
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590

STATE OF FLORIDA
DEPARTMENT OF
ENVIRONMENTAL
PROTECTION
2003 MAY -9 P 1:56
NORTHEAST DISTRICT
JACKSONVILLE, FL

RE: Georgia-Pacific, Palatka Operations
Permit No. 1070005-019-AC (PSD-FL-264A)

Dear Mr. Kirts:

Please find enclosed Proof of Publication of Public Notice for permit 1070005-0019-AC for Intent to Issue a Prevention of Significant Deterioration (PSD) permit modification to Georgia-Pacific Corporation for the No. 3 Bleach Plant.

If further information is needed, please contact me at (386) 329-0918.

Sincerely,

Myra J. Carpenter
Environmental Superintendent

tk

Enclosure

cc: Rita Felton-Smith, FDEP
W. M. Jernigan
Scott Matchett

STATE OF FLORIDA

County of Putnam

The undersigned personally appeared before me, a Notary Public for the State of Florida, and deposes that the Palatka Daily News is a daily newspaper of general circulation, printed in the English language and published in the City of Palatka in said County and State; and that the attached order, notice, publication and/or advertisement:

PUBLIC NOTICE OF INTENT TO IS

Was published in said newspaper 1 time(s) with said being made on the following dates:

05/06/2003

The Palatka Daily News has been continuously published as a daily newspaper, and has been entered as second class matter at the post office at the City of Palatka, Putnam County, Florida, each for a period of more than one year next preceding the date of the first publication of the above described order, notice and/or advertisement.

Jessica Heaton

Sworn to and subscribed to before me this 6th day of May, 2003 by Jessica Heaton, administrative Assistant, of the Palatka Daily News, a Florida corporation, on behalf of the corporation.

Mary Kaye Wells

Mary Kaye Wells, Notary Public
My commission expires July 22, 2003

MARY KAYE WELLS
MY COMMISSION # CC 857333
EXPIRES: July 22, 2003
Bonded Thru Notary Public Underwriters

Notary Seal
Seal of Office:

_____ Personally known to me, or
_____ Produced identification:
_____ Did take an oath

**PUBLIC NOTICE**

**PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION**

**STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**DEP File No. 1070005-019-AC(PSD-FL-264A)**
**Putnam County, Florida**

The Department of Environmental Protection (Department) gives notice of its intent to issue a Prevention of Significant Deterioration (PSD) permit modification to Georgia-Pacific Corporation for the No. 3 Bleach Plant located in Putnam County, Florida. A construction permit was issued to Georgia-Pacific in June 1999 to replace two bleach plants with a new elemental chlorine-free bleach plant. The modification will allow increase of the Carbon Monoxide emission rate and reduce the daily maximum production rate for the No. 3 Bleach Plant. A Best Available Control Technology (BACT) determination was required for carbon monoxide (CO) pursuant to Rule 62-212.400, F.A.C.

The applicant's name and address are Georgia-Pacific Corporation, Post Office Box 919, Palatka, Florida 32178-0919. The Palatka Mill is located at North of CR 216 and West of US 17, Palatka, Putnam County, Florida.

The Department reviewed DACT alternatives and costs presented by Georgia-Pacific CO including regenerative thermal oxidation (RTO) and incineration in an existing boiler. The proposed (draft) BACT determination is that emissions from the new bleach plant will be limited to 100 pounds per hour by efficient bleaching operations.

The net emissions increases due to the original project and its modification are 324 tons per year of CO. An air quality impact analysis was conducted for carbon monoxide. Emissions from the facility will not significantly contribute to or cause a violation of any state or federal ambient air quality standards.

The Department will issue the Final PSD Permit Modification in accordance with the conditions of the Draft PSD Permit Modification unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions. The permitting authority has determined that a PSD Permit Modification is required.

The Department will accept written comments and requests for a public meeting concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of "PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION." Written comments should be provided to the Department's Bureau of Air regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of general Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday though Friday, except legal holidays, at:

Department of Environmental Protection
Bureau of Air Regulation
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32301
Telephone: 850/488-0114
Fax: 850/922-6979

Department of Environmental Protection
Northeast District Office
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256-7590
Telephone: 904/807-3233
Fax: 904/448-4363

The complete project file includes the application, technical evaluations, Draft Permit, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Administrator, New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114, for additional information.

05/06/03

Georgia-Pacific

*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919

CERTIFIED MAIL



7002 0860 0004 1969 9223

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Christopher L. Kirts, P.E.
State of Florida
Department of Environmental Protection
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590

32256+7590

**Memorandum**

# Florida Department of Environmental Protection

TO: Trina Vielhauer

THRU: Al Linero 4/10

FROM: Syed Arif

DATE: April 7, 10, 2003

SUBJECT: Georgia-Pacific Palatka Mill
PSD-FL-264A; No. 3 Bleach Plant

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Attached is the Public Notice and draft permit modification to increase the Carbon Monoxide (CO) emission rate and to reduce the daily maximum production rate for the No. 3 Bleach Plant. Based on initial test data from the new bleach plant, G-P believes that the CO emission limit need to be revised to adequately reflect process variability of the bleach plant.

The initial construction permit was issued on June 30, 1999. This modification will allow an increase of 123 tons per year of CO emissions, while reducing the maximum daily production rate from 1,702 to 1,440 tons per day of air-dried bleached pulp.

A Best Available Control Technology determination was required for carbon monoxide pursuant to Rule 62-212.400, F.A.C. CO emissions will be controlled through good combustion practices.

I recommend your approval and signature.

April 7, 2003 is day 31 of the 90-day time clock.

SA/a

Attachments

# Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary


## P.E. Certification Statement

**Permittee:**
Georgia-Pacific Corporation
Palatka Mill

**DEP File No.** 1070005-019-AC
**Permit No.** PSD-FL-264A

**Project type:** PSD permit modification that will allow an increase in the carbon monoxide emission rate and reduce the daily maximum production rate for the No. 3 Bleach plant. CO emissions will be minimized by good combustion practices.

***I HEREBY CERTIFY*** *that the engineering features described in the above referenced application and subject to the proposed permit conditions provide reasonable assurance of compliance with applicable provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-4 and 62-204 through 62-297. However, I have not evaluated and I do not certify aspects of the proposal outside of my area of expertise (including but not limited to the electrical, mechanical, structural, hydrological, and geological features).*

Syed Arif 4/7/03

Syed Arif, P.E. Date
Registration Number: 51861


Department of Environmental Protection
Bureau of Air Regulation
New Source Review Section
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32301
Phone (850) 488-0114
Fax (850) 922-6979

# Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

April 11, 2003

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Theodore D. Kennedy
Vice President, Operations
Georgia-Pacific Corporation
Post Office Box 919
Palatka, Florida 32178-0919

Re: DEP File No. 1070005-019-AC (PSD-FL-264A)
Palatka Mill
No. 3 Bleach Plant

Dear Mr. Kennedy:

Enclosed is one copy of the Draft Permit, Technical Evaluation and Preliminary Determination, for the referenced project in Putnam County. The Department's Intent to Issue Permit and the "PUBLIC NOTICE OF INTENT TO ISSUE " are also included.

The "Public Notice of Intent to Issue Permit" must be published as soon as possible in a newspaper of general circulation in the area affected. Proof of publication, i.e., newspaper affidavit, must be provided to the Department's Bureau of Air Regulation within 7 (seven) days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit.

Please submit any written comments you wish to have considered concerning the Department's proposed action to A. A. Linero, P.E., Administrator, New Source Review Section, at the above letterhead address. If you have any questions, please call Syed Arif at 850/921-9528.

Sincerely,

Trina L. Vielhauer

Trina L. Vielhauer, Chief,
Bureau of Air Regulation

TLV/sa

Enclosures

In the Matter of an
Application for Permit Modification by:

Mr. Theodore D. Kennedy
Vice President, Operations
Georgia-Pacific Corporation
Post Office Box 919
Palatka, Florida 32178-0919

DEP File No. 1070005-019-AC
Draft Permit No. PSD-FL-264A
Palatka Mill
No. 3 Bleach Plant
Putnam County

## INTENT TO ISSUE PSD PERMIT MODIFICATION

The Florida Department of Environmental Protection (Department) gives notice of its intent to issue a permit modification under the requirements for the Prevention of Significant Deterioration (PSD) of Air Quality (copy of Draft PSD Permit modification attached) for the proposed project, detailed in the application specified above and the attached Technical Evaluation and Preliminary Determination, for the reasons stated below.

The applicant, Georgia-Pacific Corporation, applied on November 1, 2002 (complete March 7, 2003) to the Department for a PSD permit modification to increase the Carbon Monoxide emission rate and to reduce the daily maximum production rate at its existing No. 3 Bleach Plant in Putnam County, Florida.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-212. The above actions are not exempt from permitting procedures. The Department has determined that a PSD Permit Modification and a determination of Best Available Control Technology for the control of carbon monoxide is required to conduct the work.

The Department intends to issue this PSD Permit Modification based on the belief that reasonable assurances have been provided to indicate that operation of these emission units will not adversely impact air quality, and the emission units will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297, F.A.C.

Pursuant to Section 403.815, F.S., and Rule 62-110.106(7)(a)1., F.A.C., you (the applicant) are required to publish at your own expense the enclosed "PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION." The notice shall be published one time only in the legal advertisement section of a newspaper of general circulation in the area affected. Rule 62-110.106(7)(b), F.A.C., requires that the applicant cause the notice to be published as soon as possible after notification by the Department of its intended action. For the purpose of these rules, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address or telephone number listed below. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400 (Telephone: 850/488-0114; Fax 850/ 921-9533). You must provide proof of publication within seven days of publication, pursuant to Rule 62-110.106(5), F.A.C. No permitting action for which published notice is required shall be granted until proof of publication of notice is made by furnishing a uniform affidavit in substantially the form prescribed in section 50.051, F.S. to the office of the Department issuing the permit. Failure to publish the notice and provide proof of publication may result in the denial of the permit pursuant to Rules 62-110.106(9) & (11), F.A.C.

The Department will issue the Final PSD Permit Modification in accordance with the conditions of the attached Draft PSD Permit Modification unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments and requests for a public meeting concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION. Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the Draft PSD Permit Modification, the permitting authority shall issue a Revised Draft PSD Permit Modification and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above. Mediation is not available in this proceeding.

In addition to the above, a person subject to regulation has a right to apply for a variance from or waiver of the requirements of particular rules, on certain conditions, under Section 120.542 F.S. The relief provided by this state statute applies only to state rules, not statutes, and not to any federal regulatory requirements. Applying for a variance or waiver does not substitute or extend the time for filing a petition for an administrative hearing or exercising any other right that a person may have in relation to the action proposed in this notice of intent.

The application for a variance or waiver is made by filing a petition with the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. The petition must specify the following information: (a) The name, address, and telephone number of the petitioner; (b) The name, address, and telephone number of the attorney or qualified representative of the petitioner, if any; (c) Each rule or portion of a rule from which a variance or waiver is requested; (d) The citation to the statute underlying (implemented by) the rule identified in (c) above; (e) The type of action requested; (f) The specific facts that would justify a variance or waiver for the petitioner; (g) The reason why the variance or waiver would serve the purposes of the underlying statute (implemented by the rule); and (h) A statement whether the variance or waiver is permanent or temporary and, if temporary, a statement of the dates showing the duration of the variance or waiver requested.

The Department will grant a variance or waiver when the petition demonstrates both that the application of the rule would create a substantial hardship or violate principles of fairness, as each of those terms is defined in Section

120.542(2) F.S., and that the purpose of the underlying statute will be or has been achieved by other means by the petitioner.

Persons subject to regulation pursuant to any federally delegated or approved air program should be aware that Florida is specifically not authorized to issue variances or waivers from any requirements of any such federally delegated or approved program. The requirements of the program remain fully enforceable by the Administrator of the EPA and by any person under the Clean Air Act unless and until the Administrator separately approves any variance or waiver in accordance with the procedures of the federal program.

Executed in Tallahassee, Florida.

Trina L. Vielhauer, Chief
Bureau of Air Regulation

**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy agency clerk hereby certifies that this INTENT TO ISSUE PSD PERMIT MODIFICATION (including the PUBLIC NOTICE, Technical Evaluation and Preliminary Determination, Draft BACT Determination, and the DRAFT permit) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on 4/11/03 to the person(s) listed:

Mr. Theodore D. Kennedy, Georgia-Pacific Corp.*
Mr. Chris Kirts, DEP-NED
Ms. Jeaneanne Gettle, EPA Region IV
Mr. John Bunyak, NPS
Mr. David Buff, P.E., Golder Associates

Clerk Stamp

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

Victoria Gibson / April 11, 2003
(Clerk) (Date)

**PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION**

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP File No. 1070005-019-AC (PSD-FL-264A)
Putnam County, Florida

The Department of Environmental Protection (Department) gives notice of its intent to issue a Prevention of Significant Deterioration (PSD) permit modification to Georgia-Pacific Corporation for the No. 3 Bleach Plant located in Putnam County, Florida. A construction permit was issued to Georgia-Pacific in June 1999 to replace two bleach plants with a new elemental chlorine-free bleach plant. The modification will allow increase of the Carbon Monoxide emission rate and reduce the daily maximum production rate for the No. 3 Bleach Plant. A Best Available Control Technology (BACT) determination was required for carbon monoxide (CO) pursuant to Rule 62-212.400, F.A.C.

The applicant's name and address are Georgia-Pacific Corporation, Post Office Box 919, Palatka, Florida 32178-0919. The Palatka Mill is located at North of CR 216 and West of US 17, Palatka, Putnam County, Florida.

The Department reviewed BACT alternatives and costs presented by Georgia-Pacific CO including regenerative thermal oxidation (RTO) and incineration in an existing boiler. The proposed (draft) BACT determination is that emissions from the new bleach plant will be limited to 100 pounds per hour by efficient bleaching operations.

The net emissions increases due to the original project and its modification are 324 tons per year of CO. An air quality impact analysis was conducted for carbon monoxide. Emissions from the facility will not significantly contribute to or cause a violation of any state or federal ambient air quality standards.

The Department will issue the Final PSD Permit Modification in accordance with the conditions of the Draft PSD Permit Modification unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions. The permitting authority has determined that a PSD Permit Modification is required.

The Department will accept written comments and requests for a public meeting concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of "PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION." Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within

NOTICE TO BE PUBLISHED IN THE NEWSPAPER

fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

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

Department of Environmental Protection
Bureau of Air Regulation
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32301
Telephone: 850/488-0114
Fax: 850/922-6979

Department of Environmental Protection
Northeast District Office
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256-7590
Telephone: 904/807-3233
Fax: 904/448-4363

The complete project file includes the application, technical evaluations, Draft Permit, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Administrator, New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114, for additional information.

## NOTICE TO BE PUBLISHED IN THE NEWSPAPER

May xx, 2003

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Theodore D. Kennedy
Vice President, Operations
Georgia-Pacific Corporation
P.O. Box 919
Palatka, Florida 32178-0919

Re: DEP File No. 1070005-019-AC; PSD-FL-264A
Palatka Mill
No. 3 Bleach Plant

Dear Mr. Kennedy:

The Department has reviewed your (application) request of November 1, 2002, to increase the Carbon Monoxide (CO) emission rate and to reduce the daily maximum production rate for the No. 3 Bleach Plant. Based on initial test data from the new bleach plant, G-P believes that the CO emission limit needs to be revised to adequately reflect process variability of the bleach plant. This request is acceptable to the Department. For the proposed change, greater than significant increases will occur for CO. As such, this pollutant was reviewed under the PSD permitting program.

Based on the above, the Department will modify PSD-FL-264, previously issued on June 30, 1999, as follows:

**SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS**

3. The production rate of the No. 3 Bleach Plant shall not exceed 1,350 tons per day (TPD) of air-dried bleached pulp (ADBP) as a maximum monthly average, nor ~~1,702~~ 1,440 TPD ADBP as a daily maximum. **[Rule 62-210.200, F.A.C.]**

5. Carbon monoxide emissions from the No. 3 Bleach Plant shall be minimized to the extent practicable by efficient bleaching operations. Carbon monoxide emissions from the No. 3 Bleach Plant wet scrubber shall not exceed ~~46~~ 100 pounds per hour and ~~201~~ 324 tons per year. Initial and annual compliance tests will be conducted to demonstrate compliance with this emission limit while processing 100 percent softwood. Initial performance test shall be completed by October 31, 2003. For the duration of all tests the emission units shall be operating at permitted capacity. Permitted capacity is defined as at least 90 percent of the maximum operating rate (1,440 TPD ADBP) allowed by the permit. If it is impracticable to test at permitted capacity, then the emission unit may be tested at less than permitted capacity (i.e., 90% of the maximum operating rate allowed by the permit); in this case, subsequent emission unit operation is limited to 110 percent of the test load until a new test is conducted. Once the emission unit is so limited, then operation at higher capacities is allowed for no more than 15 consecutive days for the purposes of additional compliance testing to regain the

permitted capacity in the permit. If additional physical modification is required to attain 1,440 TPD ADBP, the permittee shall submit an application for Department approval. **[Rules 62-212.400 and 62-297.310, F.A.C.]**

A copy of this letter shall be filed with the referenced permit and shall become part of the permit. This permitting decision is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order (permit modification) has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

Howard L. Rhodes, Director
Division of Air Resources Management

**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy agency clerk hereby certifies that this PERMIT MODIFICATION was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on _____ to the person(s) listed:

Mr. Theodore D. Kennedy, G-P*
Ms. Myra Carpenter, G-P
Mr. Chris Kirts, DEP-NED
Ms. Jeaneanne Gettle, EPA Region IV
Mr. John Bunyak, NPS
Mr. David Buff, P.E., Golder Associates, Inc.

Clerk Stamp

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

(Clerk) (Date)

DRAFT

# TECHNICAL EVALUATION

# AND

# PRELIMINARY DETERMINATION

## GEORGIA-PACIFIC CORPORATION

Kraft Pulp Mill
Palatka, Putnam County

DEP File No. 1070005-019-AC
PSD-FL-264A

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

April 10, 2003

## 1. APPLICATION INFORMATION

1.1 Applicant Name and Address

Georgia-Pacific (G-P) Corporation
North of CR 216; West of US 17
Palatka, Florida 32177

Authorized Representative: Mr. David Spraley, V.P., Operations

1.2 Reviewing and Process Schedule

11-01-02: Date of Receipt of Original Application
11-14-02: Date of Receipt of Revised Application
11-26-02: DEP Completeness Request
01-06-03: G-P's 1st response to DEP's Completeness Request of 11-26-02
01-28-03: G-P's 2nd response to DEP's Completeness Request of 11-26-02
03-07-03: G-P's submittal of additional information
03-07-03: Application complete

## 2. FACILITY INFORMATION

2.1 Facility Location

The Georgia-Pacific Corporation Palatka pulp and paper mill facility is located North of County Road 216 and west of US 17, near Palatka, Putnam County. This site is approximately 110 kilometers from the Okeefenokee National Wilderness Refuge, a Class I PSD Area. The UTM coordinates of this facility are Zone 17; 434.0 km E; 3283.4 km N.

2.2 Standard Industrial Classification Codes (SIC)

| | | |
|---|---|---|
| Major Group No. | 26 | Paper and Allied Products |
| Industry Group No. | 2611 | Pulp Mills |
| Industry Group No. | 2621 | Paper Mills |

2.3 Facility Category

The Kraft pulp mill, located in Palatka, Florida and operated by G-P, consists of a batch digester system, brown stock washer system, multiple effect evaporator (MEE) system, condensate stripper system, recovery boiler and smelt tanks, lime kiln, tall oil plant, bleach plant, steam boilers, and other equipment to produce finished paper products from virgin wood.

The facility is classified as a major or Title V source of air pollution because emissions of at least one regulated air pollutant exceed 100 TPY. This industry is included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Because emissions are greater than 100 tons per year (TPY) for at least one regulated air pollutant, the facility is classified as a major facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD). Per Table 62-212.400-2, modifications at the facility resulting in emissions increases greater than the listed significance levels require review per the PSD rules and a determination of Best Available Control Technology (BACT) per Rule 62-212, F.A.C. For the proposed change, greater than

significant increases will occur for CO. As such, this pollutant is subject to review under the PSD permitting program.

## 3. PROCESS DESCRIPTION

In 1999, G-P applied for a construction permit for the ECF three-stage bleach plant. On June 30, 1999, the Department issued a PSD permit to construct the No. 3 Bleach Plant. Construction for the No. 3 Bleach Plant was completed by February 15, 2001. Based on initial test data from the new bleach plant, G-P believes that the CO emission limit need to be revised to adequately reflect process variability of the bleach plant.

In the basic ECF pulp bleaching process, chlorine dioxide is substituted for chlorine and/or sodium hypochlorite to bleach the pulp. ECF pulp bleaching can be used to bleach either softwood or hardwood pulp. ECF bleach plants of the design installed by G-P typically bleach the pulp in three stages. The three stages consist of a $D_{100}$ stage (chlorine dioxide stage), an $E_{OP}$ stage (caustic extraction with oxygen and peroxide), and a final D stage (chlorine dioxide stage), resulting in a $D_{100}$ ($E_{OP}$) D sequence. Equipment includes bleaching towers, washers, filtrate tanks, pumps, etc. Pulp to the bleach plant is usually supplied from a high-density chest or washed stock chest for either hardwood or softwood pulp. Air emissions generated from the ECF bleaching process include chlorine, carbon monoxide (CO), volatile organic compounds (VOC), and hazardous air pollutants (HAPs). Total reduced sulfur (TRS) emissions are also potentially generated. An add-on wet scrubber, typically installed on bleach plants, provides control of chlorinated HAPs and some control of VOCs and other HAPs, but does little to control CO emissions.

## 4. PROJECT DESCRIPTION

This permit addresses the following emissions units:

| EMISSION UNIT NO. | SYSTEM | EMISSION UNIT DESCRIPTION |
|---|---|---|
| 036 | Process | No. 3 Bleach Plant |

The applicant proposes to revise the CO emission limit in the No. 3 Bleach Plant PSD permit, Permit No. 1070005-006-AC; PSD-FL-264. G-P is proposing to increase the CO emission limit to 100 lbs/hr and 324 TPY. This increase in emissions reflects the potential for 100 percent softwood processing on a short-term (daily) basis.

In the original PSD application, G-P estimated an average hourly CO emission rate of 63 lbs/hr. This was based on processing 65 percent softwood and 35 percent hardwood, and using the emission factors developed by National Council for Air and Stream Improvement, Inc. (NCASI) in Technical Bulletin No. 760. The NCASI data indicated that CO emissions from softwood bleaching are dependent on the rate of chlorine dioxide ($ClO_2$) application to the pulp, but CO emissions from hardwood bleaching are not dependent on $ClO_2$ application rate. The projected CO emissions from softwood bleaching were estimated as 1.03 pounds per air dried ton of bleached pulp (lbs/ADTBP) for short-term emissions and 0.91 lbs/ADTBP for long-term

emissions. The projected CO emissions from hardwood bleaching were estimated as 0.64 lbs/ADTBP. Maximum hourly emissions from the No. 3 Bleach Plant were based on a projected maximum pulp production rate of 1,702 ADTBP per day. Annual emissions were based on a projected daily average pulp production rate of 1,350 ADTBP per day and a processing ratio of 65 percent softwood and 35 percent hardwood.

G-P has actual operating experience with the No. 3 Bleach Plant and now believes the maximum hourly throughput that can be achieved by the No. 3 Bleach Plant is 60 ADTBP per hour (1,440 ADTBP per day). G-P believes that the average daily throughput rate, on a monthly basis, that was presented in the original application (1,350 ADTBP per day) is still representative.

A series of test runs were recently conducted (October 2002) to measure actual CO emissions from the No. 3 Bleach Plant when processing 100 percent softwood. Of nine test runs conducted over a three-day period, six of the runs were conducted at throughput rates approaching 50 ADTBP per hour or higher which is within 90% of 1,350 ADTBP per day (average daily throughput rate, on a monthly basis). As such, these six runs were used to calculate the average CO emission factor that would be most representative of future operating conditions. The average CO emission factor was calculated to be 1.32 lbs/ADTBP. In order to account for the limited data set, and the potential for process variation, a 95 percent confidence level (statistically corresponding to two standard deviations) was utilized in computing a final emission factor of 1.68 lbs/ADTBP for softwood. This results in a maximum hourly CO emission rate of approximately 100 lbs/hour.

The annual CO emission rate that is being proposed is based on a wood species mix of 65% softwood and 35% hardwood on an annual basis. Due to the lack of Mill-specific data for hardwood processing, NCASI emission factor of 0.64 lb/ADTBP was used. The use of these factors and assumptions results in an annual CO emission rate of 324 TPY.

No other emissions unit at the facility will be affected by the modification of the No. 3 Bleach Plant. No increase in total pulp production by the digester system at the facility will result from the proposed project.

The proposed project will result in a significant emission increase in CO per Table 62-212.400-2, F.A.C., and does require PSD review for CO. Estimated emissions from the original project and the proposed modification are shown below:

| POLLUTANT | EXISTING EMISSIONS (No. 3 Bleach Plant) | PROPOSED EMISSIONS (No. 3 Bleach Plant) | NET CHANGE IN EMISSIONS |
|---|---|---|---|
| CO | 201 TPY | 324 TPY | 123 TPY |

## 5. RULE APPLICABILITY

The project is subject to the federal National Emission Standards for Hazardous Air Pollutants (NESHAPS) for Pulp and Paper Facilities (40 CFR 63, Subpart S), incorporated by reference in

Rule 62-204.800, F.A.C.

The proposed project is subject to permitting, preconstruction review, emissions limits and compliance requirements under the provisions of Chapter 403, Florida Statutes, and Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.).

This facility is located in Putnam County; an area designated as attainment for all criteria pollutants in accordance with Rule 62-204.360, F.A.C. The proposed project is subject to review under Rule 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD), because the potential emission increases for CO exceeds the significant emission rate given in Chapter 62-212, Table 62-212.400-2, F.A.C. PSD review requires an assessment of air quality impacts and a determination of Best Available Control Technology (BACT).

The emission units affected by this permit modification shall comply with all applicable provisions of the Florida Administrative Code (including applicable portions of the Code of Federal Regulations incorporated therein) and, specifically, the following Chapters and Rules:

| | |
|---|---|
| Chapter 62-4 | Permits. |
| Rule 62-204.220 | Ambient Air Quality Protection |
| Rule 62-204.240 | Ambient Air Quality Standards |
| Rule 62-204.260 | Prevention of Significant Deterioration Increments |
| Rule 62-204.360 | Designation of Prevention of Significant Deterioration Areas |
| Rule 62-204.800 | Federal Regulations Adopted by Reference |
| Rule 62-210.300 | Permits Required |
| Rule 62-210.350 | Public Notice and Comments |
| Rule 62-210.370 | Reports |
| Rule 62-210.550 | Stack Height Policy |
| Rule 62-210.650 | Circumvention |
| Rule 62-210.700 | Excess Emissions |
| Rule 62-210.900 | Forms and Instructions |
| Rule 62-212.300 | General Preconstruction Review Requirements |
| Rule 62-212.400 | Prevention of Significant Deterioration |
| Rule 62-213 | Operation Permits for Major Sources of Air Pollution |
| Rule 62-296.320 | General Pollutant Emission Limiting Standards |
| Rule 62-297.310 | General Test Requirements |
| Rule 62-297.401 | Compliance Test Methods |
| Rule 62-297.520 | EPA Continuous Monitor Performance Specifications |
| 40 CFR 63, Subpart A | General Provisions for MACT Sources |
| 40 CFR 63.445 | Standards for Bleaching Systems |
| 40 CFR 63.450 | Standards for Enclosures and Closed-Vent Systems |
| 40 CFR 63.453 | Monitoring Requirements |
| 40 CFR 63.454 | Recordkeeping Requirements |

| | |
|---|---|
| 40 CFR 63.455 | Reporting Requirements |
| 40 CFR 63.457 | Test Methods and Procedures |

## 6. SOURCE IMPACT ANALYSIS

6.1 Air Quality Analysis

6.1.1 Introduction

According to the application, the proposed project will increase emissions of carbon monoxide by more than PSD significant amounts. Carbon monoxide (CO) is a criteria pollutant and has national and state ambient air quality standards (AAQS) defined for it. There are no PSD increments for CO. The PSD regulations require the following air quality analyses for this project:

- A significant impact analysis for CO;
- An analysis of existing air quality for CO, if significance levels are exceeded;
- An analysis of impacts on soils, vegetation, and visibility and of growth-related air quality modeling impacts.

Based on the required analyses, the Department has reasonable assurance that the proposed project, as described in this report and subject to the conditions of approval proposed herein, will not cause or significantly contribute to a violation of any AAQS (there is no PSD increment for CO). However, the following EPA-directed stack height language is included: "In approving this permit, the Department has determined that the application complies with the applicable provisions of the stack height regulations as revised by EPA on July 8, 1985 (50 FR 27892). Portions of the regulations have been remanded by a panel of the U.S. Court of Appeals for the D.C. Circuit in NRDC v. Thomas, 838 F. 2d 1224 (D.C. Cir. 1988). Consequently, this permit may be subject to modification if and when EPA revises the regulation in response to the court decision. This may result in revised emission limitations or may affect other actions taken by the source owners or operators." A discussion of the required analyses follows.

6.1.2 Analysis of Existing Air Quality and Determination of Background Concentrations

Preconstruction ambient air quality monitoring is required for all pollutants subject to PSD review unless otherwise exempted or satisfied. The monitoring requirement may be satisfied by using existing representative monitoring data, if available. An exemption to the monitoring requirement may be obtained if the maximum air quality impact resulting from the projected emissions increase, as determined by air quality modeling, is less than a pollutant-specific *de minimis* concentration. In addition, if EPA has not established an acceptable monitoring method for the specific pollutant, monitoring may not be required.

If preconstruction ambient monitoring is exempted, determination of background concentrations for PSD significant pollutants with established AAQS may still be necessary for use in any required AAQS analysis. These concentrations may be established from the required preconstruction ambient air quality monitoring analysis or from existing representative monitoring data. These background ambient air quality concentrations are added to pollutant impacts

predicted by modeling and represent the air quality impacts of sources not included in the modeling.

The table below shows that predicted CO impacts from the project is predicted to be less than the monitoring *de minimis* level. Therefore, preconstruction ambient air quality monitoring is not required for this pollutant.

**Maximum Project Air Quality Impacts for Comparison to the Monitoring de Minimis Levels.**

| Pollutant | Avg. Time | Max Predicted Impact ($ug/m^3$) | De Minimis Level ($ug/m^3$) | Impact Greater Than de Minimis? |
|---|---|---|---|---|
| CO | 8-hour | 293 | 575 | No |

6.1.3 Models and Meteorological Data Used in the Air Quality Impact Analysis

The applicant and the Department used the EPA-approved Industrial Source Complex Short-Term (ISCST3) dispersion model to evaluate the pollutant emissions from the proposed project. The model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area, and volume sources. The model incorporates elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms, such as deposition. The ISCST3 model allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. The applicant used the EPA recommended regulatory options. Direction-specific downwash parameters were used for all sources for which downwash was considered. The stacks associated with this project all satisfy the good engineering practice (GEP) stack height criteria.

Meteorological data used in the ISCST3 model consisted of a consecutive 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at Jacksonville International Airport, Florida (surface data) and Waycross, Georgia (upper air data). The 5-year period of meteorological data was from 1984 through 1988. These NWS stations were selected for use in the study because they are the closest primary weather stations to the study area and are most representative of the project site. The surface observations included wind direction, wind speed, temperature, cloud cover, and cloud ceiling.

Since five years of data were used in ISCST3, the highest-second-high (HSH) short-term predicted concentrations were compared with the appropriate AAQS. For determining the project's significant impact area in the vicinity of the facility and if there are significant impacts from the project on any PSD Class I area, the highest short-term predicted concentration were compared to the significant impact level.

6.1.4 Significant Impact Analysis

Initially, the applicant conducts modeling using only the proposed project's emissions changes. If this modeling shows significant impacts, further modeling is required to determine the project's

impacts on the AAQS. The G-P facility is located in a PSD Class II area. Polar grids were mainly used for placing receptors. These receptors, comprised of 36 radials spaced at 10-degree intervals, began at the plant property and extended out to a distance of 5.5 kilometers (km). An additional 334 Cartesian grid receptors, spaced at 100 meter (m) intervals, were used to predict impacts along the fence line areas.

In addition, eleven discrete receptors were used to predict CO impacts at the two closest PSD Class I areas. Ten of the eleven receptors were located along the southern and eastern boundaries of the Okeefenokee National Wilderness Refuge (ONWR) located approximately 111 km north-northwest of the facility. One additional receptor was located at the Wolf Island National Wilderness Refuge (WINWR), located approximately 150 km north of the facility.

For each pollutant subject to PSD and also subject to AAQS analyses, this modeling compared maximum predicted impacts due to the project with significant impact levels to determine whether significant impacts due to the project are predicted in the vicinity of the facility. The tables below summarize the results of this modeling. The results of the significant impact modeling indicate that there are no significant impacts predicted from the increase in emissions from this project. Therefore, no further modeling to demonstrate compliance with the AAQS was required.

**Maximum Project Air Quality Impacts for Comparison to the PSD Significant Impact Levels**

| Pollutant | Averaging Time | Maximum Predicted Impact ($ug/m^3$) | Significant Impact Level ($ug/m^3$) | Significant Impact? |
|---|---|---|---|---|
| CO | 8-hour | 293 | 500 | No |
| | 1-hour | 1096 | 2,000 | No |

Because allowable PSD increments do not exist for CO, the Class I modeling analysis was performed only for the Air Quality Related Value (AQRV) assessment. The Class I modeling predicts very low CO impacts upon the Class I areas.

6.2 Additional Impacts Analysis

6.2.1 Impact Analysis Impacts On Soils, Vegetation, And Wildlife

The maximum ground-level concentrations predicted to occur from CO emissions as a result of the proposed project are predicted to be insignificant. As such, this project is not expected to have a harmful impact on soils and vegetation in the PSD Class II area near the G-P facility. An AQRV analysis was performed by the applicant for the Class I area by identifying the AQRV's for the

Class I areas, and assessing potential impacts due to the project.. Predicted CO impacts upon the Class I areas are very small, and no significant impacts on these areas are expected.

6.2.2 Impact On Visibility

A regional haze analysis is used to assess the potential for a significant increase in regional haze in the Class I areas due to this source's projected increase in emissions. Since the visibility criteria is not dependent upon CO emissions, the proposed project is predicted to have no adverse effects on visibility in the Class I area.

6.2.3 Growth-Related Air Quality Impacts

The proposed modification will not significantly change employment, population, housing or commercial/industrial development in the area to the extent that a significant air quality impact will result.

## 7. CONCLUSION

Based on the foregoing technical evaluation of the application and additional information submitted by the applicant, the Department has made a preliminary determination that the proposed project will comply with all applicable State of Florida and federal air pollution regulations, provided the Department's BACT determination is implemented.

Syed Arif, P.E.
Cleve Holladay, Meteorologist

# APPENDIX BD
## BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

**Georgia-Pacific Corporation**
**No. 3 Bleach Plant**
**PSD-FL-264A / 1070005-019-AC**
**Palatka, Putnam County**

In 1999, G-P applied for a construction permit for the elemental chlorine-free (ECF) three-stage bleach plant. On June 30, 1999, the Department issued a PSD permit to construct the No. 3 Bleach Plant. The No. 3 Bleach Plant was constructed to replace the No. 1 and the No. 2 Bleach Plants and to aid G-P in meeting the Maximum Achievable Control Technology (MACT) Standards promulgated for the pulp and paper industry (40 CFR Part 63) by converting the bleaching system to a totally elemental chlorine-free (ECF) process. Construction for the No. 3 Bleach Plant was completed by February 15, 2001. Based on initial test data from the new bleach plant, G-P believes that the CO emission limit need to be revised to adequately reflect process variability of the bleach plant.

The bleach plant consists of bleaching towers, washers, tanks, and associated equipment. The No. 3 Bleach Plant will be capable of bleaching up to 1,440 tons per day (TPD) of air-dried bleached pulp (ADBP) as a daily maximum and 1,350 TPD ADBP as a maximum monthly average.

The proposed project will result in an increase in carbon monoxide (CO) emissions. PSD review is required for CO since the increase in emissions, per the application, is more than the PSD significance level per Table 62-212.400-2, F.A.C.

The project is subject to Prevention of Significant Deterioration (PSD) review for CO in accordance with Rule 62-212.400, Florida Administrative Code (F.A.C.). A Best Available Control Technology (BACT) determination is part of the review required by Rules 62-212.400 and 62-296, F.A.C. Air pollution control equipment will consist of efficient operation to minimize CO emissions from the No. 3 Bleach Plant.

**PROCESS EMISSIONS**

The applicant proposes the following emissions:

| POLLUTANT | EXISTING EMISSIONS (No. 3 Bleach Plant) | PROPOSED EMISSIONS (No.3 Bleach Plant) | NET CHANGE IN EMISSIONS |
|---|---|---|---|
| CO | 201 TPY | 324 TPY | 123 TPY |

**DATE OF RECEIPT OF COMPLETE BACT APPLICATION:**

March 7, 2003

## BACT DETERMINATION PROCEDURE:

In accordance with Chapter 62-212.400, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case-by-case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically infeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

## BACT EMISSION LIMITS PROPOSED BY APPLICANT:

| POLLUTANT | EMISSION LIMIT | LIMIT BASIS | CONTROL TECHNOLOGY |
|---|---|---|---|
| CO | 100 lb/hr and 324 TPY | Actual test data | Efficient bleaching operations |

## BACT ANALYSIS

### CARBON MONOXIDE (CO)

CO is a byproduct that is formed from the bleaching of Kraft pulp. CO is formed in the chlorine, caustic extraction, and chlorine dioxide bleaching sequences of the bleaching process. Until recently, it was not known how much CO formation could be expected from bleaching using up to 100% $ClO_2$ substitution (NCASI TB 760, 1998). Based on studies performed by NCASI, it has been postulated that CO formation from $ClO_2$ substitution occurs as a result of the synergistic reaction between $ClO_2$ and the lignin in the pulp. The results of the studies do not show a correlation between CO formation and percent $ClO_2$ substitution. However, when using 100% $ClO_2$ substitution, CO emissions appear to increase linearly with

the total percent $ClO_2$ applied on the pulp. Therefore, it would appear that when bleaching using an ECF bleaching process (*i.e.,* 100% $ClO_2$ substitution), reducing the amount of $ClO_2$ applied to the pulp could reduce CO formation. This would suggest that CO emissions from the ECF bleaching process could be "controlled" by maintaining the percentage of $ClO_2$ applied to the pulp at minimum levels that would ensure proper bleaching of the pulp. Thus, ensuring efficient use of $ClO_2$ and efficient operation of the bleaching process will minimize CO emissions.

EPA's BACT Clearinghouse database shows three other determinations besides G-P's original BACT determination. The determinations were made for two different Weyerhaeuser facilities, located in North Carolina and Mississippi. There were no add-on control technologies associated with these BACT determinations. The Mississippi Weyerhaeuser facility's BACT determination was to control CO emissions by ensuring efficient operations of the bleach plant.

At the Department's request, G-P addressed additional control techniques for the reduction of bleach plant CO emissions. Specifically, G-P performed a feasibility and cost analysis for 1) a stand-alone regenerative thermal oxidizer (RTO) and 2) on-site boilers. Cost for other thermal oxidizers types (e.g., catalytic oxidizers) are similar to an RTO and have similar destruction efficiencies.

**Thermal Oxidation**

Thermal incineration generally consists of an auxiliary fuel-fired burner and a combustion chamber. The principle of destruction is to raise the exhaust gases to a sufficiently high temperature, for an adequate retention time, so that oxidation occurs. RTO's are built on the principle of thermal oxidation, but with enhanced fuel efficiency. An RTO consists of two or more heat exchangers connected by a common combustion zone. The heat exchangers use beds of ceramic beads to store and release heat recovered from the oxidation process. The Bleach Plant exhaust air stream enters the first heat exchange bed where air stream passes directly through the ceramic media where it is preheated before entering the combustion chamber. In the combustion chamber, a burner is used to supply any heat necessary to reach optimum combustion temperature (usually 1,400 degrees Fahrenheit or higher) and complete the oxidation process.

The cleaned air stream next enters a second heat exchanger where it passes directly through the ceramic media and is cooled, while simultaneously heating the media before the air stream is exhausted to the atmosphere. The airflow through the heat exchange beds is reversed at regular intervals to conserve the heat of combustion within the RTO. The thermal efficiency of the unit can be as high as 95 percent.

A thermal oxidizer is a technically feasible, although unproven, option for reducing CO emissions from bleach plant wet scrubber vent streams. Since thermal oxidation is technically feasible, an economic analysis was performed by G-P for an RTO following the existing No. 3 Bleach Plant. According to G-P, the total estimated capital investment cost for a CO destruction efficiency of 95% is approximately $5.4 million. The total annual cost is $1,250,000/yr. Based on reduction of 187 TPY (197 TPY x 0.95 = 187 TPY) of CO, the total cost effectiveness is $6,638 per ton of CO removed.

The 197 TPY baseline emission rate used by G-P (instead of the maximum annual CO emissions of 324 TPY) is based on their use of guidance presented in Section B.IV.D.2.b of the New Source Review Workshop Manual- Draft (EPA 1990): "*In addition, historic upper bound operating data, typical for the source or industry, may be used in defining baseline emissions in evaluating the cost effectiveness of a control option for a specific source. For example, if for a source or industry, historical upper bound*

*operations call for two shifts a day, it is not necessary to assume full time (8760 hours) operation on an annual basis in calculating baseline emissions."* G-P concludes that an RTO is not cost-effective for this project.

It is noteworthy that EPA required installation of an oxidation catalyst at a combustion turbine in New York (Sithe) following a cost-effectiveness calculation of approximately $6,000 per ton. On the other hand, EPA determined that an RTO is not required as MACT for pulp bleaching.

The Department does not necessarily follow the procedures in the mentioned EPA document or adhere to previous cost-effectiveness thresholds from projects reviewed by EPA. Further, the Department does not necessarily agree with the cost estimates provided by G-P. While the Department has not set a bright-line threshold for cost-effectiveness of CO control, the value will be less than thresholds for $NO_X$ or $SO_2$. Therefore the Department still accepts G-P's conclusion that an RTO unit for this bleach plant is not cost-effective.

**Incineration in a boiler**

External combustion sources, such as a boiler, induct ambient air into the combustion zone of a primary fuel (e.g., oil or bark) to produce heat and steam. The combustion zone of a boiler will oxidize CO to carbon dioxide. Possible combustion sources at the Mill include the Power Boiler and the Combination Boiler. The Recovery Boiler and Lime Kiln at the Mill combust and convert reactants to chemicals used in the Kraft process, and cannot accept chlorine-containing streams. A cost analysis for incineration in an existing boiler was performed by G-P. The total estimated capital investment cost for a CO destruction efficiency of 95% is approximately $4 million. The total annual cost is $1 million/yr. Based on reduction of 187 TPY (197 TPY x 0.95 = 187 TPY) of CO, the total cost effectiveness is $5,339 per ton of CO removed.

The Department does not necessarily accept G-P's values or that destruction in an existing boiler is technically infeasible. However, the Department accepts their conclusion that destruction in an existing boiler is not cost-effective for this project.

**Conclusion**

Based on available information, it appears that RTO has not been demonstrated on bleach plants and would not be cost-effective for the bleach plant at G-P. Incineration in an existing boiler is also considered economically infeasible. The best method to control CO emissions is through the use of best operational practices. This was the control method recommended for the only other bleach plant PSD/BACT evaluation listed in the EPA's BACT/LAER Clearinghouse database.

**BACT DETERMINATION BY THE DEPARTMENT:**

**CARBON MONOXIDE (CO)**

Based on the information provided by the applicant and other information available to the Department, BACT is "efficient bleaching operations" as a work practice to minimize CO emissions from the proposed No. 3 Bleach Plant. The Department does not concur with the applicant in using upper bound operating

Draft

data in defining baseline emissions for the evaluation of cost-effectiveness of a control option. The Department believes that by using the maximum annual CO emissions of 324 TPY, use of an RTO or incineration at an existing boiler will not be cost-effective. The following emission limits are established for the No. 3 Bleach Plant:

| POLLUTANT | EMISSION LIMIT | LIMIT BASIS | CONTROL TECHNOLOGY |
|---|---|---|---|
| CO | 100 lb/hr and 324 TPY | Per application | Efficient bleaching operations |

**COMPLIANCE**

An initial and annual stack test of the No. 3 Bleach Plant wet scrubber stack for CO emissions shall be conducted at 1,440 TPD of air-dried bleached pulp while processing 100 percent softwood in accordance with the EPA Reference Method 10 as contained in 40 CFR 60, Appendix A. Compliance with the work practice standard shall be demonstrated by an Operation and Maintenance (O&M) Plan for the No. 3 Bleach Plant submitted by the applicant on August 15, 2001. The O&M Plan sets forth the practices G-P will employ to result in efficient bleaching operations.

**DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:**

Syed Arif, P.E., Permit Engineer
Department of Environmental Protection
Bureau of Air Regulation - MS 5505
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Draft

Recommended By:

Trina Vielhauer, Chief
Bureau of Air Regulation

Date:

Approved By:

Howard L. Rhodes, Director
Division of Air Resources Management

Date:

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Mr. Theodore D. Kennedy
Vice President, Operations
Georgia-Pacific Corporation
Post Office Box 919
Palatka, FL 32178-0919

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**Golder Associates Inc.**

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

March 6, 2003

0237624

Florida Department of Environmental Protection
2600 Blair Stone Road
Twin Towers Office Building
Tallahassee, Florida 32399

RECEIVED
MAR 07 2003
BUREAU OF AIR REGULATION

Attention: Mr. Syed Arif

Re: DEP FILE NO. 1070005-019-AC (PSD-FL-264A)
GEORGIA-PACIFIC PALATKA OPERATIONS
NO. 3 BLEACH PLANT
SUPPLEMENTAL INFORMATION

Dear Mr. Arif:

Based on our recent conversations, the purpose of this correspondence is to clarify and correct certain information contained in the Golder Associates Inc. (Golder) letter to the Department dated January 28, 2003, regarding the above-referenced project. Each item addressed is identified below.

**Baseline CO Emissions and Cost Effectiveness Calculations**

The first point of clarification is in regard to the calculation of baseline carbon monoxide (CO) emissions from the No. 3 Bleach Plant. These data were presented in Table 1 and in the text of the January 28 letter. Upon review of the data, Georgia-Pacific (G-P) has determined that the fractions of softwood and hardwood shown in Table 1 were transposed for the years 1999 and 2001 (i.e., the year 2001 fractions were really the year 1999 fractions, and vice versa). The following table presents the correct operating rates:

Table 1. BACT Baseline Operating Data for Bleaching Operations, G-P Palatka (revised 03-05-2003)

| Year | Net Throughput[a] (Bleached pulp, tons/yr) | Total Throughput (Bleached pulp, tons/yr) | Fraction Softwood | Fraction Hardwood |
|---|---|---|---|---|
| 2001 | 285,801 | 317,557 | 0.578 | 0.422 |
| 2000 | 281,756 | 313,062 | 0.574 | 0.426 |
| 1999 | 273,803 | 304,226 | 0.633 | 0.367 |

[a] Net throughput reflects a 10% loss of pulp. The amount of pulp entering the bleach plant is equal to net value ÷ 90%

The calculated baseline CO emissions then become:

1999: [(317,557 tons/yr x 0.578 softwood x 1.68 lb CO/ton softwood) +
(317,557 tons/yr x 0.422 hardwood x 0.64 lb CO/ton hardwood)] / 2000 lb/ton
= 197 TPY CO emissions

2000: [(313,062 tons/yr x 0.574 softwood x 1.68 lb CO/ton softwood) +
(313,062 tons/yr x 0.426 hardwood x 0.64 lb CO/ton hardwood)] / 2000 lb/ton
= 194 TPY CO emissions

2001: [(304,226 tons/yr x 0.633 softwood x 1.68 lb CO/ton softwood) +
(304,226 tons/yr x 0.367 hardwood x 0.64 lb CO/ton hardwood)] / 2000 lb/ton
= 197 TPY CO emissions

Consistent with the BACT guidance cited in the January 28 letter, using the highest historic rate among these three years yields a baseline emission rate of 197 TPY. The controlled emission rate for the cost effectiveness calculation is equal to:

Baseline emission rate x (1-control efficiency).

For oxidation in a boiler or a stand-alone oxidizer, the control efficiency is approximately 95%. Thus, the controlled emission rate is equal to: 197 TPY x (1-0.95) = 9.9 TPY

The net reduction in CO emissions from such a control device is then equal to:

197 TPY – 9.9 TPY = 187 TPY

Thus, 187 TPY CO removed should be used in the cost effectiveness calculations. Using this figure, G-P has revised the CO cost effectiveness calculations, previously presented in Table B-2 of the January 28 letter. For both scenarios of controlling CO emissions with either the existing boilers or a new thermal oxidizer, the cost effectiveness is calculated to be greater than $5,300 per ton of CO removed. This cost effectiveness is higher than presented in the January 28 letter. Therefore, for the reasons presented in the January 28 letter, G-P believes these costs are also excessively high.

**Calculation of Percent $ClO_2$ Applied in Bleach Plant**

The data provided in the chart in our submittal to the Department dated January 28, 2003, described the $ClO_2$ application rates in terms of pounds of $ClO_2$ applied per ton of pulp. In order to calculate $\%ClO_2$ as $ClO_2$ use the following formula using the previously mentioned chart.

79 lbs/ton x ton/2000 lbs x 100% = 3.95% $ClO_2$ applied as Total $ClO_2$ on both the Do and D1 Stages

The process data included with each of the compliance tests submitted in the January 28th package lists the $\%ClO_2$ application rates as $ClO_2$ in both the Do and D1 Stages. As an aside, our on-line instrumentation calculates $\%ClO_2$ as equivalent $Cl_2$ in the Do stage because this information is used in the control logic to determine the appropriate application rates based on several operating parameters (incoming Kappa number, brightness, etc.). In this case, the $\%ClO_2$ as equivalent $Cl_2$ is converted to $\%ClO_2$ as $ClO_2$ by dividing by 2.63. The 2.63 is the ratio of the number of pounds of $Cl_2$ to the number of pounds of $ClO_2$ that would yield an equivalent oxidizing potential. In the D1 stage, the $\%ClO_2$ is measured directly as $\%ClO_2$.

Thank you for consideration of this information. Please call if you have any questions concerning this submittal.

Sincerely,

GOLDER ASSOCIATES INC.

David A. Buff

David A. Buff, P. E., Q. E. P.
Principal Engineer
Florida P. E. #19011

cc: M. Carpenter
M. Aguilar
S. Matchett
W. Jernigan

DB/jkw

Enclosures:

4. Professional Engineer Statement:

*I, the undersigned, hereby certify, except as particularly noted herein*, that:*

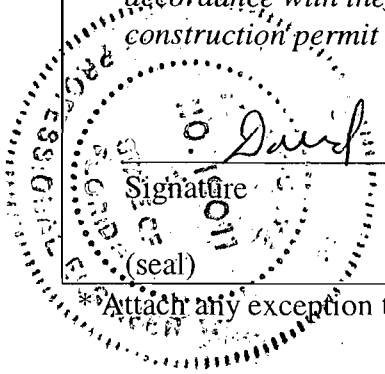
*(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and*

*(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.*

*If the purpose of this application is to obtain a Title V source air operation permit (check here [ ], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.*

*If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [ ], if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.*

*If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [X], if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.*



David A. Buff
Signature

03/05/2003
Date

(seal)

*Attach any exception to certification statement.

Table B-2. Cost Effectiveness for Control of CO Emissions From ECF No. 3 Bleach Plant, Georgia-Pacific, Palatka FL (revised 03/05/2003)

| Cost Items | Cost Factors | Cost ($) Duct to Boiler | Cost ($) Thermal Ox |
|---|---|---|---|
| DIRECT CAPITAL COSTS (DCC): | | | |
| (1) Purchased Equipment Cost | | | |
| (a) Oxidizer/Air Injection Equip/Services | Based on On-site Engineering Estimate | 2,491,934 | 3,299,584 |
| (b) New Stack | included | 0 | 0 |
| (c) Ductwork and Electronic controls | included | 0 | 0 |
| (d) Structural Support | included | 0 | 0 |
| (f) Exhaust Fan | included | 0 | 0 |
| (g) Freight | included | 0 | 0 |
| (h) Sales Tax (Florida) | 6% | 149,516 | 197,975 |
| (i) Instrumentation | included | 0 | 0 |
| (j) Subtotal - Purchased Equipment | included | 2,641,450 | 3,497,559 |
| (2) Direct Installation | included | 0 | 0 |
| Total DCC: | | 2,641,450 | 3,497,559 |
| INDIRECT CAPITAL COSTS (ICC): | | | |
| (3) Indirect Installation Costs | | | |
| (a) Engineering | (0.10) x (PEC) (EPA Factor) | 264,145 | 349,756 |
| (b) Construction & Field Expenses | (0.05) x (PEC) (EPA Factor) | 132,073 | 174,878 |
| (c) Construction Contractor Fee | (0.10) x (PEC) (EPA Factor) | 264,145 | 349,756 |
| (d) Contingencies for retrofit | (0.25) x (PEC) (EPA Factor) | 660,363 | 874,390 |
| (4) Other Indirect Costs | | | |
| (a) Startup | (0.02) x (PEC) (EPA Factor) | 52,829 | 69,951 |
| (a) Testing | (0.01) x (PEC) (EPA Factor) | 26,415 | 34,976 |
| (b) Working Capital | 30-day DOC (EPA Factor) | 19,230 | 20,210 |
| Total ICC: | (3) + (4) | 1,419,199 | 1,873,916 |
| TOTAL CAPITAL INVESTMENT (TCI): | DCC + ICC | 4,060,649 | 5,371,475 |
| DIRECT OPERATING COSTS (DOC): | | | |
| (1) Operating Labor | | | |
| Operator | $22/hr; 1 hr/day for Boiler; 3 hr/day for RTO | 8,030 | 24,090 |
| Supervisor | 15% of operator cost | 1,205 | 3,614 |
| (2) Maintenance | | | |
| Labor (includes inspection of boiler) | 2xOperating Labor for Boiler, 10% of operating labor for RTO | 18,469 | 2,770 |
| Materials | Equivalent to Maintenance Labor | 18,469 | 2,770 |
| (3) Utilities | | | |
| (a) Electricity | $0.075/kWh; 8,760 hr/yr 112 kw Boiler; 201 kw RTO | 73,584 | 132,057 |
| (b) Natural Gas | 1.56 MMBtu/hr; $4.736/MMBtu | -- | 64,720 |
| (c ) Fuel Oil for recoup steam losses | 3.52 MMBtu/hr $3.6/MMBtu (2002 actual average) | 111,007 | -- |
| (4) Chemicals and Materials | | | |
| Ceramic Bed Replacement | Once per 8 yrs @ $100,000 | -- | 12,500 |
| Total DOC: | (1) + (2) + (3) + (4) | 230,763 | 242,521 |
| INDIRECT OPERATING COSTS (IOC): | | | |
| (7) Overhead | 60% of oper. labor & maintenance (EPA Factor) | 27,704 | 19,947 |
| (8) Property Taxes | 1% of total capital investment (EPA Factor) | 40,606 | 53,715 |
| (9) Insurance | 1% of total capital investment (EPA Factor) | 40,606 | 53,715 |
| (10) Administration | 2% of total capital investment (EPA Factor) | 81,213 | 107,430 |
| Total IOC: | (7) + (8) + (9) + (10) | 190,129 | 234,806 |
| CAPITAL RECOVERY COSTS (CRC): | CRF of 0.1424 times TCI (10 yrs @ 7%) | 578,236 | 764,898 |
| ANNUALIZED COSTS (AC): | DOC + IOC + CRF | 999,129 | 1,242,225 |
| UNCONTROLLED BASELINE CO EMISSIONS (TPY) | | 197 | 197 |
| TOTAL CO REMOVED: | 95% removal efficiency | 187.2 | 187.2 |
| COST EFFECTIVENESS: | $ per ton of CO Removed | 5,339 | 6,638 |

Source: Georgia-Pacific Corp, 2003; Golder Associates Inc., 2003.

GEORGIA-PACIFIC PALATKA OPERATIONS
P.O. BOX 919
PALATKA, FLORIDA 32178-0919
TELEPHONE: (386) 325-2001
**FAX NUMBER: (386) 328-0014**

# Fax

| | | | |
|---|---|---|---|
| **To:** | Syed Arif | **From:** | Myra Carpenter |
| **Attn:** | | | Environmental Department |
| **Fax:** | | **Phone:** | 386-325-2001 |
| **Phone:** | | **Fax:** | 386-328-0014 |
| **Pages:** | 2 (including cover) | **Date:** | |

**Comments**

Is this OK? I will fax it again tomorrow if it is OK with the notary seal.
Myra Carpenter

## WAIVER OF PERMIT APPLICATION PROCESSING TIME PERIODS UNDER SECTIONS 120.60(1), 403.0872 AND 403.0876 FLORIDA STATUTES

Permit Application/Project: Bleach Plant PSD Permit
Facility ID No.: 1070005
Applicant's Name: Georgia-Pacific Corporation

The undersigned has read sections 120.60(1), 403.0872 and 403.0876, Florida Statues, and fully understands the applicant's rights under those sections. With regard to the above referenced permit application, the applicant hereby with full knowledge and understanding of its rights under Sections 120.60(1) and 403.0867, Florida Statutes, waives the 30-day completeness review of the information provided to the Department on January 28, 2003.

This waiver shall in no way limit the Department's ability to request information prior to the expiration of this waiver. This waiver shall expire 03/15/03, at which time all processing time clocks will resume.

With regard to the above reference permit application, the applicant hereby with full knowledge and understanding of its rights under Section 403.0872, Florida Statutes, waives the right under Section 403.0872, Florida Statutes, to have the application processed by the State of Florida Department of Environmental Protection within the time periods prescribed in Section 403.0872, Florida Statutes.

Said waiver is made freely and voluntarily by the applicant, is in its self interest and without any pressure or coercion by anyone employed by the State of Florida Department of Environmental Protection.

This waiver shall expire on the 15th day of March, 2003.

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

Signature Myra J. Carpenter Date 2/27/03

By: Myra J. Carpenter, Environmental Superintendent

State of Florida
County of Putnam
Sworn to (or affirmed) and subscribed before me this 28th day of February 2003. Who is personally known or has produced _____ identification.

Sealed by Notary Public

**Golder Associates Inc.**

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

January 28, 2003

0237624

Florida Department of Environmental Protection
2600 Blair Stone Road
Twin Towers Office Building
Tallahassee, Florida 32399

RECEIVED
JAN 28 2003
BUREAU OF AIR REGULATION

Attention: Mr. Syed Arif

Re: DEP FILE NO. 1070005-019-AC (PSD-FL-264A)
GEORGIA-PACIFIC PALATKA OPERATIONS
NO. 3 BLEACH PLANT
RESPONSES TO REQUESTS 15 THROUGH 20

Dear Mr. Arif:

On behalf of Georgia-Pacific Corporation (G-P), Golder Associates Inc. (Golder) is pleased to submit the following information as the second response to the Department's request for additional information, dated November 26, 2002, regarding the above referenced project. Please note that the items are listed in the same order as in the letter for convenience. The responses below address the requests numbered 15 through 20 of the letter. Responses for Questions 1 through 14 were provided in an earlier letter to the Department, dated January 3, 2003.

G-P has revised both the operating costs and emissions for the carbon monoxide (CO) cost effectiveness calculations, previously presented in Table B-1 of the 2002 application. As explained throughout several of the responses below, G-P contracted Jacobs Engineering to refine and document a site-specific estimate of direct costs. Jacobs investigated all possible incineration points to control the No. 3 Bleach Plant CO emissions. The conclusion regarding technically feasible incineration points is: 1) use the combination boiler and power boiler together, or 2) a stand-alone regenerative thermal oxidizer (RTO). Detailed costs are developed and presented for both of these alternatives.

Costs for other thermal oxidizers types (*e.g.*, catalytic oxidizers) are similar to an RTO and have similar destruction efficiencies. Because no oxidizers of any type have been demonstrated to control emissions from a bleach plant, a BACT analysis may consider these controls as equivalent choices. Thus, the Jacobs cost estimates address the RTO. The computed cost effectiveness described below for an RTO is economically infeasible, and changing the oxidizer type would not affect this determination.

In the November 2002 application, G-P used the maximum annual CO emissions from the No. 3 Bleach Plant in the cost effectiveness calculations. For the revised analysis presented herein, the emissions rate applied to the cost effectiveness calculations reflect guidance presented in Section B V.D.2.b of the New Source Review Workshop Manual - Draft (EPA 1990):

*"In addition, historic upper bound operating data, typical for the source or industry, may be used in defining baseline emissions in evaluating the cost effectiveness of a control option for a specific source. For example, if for a source or industry, historical upper bound operations call for two shifts a day, it is not necessary to assume full time (8760 hours) operation on an annual basis in calculating baseline emissions." (EPA, 1990)*

Thus, G-P reviewed the recent years of operating data to define the baseline emissions (*i.e.*, uncontrolled emissions). The following table presents the most recent operating rates:

Table 1. BACT Baseline Operating Data for Bleaching Operations, G-P Palatka

| Year | Net Throughput[a] (Bleached pulp, tons/yr) | Total Throughput (Bleached pulp, tons/yr) | Fraction Softwood | Fraction Hardwood |
|---|---|---|---|---|
| 2001 | 285,801 | 317,557 | 0.633 | 0.367 |
| 2000 | 281,756 | 313,062 | 0.574 | 0.426 |
| 1999 | 273,803 | 304,226 | 0.578 | 0.422 |

[a] Net throughput reflects a 10% loss of pulp. The amount of pulp entering the bleach plant is equal to net value ÷ 90%

The calculated baseline CO emissions then becomes:

1999: (317,557 tons/yr x 0.633 softwood x 1.68 lb CO/ton softwood +
317,557 tons/yr x 0.367 hardwood x 0.64 lb CO/ton hardwood) / 2000 lbs/ton
= 206 TPY CO emissions

2000: (313,062 tons/yr x 0.574 softwood x 1.68 lb CO/ton softwood +
313,062 tons/yr x 0.426 hardwood x 0.64 lb CO/ton hardwood) / 2000 lbs/ton
= 194 TPY CO emissions

2001: (304,226 tons/yr x 0.578 softwood x 1.68 lb CO/ton softwood +
304,226 tons/yr x 0.422 hardwood x 0.64 lb CO/ton hardwood) / 2000 lbs/ton
=189 TPY CO emissions

Consistent with the BACT guidance cited above, using the highest historic rate among these three years yields a baseline emission rate of 206 TPY. The controlled emission rate for the cost effectiveness calculation is equal to:

Baseline emission rate x (1-control efficiency).

For oxidation in a boiler or a stand-alone oxidizer, the control efficiency is approximately 95%. Thus, the controlled emission rate is equal to: 206 TPY x (1-0.95) = 10.3 TPY
The net reduction in CO emissions from such a control device is then equal to:

206 TPY – 10.3 TPY = 195.7 TPY

Thus the cost effectiveness calculations divide the annualized costs by 195.7 TPY CO removed. Using this information, Questions 15 through 20 are addressed in turn in the following sections.

**15. Request:** *Please provide the information submitted by you to the vendors in getting the quote for CO removal using thermal oxidation, catalytic incineration or incineration in an existing boiler. Provide copies of the quotes received for the three options listed. Also, indicate if the thermal*

*oxidizer and the catalytic incinerator are designed to be located upstream or downstream of the existing scrubber. What advantage does one location have over the other?*

**Response:**
The appendix attached to this letter contains the Jacobs Engineering summary of a site-specific cost estimate for thermal oxidation in the on-site boilers or an RTO. Also included are three RTO vendor quotes for other projects, which Jacobs used in developing the site-specific costs for the Palatka Mill.

G-P has applied this site-specific quote developed by Jacobs in recalculating the cost effectiveness. The revised cost effectiveness calculations are presented in Table B-2 attached. In the calculations, an equipment life of 10 years and 7% interest has been assumed, based on the OAQPS Cost Control Manual, Section 3.2, Chapter 2, Incinerators.

For both scenarios of controlling CO emissions with either the existing boilers or a new thermal oxidizer, G-P has determined the cost effectiveness to be greater than $5,000 per ton of CO removed. These costs are excessively high. Other recent BACT determinations for CO issued by the Department, with cost effectiveness values ranging between $2,500 and $4,400 per ton of CO removed, have been determined to be economically infeasible. Thus, G-P maintains that these add-on controls are not economically feasible, especially in light of the fact that no other bleach plant is known to have installed CO controls. Efficient bleaching operations remains as BACT for the No. 3 Bleach Plant.

The oxidizer location for any option must be downstream of an acid scrubber. The concentrations of chlorine compounds in the No. 3 Bleach Plant exhaust stream are much lower after the scrubber. Without scrubbing these compounds, conventional materials cannot withstand the corrosive attack of the acid gases. However, the existing scrubber on the No. 3 Bleach Plant has not been included in the cost estimates.

**16. Request:** *Please provide cost analysis in modifying (if required) the existing thermal oxidizer used for NCG's control to accommodate the bleach plant exhaust for CO control.*

**Response:**
The No. 3 Bleach Plant exhaust stream has a flow rate of approximately 15,000 cubic feet per minute (cfm). The volumetric flowrate of the existing thermal oxidizer used for non-condensible gas (NCG) control is approximately 12,000 cfm. The existing thermal oxidizer is completely loaded and cannot accept any additional gas streams. The thermal oxidizer uses a mist eliminator filter as a post-combustion control device to remove fine particles including sulfuric acid. This control system has a design flowrate of approximately 12,000 cfm. Thus, the mist eliminator filters would also be incapable of filtering the additional volumetric flow. As a result, the existing NCG thermal oxidizer is technically infeasible for oxidizing the No.3 Bleach Plant exhaust gases.

**17. Request:** *The BACT analysis refers to the removal of some VOC and HAPs with the control options selected for CO removal. Explain the reasons for not including the removal of VOC and HAPs in the cost effectiveness ($/ton) figure obtained for CO removal.*

**Response:**
Although considering the reduction of collateral pollutants, including toxic pollutants, is part of the BACT analysis, it is problematic to include such reductions in the cost effectiveness calculations. This is because the cost effectiveness for a particular project is compared to what has been determined to be unreasonable for other projects. As a result, the cost effectiveness for CO control

presented for G-P's project must be compared to other BACT determinations for CO. Including VOCs and toxic/hazardous pollutants in the cost effectiveness calculation makes it difficult to fairly compare projects. Furthermore, CO was the only pollutant that triggered PSD review for this project.

An updated estimate of HAP and VOC emissions from the No. 3 Bleach Plant is presented in Attachment GP-EU2-G8 attached. Two scenarios are presented: the first based on the maximum permitted production rate, and the second based on the expected actual production rate, as calculated above. As shown, expected VOC and HAP emissions are 9.8 and 49.9 TPY, respectively. The revised VOC emissions are based on a NCASI factor for total hydrocarbons using EPA Method 25A. This factor provides a more accurate estimate of VOC emissions based on the reference method for VOC. The previously used factor for VOC was based on summing the volatile organic HAP emissions for the No. 3 Bleach Plant.

The majority of HAP emissions are due to methanol. It is noted that the emission factor utilized for methanol is based on very limited NCASI data for bleaching with 100-percent chlorine dioxide ($ClO_2$) substitution, and therefore has a high degree of uncertainty. Actual emissions from the No. 3 Bleach Plant could be much lower.

**18. Request:** *EPA Air Pollution Control Cost Manual recommends using a flat 10 percent over the operations labor wage rate for maintenance labor costs. Table B-2 of the application indicates the maintenance labor cost to be twice the operating labor cost. Please explain the discrepancy.*

**Response:**
G-P has revised the referenced Table B-2 using a site-specific engineering estimate. The operating labor is estimated by assuming 1 hour per day for the Boiler option, and 3 hours per day for the RTO option.

The revised figures, presented in the attached Table B-2, apply two different methods to estimate the maintenance labor. For the Boiler option, the maintenance cost is estimated at twice the operating labor. The Boiler option maintenance includes inspecting the boiler interior nearest the No.3 Bleach Plant exhaust injection point. To conduct such a detailed inspection along with the external inspections of new fans and a demister, would require a significant amount of time. Thus, for the Boiler option, G-P assumed a total of 730 hours per year, which is equal to an average of 2 hours per day. In contrast, for the RTO option, G-P applied the conservative default recommendation of 10% of the operating labor.

**19. Request:** *Please explain the reasons for adding the cost of a new stack in Table B-2 using thermal oxidation or catalytic incineration when a stack already exists.*

**Response:**
Table B-2 included a new stack for exhaust from an oxidizer because it is the lowest cost option. The existing No.3 Bleach Plant scrubber stack sits adjacent to the bleaching equipment. For the hypothetical scenario of a stand-alone thermal/catalytic oxidizer, the new equipment requires more space than is available in the bleach plant area. A new oxidizer would be sited as close as possible, but no less than 700 feet away. The cost to return the post-control gas stream (i.e., an additional 700 feet back to the existing scrubber stack) is approximately $515,000. The cost for a new oxidizer stack

would be less than this amount. Thus, the lower cost option is to include the cost of a new stack, and not include additional piping to return the exhaust back to the existing stack.

**20. Request:** *In the original PSD permitting done in 1999, the purchased equipment cost for Regenerative Catalytic Oxidation providing 95% removal of CO emissions was given as $427,250. The same equipment cost for this modification is given to be $1,163,400. Please justify the increase of over $0.7M in a three-year period. Also, explain the reasons for not including the cost of gas conditioning equipment in the original project.*

**Response:**
The cost estimates cannot be directly compared for differences. The 1999 cost estimate only included oxidizer costs, and did not include piping from the bleach plant area, gas conditioning, and most other miscellaneous equipment. The 1999 estimate was very low in an attempt to predict a conservatively low cost effectiveness. Thus, the original cost estimate was sufficiently complete to demonstrate the economic infeasibility of controls without including all capital items. The enclosed cost estimate reflects all anticipated equipment, including a mist elimination system to protect against corrosive attack on the metallic components. The 1999 cost estimate was not detailed or site-specific enough to identify these protective requirements. However, the updated costs estimates attached demonstrate that CO oxidation is still economically infeasible.

The Department had also requested that G-P's previous response letter, addressing the first fifteen questions in the Department's letter, be sealed by a registered professional engineer. In order to comply with this request, the G-P response package is included in this submittal as an attachment.

Thank you for consideration of this information. Please call if you have any questions concerning this submittal.

Sincerely,

GOLDER ASSOCIATES INC.

David A. Buff

David A. Buff, P. E., Q. E. P.
Principal Engineer
Florida P. E. #19011
SEAL

cc: M. Carpenter
M. Aguilar
S. Matchett
W. Jernigan

DB/jkw

Enclosures: Appendix

P:\Projects\2002\0237624 G-P\4\4.1\012803\C012803.doc

cc: C. Kirts, NED
Q. Kittle, EPA
Q. Bunyak, NPS

Table B-2. Cost Effectiveness for Control of CO Emissions From ECF No. 3 Bleach Plant, Georgia-Pacific, Palatka FL (01/27/2003)

| Cost Items | Cost Factors | Cost ($) Duct to Boiler | Cost ($) Thermal Ox |
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| DIRECT CAPITAL COSTS (DCC): | | | |
| (1) Purchased Equipment Cost | | | |
| (a) Oxidizer/Air Injection Equip/Services | Based on On-site Engineering Estimate | 2,491,934 | 3,299,584 |
| (b) New Stack | included | 0 | 0 |
| (c) Ductwork and Electronic controls | included | 0 | 0 |
| (d) Structural Support | included | 0 | 0 |
| (f) Exhaust Fan | included | 0 | 0 |
| (g) Freight | included | 0 | 0 |
| (h) Sales Tax (Florida) | 6% | 149,516 | 197,975 |
| (i) Instrumentation | included | 0 | 0 |
| (j) Subtotal - Purchased Equipment | included | 2,641,450 | 3,497,559 |
| (2) Direct Installation | included | 0 | 0 |
| Total DCC: | | 2,641,450 | 3,497,559 |
| INDIRECT CAPITAL COSTS (ICC): | | | |
| (3) Indirect Installation Costs | | | |
| (a) Engineering | (0.10) x (PEC) (EPA Factor) | 264,145 | 349,756 |
| (b) Construction & Field Expenses | (0.05) x (PEC) (EPA Factor) | 132,073 | 174,878 |
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| Total ICC: | (3) + (4) | 1,419,199 | 1,873,916 |
| TOTAL CAPITAL INVESTMENT (TCI): | DCC + ICC | 4,060,649 | 5,371,475 |
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| Operator | $22/hr; 1 hr/day for Boiler; 3 hr/day for RTO | 8,030 | 24,090 |
| Supervisor | 15% of operator cost | 1,205 | 3,614 |
| (2) Maintenance | | | |
| Labor (includes inspection of boiler) | 2xOperating Labor for Boiler, 10% of operating labor for RTO | 18,469 | 2,770 |
| Materials | Equivalent to Maintenance Labor | 18,469 | 2,770 |
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| (b) Natural Gas | 1.56 MMBtu/hr; $4.736/MMBtu | -- | 64,720 |
| (c ) Fuel Oil for recoup steam losses | 3.52 MMBtu/hr $3.6/MMBtu (2002 actual average) | 111,007 | -- |
| (4) Chemicals and Materials | | | |
| Ceramic Bed Replacement | Once per 8 yrs @ $100,000 | -- | 12,500 |
| Total DOC: | (1) + (2) + (3) + (4) | 230,763 | 242,521 |
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| (7) Overhead | 60% of oper. labor & maintenance (EPA Factor) | 27,704 | 19,947 |
| (8) Property Taxes | 1% of total capital investment (EPA Factor) | 40,606 | 53,715 |
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| (10) Administration | 2% of total capital investment (EPA Factor) | 81,213 | 107,430 |
| Total IOC: | (7) + (8) + (9) + (10) | 190,129 | 234,806 |
| CAPITAL RECOVERY COSTS (CRC): | CRF of 0.1424 times TCI (10 yrs @ 7%) | 578,236 | 764,898 |
| ANNUALIZED COSTS (AC): | DOC + IOC + CRF | 999,129 | 1,242,225 |
| UNCONTROLLED BASELINE CO EMISSIONS (TPY) | | 206 | 206 |
| TOTAL CO REMOVED: | 95% removal efficiency | 195.7 | 195.7 |
| COST EFFECTIVENESS: | $ per ton of CO Removed | 5,105 | 6,348 |

Source: Georgia-Pacific Corp, 2003; Golder Associates Inc., 2003.

# REVISIONS TO APPLICATION FORM

## D. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

**Emission Point Description and Type**

| | |
|---|---|
| 1. Identification of Point on Plot Plan or Flow Diagram?<br>**Bleach Plant Alkaline Scrubber Stack** | 2. Emission Point Type Code:<br>**2** |
| 3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): | |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: | |

| | | |
|---|---|---|
| 5. Discharge Type Code:<br>**V** | 6. Stack Height:<br>**118** feet | 7. Exit Diameter:<br>**3.5** feet |
| 8. Exit Temperature:<br>**130-145** °F | 9. Actual Volumetric Flow Rate:<br>**16,000** acfm | 10. Water Vapor:<br>**5-10** % |
| 11. Maximum Dry Standard Flow Rate:<br>**13,500** dscfm | 12. Nonstack Emission Point Height:<br>feet | |

13. Emission Point UTM Coordinates:

Zone: East (km): North (km):

14. Emission Point Comment (limit to 200 characters):

**Values representative of scrubber exhaust stack. Based on October 2002 testing. Exit temperature and actual volumetric flow rate values are constantly changing with ambient conditions.**

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **VOC** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **3.7** lbs/hr **15.28** tons/year | 4. Synthetically Limited? [ X ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: **NCASI** | 7. Emissions Method Code: **5** |
| 8. Calculation of Emissions (limit to 600 characters): **See Attachment GP-EU1-G8.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **VOCs are from bleach plant alkaline wet scrubber.** | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lbs/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **HAPS** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **18.9** lbs/hr **77.6** tons/year | 4. Synthetically Limited? [ X ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: **Manuf. Info & NCASI** | 7. Emissions Method Code: **5** |
| 8. Calculation of Emissions (limit to 600 characters): **See Attachment GP-EU1-G8.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lbs/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **H115-Methanol** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **17.4** lbs/hr **71.5** tons/year | 4. Synthetically Limited? [ X ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: **NCASI** | 7. Emissions Method Code: **5** |
| 8. Calculation of Emissions (limit to 600 characters): **See Attachment GP-EU1-G8.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lbs/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **H043-Chloroform** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.49** lbs/hr **2.02** tons/year | 4. Synthetically Limited? [ X ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: **NCASI** | 7. Emissions Method Code: **5** |
| 8. Calculation of Emissions (limit to 600 characters): **See Attachment GP-EU1-G8.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lbs/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **CO** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **100** lbs/hr **324** tons/year | 4. Synthetically Limited? [ X ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **1.68 lbs/ADTBP (100% softwood factor)** Reference: **See Attachment A** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **See Table 2-1 for presentation of emission rates. Detailed calculations provided in Appendix A to Attachment A.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **324 TPY** | 4. Equivalent Allowable Emissions: **100** lbs/hour **324** tons/year |
| 5. Method of Compliance (limit to 60 characters): **EPA Method 10** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **See Attachment A.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **H038-Chlorine** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.8** lbs/hr **3.3** tons/year | 4. Synthetically Limited? [ X ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **10 ppmvd** Reference: **Permit No. 1070005-006-AC** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **See Attachment GP-EU1-G8.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **RULE** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **10 ppmvd** | 4. Equivalent Allowable Emissions: **0.8** lbs/hour **3.3** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Initial compliance testing by EPA Method 26A.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Permit No. 1070005-006-AC and 40 CFR 63, Subpart S.** | |

Attachment GP-EU2-G8. Estimated HAP and VOC Emissions From the No. 3 Bleach Plant, Georgia-Pacific, Palatka (revised 01/27/03)

| Pollutant Name | HAP? | Avg Factor (lb/ADTBP) (a) | Maximum ADTBP/hr (b) | Maximum ADTBP/yr (b) | Actual ADTBP/yr (c) | Maximum Hourly Emissions (lb/hr) | Maximum Annual Emissions (TPY) | Actual Annual Emissions (TPY) |
|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | YES | ND | -- | -- | -- | -- | -- | -- |
| Benzene | YES | 1.80E-04 | 60.0 | 492,750 | 317,557 | 0.011 | 0.04 | 0.03 |
| Carbon Tetrachloride | YES | ND | -- | -- | -- | -- | -- | -- |
| Chlorine (d) | YES | 0.0133 | 60.0 | 492,750 | 317,557 | 0.800 | 3.29 | 2.12 |
| Chlorine Dioxide (e) | NO | 0.0380 | 60.0 | 492,750 | 317,557 | 2.283 | 9.37 | 6.04 |
| Chlorobenzene | YES | 2.10E-04 | 60.0 | 492,750 | 317,557 | 0.013 | 0.05 | 0.03 |
| Chloroform (f) | YES | 8.19E-03 | 60.0 | 492,750 | 317,557 | 0.491 | 2.02 | 1.30 |
| 1,2-Dichloroethane (Ethylene Dichloride) | YES | ND | -- | -- | -- | -- | -- | -- |
| Dimethyl Sulfide | NO | ND | -- | -- | -- | -- | -- | -- |
| Formaldehyde (g) | YES | ND | -- | -- | -- | -- | -- | -- |
| Methanol | YES | 2.90E-01 | 60.0 | 492,750 | 317,557 | 17.40 | 71.45 | 46.05 |
| Methyl Ethyl Ketone | YES | 6.70E-04 | 60.0 | 492,750 | 317,557 | 0.040 | 0.17 | 0.11 |
| Methyl Isobutyl Ketone | YES | 4.50E-04 | 60.0 | 492,750 | 317,557 | 0.027 | 0.11 | 0.07 |
| Methyl Mercaptan | NO | 3.80E-02 | 60.0 | 492,750 | 317,557 | 2.280 | 9.36 | 6.03 |
| Methylene Chloride | YES | ND | -- | -- | -- | -- | -- | -- |
| Alpha-Pinene | NO | 4.70E-04 | 60.0 | 492,750 | 317,557 | 0.028 | 0.12 | 0.07 |
| Beta-Pinene | NO | 2.20E-04 | 60.0 | 492,750 | 317,557 | 0.013 | 0.05 | 0.03 |
| Styrene | YES | 3.50E-04 | 60.0 | 492,750 | 317,557 | 0.021 | 0.09 | 0.06 |
| Tetrachloroethyene | YES | ND | -- | -- | -- | -- | -- | -- |
| Toluene | YES | 1.70E-04 | 60.0 | 492,750 | 317,557 | 0.010 | 0.04 | 0.03 |
| 1,2,4-Trichlorobenzene | YES | 5.00E-04 | 60.0 | 492,750 | 317,557 | 0.030 | 0.12 | 0.08 |
| 1,1,1-Trichloroethane (Methyl Chloroform) | YES | ND | -- | -- | -- | -- | -- | -- |
| 1,1,2-Trichloroethane | YES | ND | -- | -- | -- | -- | -- | -- |
| Trichloroethylene | YES | ND | -- | -- | -- | -- | -- | -- |
| M&P-Xylene | YES | 4.80E-04 | 60.0 | 492,750 | 317,557 | 0.029 | 0.12 | 0.08 |
| O-Xylene | YES | 2.70E-04 | 60.0 | 492,750 | 317,557 | 0.016 | 0.07 | 0.04 |
| TOTAL HAPS | | | | | Total HAPs = | 18.89 | 77.56 | 49.98 |
| Total Hydrocarbons (Method 25A) | | 0.062 | 60.0 | 492,750 | 317,557 | 3.720 | 15.28 | 9.84 |

ND = Non Detectable
ADTBP = Air Dried Tons of Bleached Pulp
ODTBP = Oven Dried Tons of Bleached Pulp
lb/hr = pounds per hour
TPY = tons per year
Footnotes:

(a) All emission factors (except chlorine, chlorine dioxide, chloroform and formaldehdye) based on data in NCASI Technical Bulletin No. 701: Compilation of Air Toxic and Total Hydrocarbon Emissions Data for Sources at Chemical Wood Pulp Mills. Mill codes BPF and BPME1 are most representative of the proposed ECF bleach plant at Georgia Pacific's Palatka mill. If values were given for both mill codes, then the values were averaged. Non-detectable limits not used.

(b) Maximum hourly based on 1,440 ADTBP/day. Maximum annual based on a production rate of 1,350 ADTBP times 365 days/yr.

(c) Based on actual annual production rate for 1999.

(d) Based on Permit No. 1070005-006-AC, Specific Condition 7.(a), 10 ppmvd limit for chlorinated HAPs (as chlorine) and flow rate of 13,500 dscfm, equal to 0.75 lb/hr. Then divide by 1,350 ADTBP per day (56.25 ADTBP/hr).

(e) Based on design information provided by scrubber manufacturer. Factor based on 1,350 ADTBP/day and 214.25 lb/hr uncontrolled chlorine dioxide and 99% scrubber removal efficiency.

(f) Based on data in NCASI Technical Bulletin No. 679: Volatile Organic Emissions From Pulp and Paper Mill Sources, Part V - Kraft Mill Bleach Plants. Mill Code E "c" Line is most representative of the proposed ECF bleach plant at Georgia Pacific's Palatka mill. Chloroform emission factor converted to lb/ADTBP using the following formula: 9.1 e-3 lb/ODTBP * (0.90 ODTBP/ADTBP) = 8.19 e-3 lb/ADTBP.

(g) Based on data in NCASI Technical Bulletin No. 701: Compilation of Air Toxic and Total Hydrocarbon Emissions Data for Sources at Chemical Wood Pulp Mills. Formaldehyde data based on Mill Code BPMN.

**JACOBS ENGINEERING QUOTE**

JACOBS

1041 East Butler Road (29607)
Post Office Box 5456
Greenville, SC 29606-5456
864-676-6000 FAX 864-676-6368

January 27, 2003

Ms. Elizabeth Sellers
Georgia-Pacific
John Campbell Highway 216
Palatka, Florida 32177

Re: Georgia-Pacific
Palatka, Florida
Jacobs Job No. 16AZ1380
Study of Thermal Oxidation of
Bleach Plant Scrubber Vent CO

Dear Beth:

As requested by Georgia-Pacific, we have studied the potential options for controlling the carbon monoxide, CO, discharged from the No. 3 Bleach Plant Scrubber at Palatka, Florida and have prepared budgetary estimates (P-1) for two options. After analysis as described below, the selected two options were identified as follows:

Option 1: Incinerate the gases in the No. 5 Power Boiler and use the No. 4 Combination Boiler as a backup.

Option 2: Incinerate the gases in a new Regenerative Thermal Oxidizer (RTO).

Jacobs visited the mill to gather data and obtain information, which has been used as the basis for the option evaluations and cost estimates. The accuracy of the estimates is consistent with the P-1 requirement.

Option Analysis

Test results of Georgia-Pacific's Palatka, FL mill show that it's No. 3 Bleach Plant scrubber discharge is approximately 15,500 ACFM at 130$^0$F, saturated. This discharge has CO as one of its constituents. The recommended design flow rate is 16,000 ACFM at 150°F. The dry gas is primarily air.

The mill has seven existing units that are thermal oxidation devices. The following chart summarizes their potential utilization to control CO emissions:

| Existing Thermal Oxidation Device | Comments | Uptime |
|---|---|---|
| No. 5 Power Boiler | Good average steam load to accommodate bleach plant gas stream. Furnace is positive pressure, allowing furnace gas leaks, which is less desirable with CO gas stream incineration. Good air heater exit gas temperature @ 400 Deg. F. | 94.5% |
| No. 4 Combination Boiler | Good average steam load to accommodate bleach plant gas stream. Bark firing on grate can produce inconsistent furnace conditions and less than ideal CO gas stream oxidation. Good air heater exit gas temperature @ 400 Deg. F. | 94.5% |
| No. 4 Recovery Boiler | Chlorides in bleach plant gas stream will lower chemical ash melting temperature, increasing plugging of superheater and boiler bank. | 95% |
| New Thermal Oxidizer (Installed 2002) | Does not have adequate capacity for volume of gas from bleach plant scrubber | (Not Applicable) |
| No. 4 Package Boiler | A standby unit. Does not have necessary uptime. | <50% |
| No. 6 Package Boiler | A rental standby unit. Does not have necessary uptime. | <50% |
| Lime Kiln | Lime Kiln does not have capacity for additional air. | |

From the above choices, there are several devices, which are not technically feasible. The recovery boiler has potential operational issues that need to be avoided (e.g., reaction and conversion of recovery products beyond design of recovery system). In addition, the last four units in the chart are not acceptable.

In contrast, the No. 5 Power Boiler is the best oxidation device option. The No. 4 Combination Boiler is a second choice or could serve as a backup as in Option 1. The power boiler should be able to provide very good oxidation of CO. However, in a furnace of the power boiler's size, there can be some CO at the furnace outlet, which may interfere with identifying oxidation of the bleach plant's CO. By combining the two boilers, the uptime is at least 98%, as either boiler is typically operating. The limiting factor for uptime is the operating condition of low steam demand, and thus low-fuel usage rates. These low-load conditions limit the amount of additional air, such as the bleach plant stream, that can be added. Destruction efficiency of CO from the Bleach Plant Scrubber Vent stream for both the Power Boiler and Combination Boiler would be approximately 95%.

Besides using existing thermal oxidation devices for the bleach plant gas stream, a new unit can be installed. For this application, an RTO is recommended. It will have approximately 98% uptime. If additional uptime is needed, a second RTO may be considered. Destruction efficiency of CO is guaranteed at 95%.

For the estimate, we will consider two alternates, the No. 5 Power Boiler backed up by the No. 4 Combination Boiler and an RTO without a backup device. Deciding the merits of a backup unit (either alternate) will be part of the BACT analysis.

Cost Summary

Our cost estimates for the two defined options are shown below. These costs are direct costs, which include labor, equipment and materials only without any contingency allowance. Indirect costs are also not included.

Option 1 Direct Cost $2,491,934

Option 2 Direct Cost $3,299,584

Utilities Requirements

| | Option 1 | Option 2 |
|---|---|---|
| Fuel | 3.52 MM Btu/hr of Fuel Oil | 1.56 MM Btu of Natural Gas |
| Steam | 300 pph of 50 psig steam | 0 |
| Electric Power | 112 kW | 201 kW |

The scope, for the two options reflected in the Direct Costs above, is described as follows. Collection and transport is common to both options.

Collection and Transport of Gases

The No. 3 Bleach Plant scrubber exhaust gases will be ducted to the CO thermal oxidation device by tying a duct into the bleach plant scrubber stack. There will be a damper that isolates the stack and a damper that isolates the duct to the oxidizer. This arrangement allows startup of the scrubber through the existing stack initially, before transporting the gases through the new duct.

The new duct will be routed either to an area under the No. 4 Combination Boiler precipitator for oxidation in the No. 5 Power Boiler, or across the effluent channel to the area of the existing oxygen storage facility for oxidation in an RTO.

Power Boiler (Option 1)

The transport duct will feed a mist eliminator followed by a constant speed motor driven fan. A steam coil air heater follows the fan and will elevate the gas temperature enough to avoid condensation on existing metal surfaces at the No. 5 Power Boiler. A tee after the heater will allow the gases to either vent to atmosphere or continue to the boiler. The vent will only be used on startup for proving proper operation. The tee will have a damper on its vent leg and on its downstream leg. If both the power boiler and combination boiler will be used as thermal oxidation devices, with the combination boiler as a backup, the duct split to feed either boiler will be located after the vent tee.

Leaving the fan and steam heater location, the duct will be routed around the boiler building to the No. 5 Power Boiler where it will be fed into the combustion air duct between the air heater and the burner windbox. There will be a perforated distribution header added inside the existing combustion air duct.

The No. 4 Combination Boiler is used to back up the power boiler. For this, the line to the combination boiler will feed the gas into the undergrate air plenum. This must be done at the ground floor, which has minimal headroom, so the duct will transition to a shallow rectangular section. It will enter the undergrate plenum near the rear of the grate and have an internal perforated distribution header. Control of the fan, heater and injection will be by the boiler operators.

Regenerative Thermal Oxidizer (Option 2)

The transport duct will feed a mist eliminator followed by a constant speed motor driven fan. A tee after the fan will allow the gases to either vent to atmosphere or continue to the RTO. The vent will only be used on startup or during an upset condition. The tee will have a damper on its vent leg and on its downstream leg. The RTO system will include a valveless style unit equipped with a variable speed motor driven I.D. fan, combustion fan, and stack. A propane fuel system will be included as a back up to natural gas.

Structural

All new equipment will be supported at grade on either concrete slabs on grade or on concrete foundation mats supported on piling. Pipe support will be provided at 20 foot spacing on existing pipe bridges and within existing buildings along routes provided by the piping engineer. Existing pipe bridges will be modified as needed to support the vent gas piping. Steel has been included for fan and air heater access platforms. For the RTO option, mat foundations and piling have been included for all equipment at grade.

Piping

The estimator made piping material take-offs using the block flow diagrams and the overall site layout drawings developed for this project. The piping estimate was developed using overall lengths of pipe runs and applying a factor based on a cost per diameter inch of pipe per foot. For this phase of the estimate Fiberglass pipe was used for gas transmission lines from the scrubber to the incineration point. Schedule 40 Carbon Steel was used for all steam and steam condensate lines and natural gas lines. The estimate included all above ground process piping. Piping designed by other departments or other vendors was excluded.

A visit to the jobsite was made to establish the scope definition, and to meet with the client to establish approximate tie-in locations, locations of utility bridges, interface with other design groups and/or vendors for space availability, etc.

Instrumentation

Allowances for instrumentation and controls are based on an estimated loop count for the gas transport system and for any additional loops needed for the RTO options. Allowances for DCS additions or upgrades are added as a line item in the estimate as needed for the particular option.

Electrical

*Power Boiler Option for Total Oxidation*

The new 200 hp fan motor required for transport of the vent gas to incineration in the Power Boiler is a 4160 volt motor. A new starter is included for the new fan motor. Instrument wiring is included for the new loops. No electrical heat tracing is included.

*RTO Option for Total Oxidation*

The new 200 hp fan motor required for transport of the vent gas to incineration in the RTO is a 4160 volt motor. All other motors required for the RTO are 460 volt motors. New starters are included for the new motors. New electrical equipment will be located in existing facilities and in the RTO facility. Instrument wiring is included for the new loops from the RTO to the existing DCS. No electrical heat tracing is included.

We trust this evaluation and the cost estimates meet your requirements and thank you for this opportunity to assist Georgia-Pacific.

Sincerely.

James R. Uz
Project Manager

Distribution

| G-P | Jacobs | Golder Associates |
|---|---|---|
| Eric Allen | John Rickard | David A. Buff |
| Mark Aguilar | James Cantrell | |
| Mike Evans | Tod Flathmann | |
| Jeff Brown | | |

# TOTAL COST SUMMARY - JE PRIME CODE

JOB: ESTIMATE 1 - BLEACH PLANT SCRUBBER DISCHARGE TO POWER BOILER
CLIENT: GEORGIA PACIFIC
LOCATION: PALATKA, FLORIDA
JOB NUMBER: 16AZ1380
CONSTRUCTION DURATION: TBD
ESTIMATE TYPE: +/- 25%
G:\ESTIMATI\GEORPAC\HVLC STUDIES\PALATKA, FLORIDA\16AZ1380\[EMAIL_Bleach Plant Scrubber Disch to Power Boiler_R1.xls]PRIME CODE TCS

ESTIMATE DATE: 01/17/03
REVISION: 1
ESTIMATED BY: MICHAEL WATSON
CHECKED BY:
EST. FILE #: 02052

| PRIME CODE | DESCRIPTION | W-H | QTY | UNIT | LABOR | EQUIPMENT | MATERIAL | SUBCONTRACT | TOTAL COST |
|---|---|---|---|---|---|---|---|---|---|
| | **DIRECT COSTS** | | | | | | | | |
| 50 | MAJOR EQUIPMENT | 300 | 0 | 0 | $12,313 | $133,282 | $3,235 | $0 | $148,830 |
| 51 | DEMOLITION | 0 | 0 | 0 | $0 | $0 | $0 | $50,000 | $50,000 |
| 52 | SITE EARTHMOVING | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 53 | SITE IMPROVEMENTS | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 54 | PILING, CAISSONS | 0 | 0 | LF | $0 | $0 | $0 | $0 | $0 |
| 55 | BUILDINGS | 0 | 1 | LOT | $0 | $0 | $0 | $0 | $0 |
| 56 | CONCRETE | 787 | 53 | CY | $24,755 | $0 | $11,191 | $0 | $35,945 |
| 57 | MASONRY, REFRACTORY | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 58 | STRUCTURAL STEEL | 900 | 22 | TN | $32,093 | $0 | $55,525 | $2,700 | $90,318 |
| 59 | ROOFING AND SIDING | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 60 | FIRE PROOFING | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 61 | PROCESS DUCTWORK (NON-BUILDING) | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 62 | PIPING | 13,687 | 1,560 | LF | $561,190 | $0 | $582,879 | $0 | $1,144,069 |
| 63 | INSULATION - PIPE, EQUIPMENT & DUCTWORK | 0 | 0 | 0 | $0 | $0 | $0 | $3,900 | $3,900 |
| 64 | INSTRUMENTATION | 680 | 0 | 0 | $27,879 | $300,000 | $0 | $0 | $327,879 |
| 65 | ELECTRICAL | 832 | 5,297 | LF | $34,111 | $134,150 | $13,671 | $0 | $181,932 |
| 66 | PAINTING, PROTECTIVE COATINGS | 0 | 0 | 0 | $0 | $0 | $0 | $15,000 | $15,000 |
| 67 | FURNITURE, LAB & SHOP EQUIPMENT | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 75 | CONSTRUCTION SERVICE LABOR | 3,437 | 0 | 0 | $122,686 | $0 | $0 | $0 | $122,686 |
| | **TOTAL DIRECT COSTS** | 20,623 | | | $815,026 | $567,432 | $666,501 | $71,600 | $2,120,559 |

# TOTAL COST SUMMARY - JE PRIME CODE

JOB: ESTIMATE 1A - ADDER FOR BLEACH PLANT SCRUBBER DISCHARGE TO POWER & COMBINATION BOILER
CLIENT: GEORGIA PACIFIC
LOCATION: PALATKA, FLORIDA
JOB NUMBER: 16AZ1380
CONSTRUCTION DURATION: TBD
ESTIMATE TYPE: +/- 25%
G:\ESTIMAT\GEORPAC\HVLC STUDIES\PALATKA, FLORIDA\16AZ1380\[EMAIL_Bleach Plant Scrubber Disch to Power & Combination Boilers_R0.xls]PRIME CODE TCS

ESTIMATE DATE: 01/16/03
REVISION: 0
ESTIMATED BY: MICHAEL WATSON
CHECKED BY:
EST. FILE #: 02052

| PRIME CODE | DESCRIPTION | W-H | QTY | UNIT | LABOR | EQUIPMENT | MATERIAL | SUBCONTRACT | TOTAL COST |
|---|---|---|---|---|---|---|---|---|---|
| | **DIRECT COSTS** | | | | | | | | |
| 50 | MAJOR EQUIPMENT | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 51 | DEMOLITION | 0 | 0 | 0 | $0 | $0 | $0 | $50,000 | $50,000 |
| 52 | SITE EARTHMOVING | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 53 | SITE IMPROVEMENTS | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 54 | PILING, CAISSONS | 0 | 0 | LF | $0 | $0 | $0 | $0 | $0 |
| 55 | BUILDINGS | 0 | 1 | LOT | $0 | $0 | $0 | $0 | $0 |
| 56 | CONCRETE | 0 | 0 | CY | $0 | $0 | $0 | $0 | $0 |
| 57 | MASONRY, REFRACTORY | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 58 | STRUCTURAL STEEL | 47 | 1 | TN | $1,684 | $0 | $2,913 | $0 | $4,598 |
| 59 | ROOFING AND SIDING | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 60 | FIRE PROOFING | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 61 | PROCESS DUCTWORK (NON-BUILDING) | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 62 | PIPING | 1,410 | 102 | LF | $57,814 | $0 | $70,200 | $0 | $128,014 |
| 63 | INSULATION - PIPE, EQUIPMENT & DUCTWORK | 0 | 0 | 0 | $0 | $0 | $0 | $1,000 | $1,000 |
| 64 | INSTRUMENTATION | 480 | 0 | 0 | $19,679 | $150,000 | $0 | $0 | $169,679 |
| 65 | ELECTRICAL | 40 | 216 | LF | $1,640 | $0 | $329 | $0 | $1,969 |
| 66 | PAINTING, PROTECTIVE COATINGS | 0 | 0 | 0 | $0 | $0 | $0 | $2,000 | $2,000 |
| 67 | FURNITURE, LAB & SHOP EQUIPMENT | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 75 | CONSTRUCTION SERVICE LABOR | 395 | 0 | 0 | $14,115 | $0 | $0 | $0 | $14,115 |
| | **TOTAL DIRECT COSTS** | **2,373** | | | **$94,932** | **$150,000** | **$73,442** | **$53,000** | **$371,375** |

# TOTAL COST SUMMARY - JE PRIME CODE

JOB: ESTIMATE 2 - BLEACH PLANT SCRUBBER DISCHARGE TO RTO
CLIENT: GEORGIA PACIFIC
LOCATION: PALATKA, FLORIDA
JOB NUMBER: 16AZ1380
CONSTRUCTION DURATION: TBD
ESTIMATE TYPE: +/- 25%
G:\ESTIMATI\GEORPAC\HVLC STUDIES\PALATKA, FLORIDA\16AZ1380\[EMAIL_Bleach Plant Scrubber Disch to RTO_R2.xls]PRIME CODE TCS

ESTIMATE DATE: 01/27/03
REVISION: 2
ESTIMATED BY: MICHAEL WATSON
CHECKED BY:
EST. FILE #: 02052

| PRIME CODE | DESCRIPTION | W-H | QTY | UNIT | LABOR | EQUIPMENT | MATERIAL | SUBCONTRACT | TOTAL COST |
|---|---|---|---|---|---|---|---|---|---|
| | **DIRECT COSTS** | | | | | | | | |
| 50 | MAJOR EQUIPMENT | 888 | 0 | 0 | $36,423 | $287,782 | $6,985 | $1,356,000 | $1,687,190 |
| 51 | DEMOLITION | 0 | 0 | 0 | $0 | $0 | $0 | $50,000 | $50,000 |
| 52 | SITE EARTHMOVING | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 53 | SITE IMPROVEMENTS | 0 | 0 | 0 | $0 | $0 | $0 | $5,000 | $5,000 |
| 54 | PILING, CAISSONS | 0 | 0 | LF | $0 | $0 | $0 | $60,000 | $60,000 |
| 55 | BUILDINGS | 0 | 1 | LOT | $0 | $0 | $0 | $0 | $0 |
| 56 | CONCRETE | 1,357 | 200 | CY | $42,661 | $0 | $29,995 | $0 | $72,656 |
| 57 | MASONRY, REFRACTORY | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 58 | STRUCTURAL STEEL | 755 | 18 | TN | $26,950 | $0 | $46,616 | $2,700 | $76,265 |
| 59 | ROOFING AND SIDING | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 60 | FIRE PROOFING | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 61 | PROCESS DUCTWORK (NON-BUILDING) | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 62 | PIPING | 10,442 | 1,960 | LF | $428,141 | $0 | $444,516 | $0 | $872,657 |
| 63 | INSULATION - PIPE, EQUIPMENT & DUCTWORK | 0 | 0 | 0 | $0 | $0 | $0 | $500 | $500 |
| 64 | INSTRUMENTATION | 680 | 0 | 0 | $27,879 | $200,000 | $0 | $0 | $227,879 |
| 65 | ELECTRICAL | 1,307 | 7,358 | LF | $53,585 | $36,450 | $32,256 | $0 | $122,291 |
| 66 | PAINTING, PROTECTIVE COATINGS | 0 | 0 | 0 | $0 | $0 | $0 | $15,000 | $15,000 |
| 67 | FURNITURE, LAB & SHOP EQUIPMENT | 0 | 0 | 0 | $0 | $0 | $0 | $0 | $0 |
| 75 | CONSTRUCTION SERVICE LABOR | 3,086 | 0 | 0 | $110,146 | $0 | $0 | $0 | $110,146 |
| | **TOTAL DIRECT COSTS** | 18,515 | | | $725,784 | $524,232 | $560,368 | $1,489,200 | $3,299,584 |

**RTO VENDOR QUOTES**

**MEGTEC Systems**
830 Prosper Road
P.O. Box 5030
De Pere, WI 54115-5030

920/336-5715

# CLEANSWITCH™ -100-90 REGENERATIVE THERMAL OXIDIZER

Proposal Number 114973A

Prepared For:

Mr. Bruce Payne
Georgia Pacific Corporation
133 Peachtree Street NE
Atlanta, GA 30303

Mr. Pat Braud
Naheola Mill
7530 Highway 114
Pennington, AL 36916

By: Lisa Mencheski
Inside Sales Representative
Industrial and Emission Control Products

March 20, 2002

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## EXECUTIVE SUMMARY

Dear Gentlemen:

Thank you for considering MEGTEC Systems as your solution to your abatement requirements. I look forward to assisting you in your upcoming projects. I am forwarding you this package of information detailing MEGTEC's product offerings. Included in this package is a book *The Clean Air Compliance Handbook* that may be used for your reference.

MEGTEC Systems continually strives to build upon our reputation as a leading oxidizer manufacturer for VOC emission control. The statement "The Bottom Line is Process Knowledge" summarizes our core focus. We work to fully understand your process and how our equipment is to be integrated with your facility.

MEGTEC Systems differentiates itself from the competition through experience, innovation, product offerings, in-house fabrication and service.

**Experience** – Since 1971, MEGTEC Systems has been building oxidation systems, and has over 2,000 systems in operation worldwide. With installations in about every industry, our knowledge base is confidently applied to your specific application.

**Innovation** – MEGTEC Systems continually researches ways to offer abatement solutions. Our in-house Research & Development Department is dedicated to developing the latest technologies in oxidation with practical designs to meet challenging applications.

**Product offerings** – MEGTEC Systems offers the widest selection of abatement designs that can be tailored to meet your specific needs. Whether it's adsorption, thermal, recuperative, regenerative or catalytic, we have your solution.

**In-house fabrication** - MEGTEC Systems engineers and builds your equipment at our headquarters in DePere, WI. Our 250,000 $ft^2$ shop is equipped with the latest fabrication tools. Implementation of 6sigma quality program throughout engineering and fabrication assures your complete satisfaction.

**Service** - MEGTEC Systems has a manned 24/7/365 emergency parts and service assistance with 13 regional service centers located across the country and in Canada. Modem connection allows remote diagnostics of your equipment. Along with a $5 million revolving spare parts inventory, we have fifty (50) service representatives throughout North America.

I look forward to working with you and would like to offer my assistance in any way that I can. In the mean time, feel free to contact me with any comments or questions that you may have.

Respectfully yours,

Wade S. Klos
MEGTEC Systems
Account Executive
920-337-1505
wklos@megtec.com

cc: ROD, LMM Inside Sales Representative - MEGTEC Systems

## PRICE, TERMS, DELIVERY AND WARRANTY

### PRICE

| | Pricing |
|---|---|
| One (1) 10,000 SCFM CLEANSWITCH™ Regenerative Thermal Oxidizer | $560,900 |
| Level 1 Spare Parts | $1,900 |
| Level 2 Spare Parts | $4,700 |
| Freight | $9,100 |
| Installation Supervision | $8,500 |
| Start-up | $14,700 |
| Training | $4,200 |
| **Total** | **$604,000** |

All prices are FOB Pennington, AL and are valid for 60 days.

### TERMS

Purchase orders should be made out to MEGTEC Systems.

30% with purchase order
30% 60 days prior to shipment
30% upon notification of shipment
10% 30 days after shipment

### CONDITIONS OF SALE

"The conditions of sale under date of July 15, 1999 shall constitute a part of this proposal and are incorporated herein by reference as if fully set forth herein."

### DELIVERY

This equipment can be manufactured and ready for shipment 16-18 weeks from the receipt of your purchase order and down payment.

### CONSTRUCTION TIME ON SITE

This equipment would require five (5) days for mechanical and electrical installation.

## PRICE, TERMS, DELIVERY, AND WARRANTY

### PRODUCT WARRANTY

Equipment sold and commissioned by a MEGTEC Systems representative will be warranted for a period of one (1) year from the date of commissioning; startup not to exceed one hundred eighty (180) days from the date of shipment. This warranty will provide service for one (1) year to repair or replace warranted parts at no charge for labor or material. Only incurred airfare, car rental, living expenses (food and lodging) and overtime premiums (the difference between the applicable overtime rate and the standard straight time rate) will be billed to the customer.

**Warranty service means remedying any defects in workmanship and material found in the equipment.**

Expendable parts will not be included under warranty.

For further data, see the MEGTEC Systems' Terms and Conditions sheet.

### UPTIME

The MEGTEC Systems ENTERPRISE II® oxidizer system we are quoting for this project is the latest generation of regenerative oxidizers supplied by MEGTEC Systems. The design of this unit includes engineering and manufacturing practices we have developed over our 30-year history of building oxidation systems for outdoor industrial installations. Our goal is to have 24 hours, 7 days a week trouble free operation. To the extent that we do not meet this goal we have a commitment to our customer to react as fast as possible to get our equipment operational after any unanticipated fault or failure. In addition, we provide several options for preventative maintenance services to avoid any unforeseen problems.

## PROCESS CONDITIONS

The **CLEANSWITCH™** Regenerative Thermal Oxidation System is designed to operate with the following pulp and paper process.

**Design Criteria**

| | |
|---|---|
| Process: | Naheola Mill |
| Process Lines: | Chemiwasher, Knotters, Screens and Filtrate Tanks |
| Process Volume: | 9,000 SCFM |
| Process Temperature: | 120° - 160° F |
| Process Solvent: | Primarily acetone; Exhaust also contains sulfide compounds |
| Solvent Concentration: | 17.4 lbs/hr – total hydrocarbon and sulfide loading |

## EQUIPMENT RECOMMENDATION

MEGTEC Systems proposes a CLEANSWITCH™ Regenerative Thermal Oxidizer to meet your pollution control needs.

The CLEANSWITCH™ Regenerative Thermal Oxidizer System provides destruction of Volatile Organic Compounds (VOC's) and odor control. It combines high temperature thermal oxidation with a regenerative heat exchange to efficiently convert VOC's and other odor causing organic compounds to carbon dioxide and water vapor.

The CLEANSWITCH™ consists of two (2) energy recovery columns connected by a high temperature combustion chamber. The unit is internally lined with ceramic fiber insulation.

Flow is directed through the unit by a single valve such where one column is in a gas-heating (inlet) mode and the other column is in a gas-cooling (outlet) mode. The single switch valve incorporates a sealing system to ensure no bypass or leakage of process gas to clean exhaust gas.

VOC-laden air enters the oxidizer through the inlet manifold and is fed into the base of column A, where it passes vertically up through ceramic heat exchange media and is preheated almost to the combustion chamber temperature. The burner in the combustion chamber raises the air temperature to the operating set point where the oxidation process, which started in the ceramic media, is completed. Hot purified air then enters column B and passes vertically down through the ceramic media and is cooled before being exhausted to atmosphere.

### EQUIPMENT SIZE

- Length ..... 382 inches
- Width ..... 104 inches
- Height ..... 195 inches
- Weight (approx.) ..... 63,000 lbs.
- Packing weight ..... 18,200 lbs.

  Also refer to General Arrangement Drawing #114973-0104

### EXTERIOR APPEARANCE OF UNIT

Exterior will be painted #15 charcoal.

### EQUIPMENT SPECIFICATIONS

- Maximum air flow: ..... 10,000 scfm
- Maximum solvent capacity: ..... 2,160,000 Btu/hr
  ..... 174 lbs/hr solvent[1]
- Maximum Process Inlet Temperature: ..... 150° F
- Natural gas @ 5 psi with 1,000 Btu/ft$^3$ ± ¼ psig. ..... 1,675 CFH
- Air required ..... @ 80-100 psig, -40°F dew point, 5 CFM
- Voltage: ..... 460v/3Φ/60hz
- Electrical service required at: ..... 211 KVA
- Oxidizer differential pressure drop at design conditions ..... 14 inches

[1]Solvent heat value of 12,400 BTU/lb.

## OPERATING COSTS

| Process Exhaust Parameters | | | | Energy Consumption | | Flow to Stack | |
|---|---|---|---|---|---|---|---|
| Flow Rate [scfm] | Inlet Temp. [°F] | Water Concentration [% by volume] | Solvent Load [lbs/hr] | Fuel [MMBtu/hr] | Electrical [kW] | Flow Rate [scfm] | Stack Temp. [°F] |
| 8,941 | 140 | 20 | 17 | 2.2 | 48.0 | 9,237 | 372 |
| 8,941 | 140 | 0 | 17 | 2.1 | 48.0 | -- | -- |
| 3,750 | 140 | 0 | 0 | 0.58 | 8.0 | -- | -- |

**Operating Costs are based on:**

- 12,400 Btu/# for VOC's
- 950 BTU/$Ft^3$ for Natural Gas
- The above fuel consumption values include burner efficiency and thermal radiation.

## BILL OF MATERIAL

### ENCLOSURE

- The main housing consists of two (2) insulated energy recovery columns connected by a common insulated combustion chamber.
- The shell is constructed of 316L stainless steel
- The unit is shop assembled to the greatest extent possible to simplify field erection.
- Insulated with ceramic fiber
- Casing is coated with Therma-Cover thermal barrier
- All welded joints to eliminate any leakage of fumes or vapors.
- Normal operating temperature of 1650° F and maximum operating temperature of 1800° F
- Residence time of 0.75 seconds at 1600° F
- Time required to reach operating temperature from a cold start is one and one half (1½) hours.

### HEAT EXCHANGE MEDIA

- High $Al_2O_3$ Acid Resistant ceramic heat exchange media to resist acid attack
- Media is chemically inert and thermally stable up to 2200° F.
- Sufficient quantity of ceramic media will be provided to obtain 90% nominal thermal efficiency.

### BURNER

- Maxon Kinemax Burner or equivalent
- Fuel source is natural gas
- Electric modulating actuator
- 20:1 maximum turndown (on natural gas)
- Flame safeguard with Self-Checking Ultraviolet Scanner
- High temperature protection device
- Necessary interlocks to achieve safe starts and fail-safe operation (FM or IRI compatible)

### BURNER ACCESS PLATFORM

- Allows for complete access to burner provided with an OSHA approved access platform. Safety rails, ladder and grating are included.

### SYSTEM FAN

- Twin City Fan or equivalent
- 125 HP, High Efficiency TEFC Motor
- Complete with couplings or belts and OSHA approved guard
- Constructed of 316L stainless steel
- Insulated to prevent condensation and for personnel protection
- AC variable frequency fan speed control to maintain proper exhaust rates
- Teflon coated expansion joints
- Arrangement 1

### VARIABLE FREQUENCY DRIVE (VFD)

- Yaskawa AC variable frequency speed drive is provided to vary fan motor speed, controlling the air volume to the oxidizer using negative pressure ductwork as the indication of flow.
- The drive is shipped mounted in the control house.

## BILL OF MATERIAL

### COMBUSTION BLOWER

- Twin City Blower or equivalent
- 10 HP, High Efficiency TEFC Motor
- Direct Drive, Arrangement 4 with inlet filter
- Across-the-line starters, circuit breakers and thermal overload relays for each motor

### OXIDIZER FAN TO INLET DUCT

- Insulated to prevent condensation and for personnel protection
- Fabricated from 316L stainless steel and welded air tight

### SWITCH VALVE

- Pneumatically Actuated
- Valve sealing included
- Constructed of 316L stainless steel

### COMPRESSED AIR TANK

Provided to maintain sufficient volume of air for a switch valve change. Included are:

- 30 gallon ASME Code tank
- Mounted to CLEANSWITCH frame
- Prepiped
- Pressure gauge included

### FRESH AIR DAMPER

- Enables the oxidizer exhaust fan to run without drawing air from the process during idle, standby and oxidizer purge periods. Damper is constructed of 316L stainless steel. Damper is actuated by a 120-volt motor with limit switches and NEMA 4 enclosure. Internal limit switches verify damper position. Damper is mounted in the ductwork prior to the oxidizer system fan. Damper is preset and pinned for positive action.

- The system automatically opens the fresh air damper to allow air into the fan inlet and maintain minimum flow if process air volumes are below the minimum turndown of the unit. In addition, this package is used for temperature control in high solvent situations.

### CONTROL HOUSE

The CLEANSWITCH™ provides a unit mounted electrical control house that contains the following:

- Power distribution panel and programmable controller and oxidizer control panel
- AC drive
- Environmental control system (HVAC)
- Circuit breaker panel for lighting and outlets
- A single power feed is required for oxidizer power and all auxiliary power

## BILL OF MATERIAL

### VIDEO DISPLAY OPERATOR INTERFACE

- PanelMate grayscale touch screen display operator interface
- Video display operator interface
- One button start-up
- By-pass key switches wired to common terminal strip

### PROGRAMMABLE LOGIC CONTROLLER (PLC)

- Allen Bradley SLC 5/04 Series PLC
- RS Logix software
- First-out indication for ease of trouble shooting
- Alarm history

### CHART RECORDER

- Yokogawa one point chart recorder provides method to record operating temperature for proof of compliance as required by regulatory agencies.
- The chart recorder is mounted in the control house

### MODEM

- Provided for remote access to PLC for trouble shooting, alarms, program modifications, and monitoring process variables.
- Auto-answer
- Shipped mounted in control cabinet
- Dedicated phone (voice and data) lines to be provided by customer

### BAKE OUT CYCLE

- For applications where organic particulate, aerosols or condensables may exist in the process exhaust, the optional bake out cycle provides a method of cleaning the cold side of the oxidizer of these deposits. During this cycle, each of the energy recovery columns will be held in an extended gas-cooling (outlet) mode until the cold side of the oxidizer is raised to an appropriate temperature where any organic build up will burn off.

### DOCUMENTATION

- Documentation – Five (5) sets of operator manuals and drawings are provided. Additional manuals are available at $200.00 each.

## BILL OF MATERIAL

### SPARE PARTS

#### Level 1 Spare Parts

| Qty | Part No. | Description |
|---|---|---|
| 3 | 198675 | RELAY,3PDT,110VAC,10 A,IDEC RH 3B-ULAC110V |
| 2 | 290290 | THERMOCOUPLE,DUAL,TYPE K,12LG, MGO,PYRO KK43U-012-00-8HN31 |
| 1 | 179471 | SWITCH-TEMP,DIGITAL,32-2502 DE G F,AIR,EUROTHERM 93 |
| 1 | 134031 | IGNITER-SPARK,AUBURN #I-P17/MO DIFIED |
| 1 | 289654 | CYLINDER-AIR,6.00 BORE,18.875, PARKER,6.00CJ2MAUS14AC18.875 |
| 1 | 299489 | CYLINDER-AIR,8.00 BORE,3.00 ST ROKE,COMPACT AIR,R8X3 |
| 1 | 299802 | VALVE-SOLENOID,AAA,0.75 NPT,12 0V,50/60 HZ,391V-120V |
| 1 | 213466 | RELAY,120V AC,ALLEN BRADLEY #7 00-CF220-D |
| 2 | 285177 | SENSOR-PROXIMITY,SHIELDED,2 WI RE,PEPPER & FUCHS,NJ15+U4+W-T |
| 1 | 121860 | CIRCUIT BREAKER,5A,250V,SINGLE POLE, A-B 1492-GH050 |
| 1 | 267185 | SCANNER-UV,SELF CHECKING,HONEY WELL C7061A1012 |
| 1 | 122030 | TIMER,MULTI RANGE,FM,CE,24-240 V,50/60 HZ,10A,11 PIN,ATC 328D |
| 1 | 121861 | CIRCUIT BREAKER,10A,250V,SINGL E POLE,A-B 1492-G100 |
| 1 | 121862 | CIRCUIT BREAKER,15A,250V,SINGL E POLE,A-B 1492-GH150 |

#### Level 2 Spare Parts

| Qty | Dwg No. | Description |
|---|---|---|
| 3 | 191998 | SAFEGUARD-COMBUSTION,RELAY MOD ULE,HONEYWELL RM7890B1014B |
| 1 | 267904 | REMOTE RESET WITH DISPLAY,SAFE GUARD,HONEYWELL S7800A1001 |
| 1 | 278564 | AMPLIFIER-UV,2 OR 3 SEC RESPON SE,CE,HONEYWELL,R7861A1026 |
| 1 | 256850 | SWITCH-PRESS,GAS/AIR,100-500MB AR,40-200WC,SCHRODER,DG 500T. |
| 1 | 168109 | SWITCH-PRESS,GAS/AIR,1-10MBAR, 0.4-4"WC,KROMSCHRODER DG 10T |
| 1 | 168110 | SWITCH-PRESS,GAS/AIR,2.5-50MBA R,1-20WC,KROMSCHRODER,DG 50T |
| 1 | 185672 | SWITCH-PRESS,GAS/AIR,0.5-6MBAR ,0.2-2.4"WC,KROMSCHRODER DG 6T |
| 1 | 169182 | SWITCH-PRESSURE,0-100 PSI,ASHC ROFT,B4-24B100 PSI |
| 1 | 126553 | PAPER-CHART,Z-FOLD,F/STRIP CHA RT RECORDER,YOKOGAWA B9565AW |
| 1 | 269130 | TRANSMITTER,PRESS,0 TO 50 IN W C,ASHCROFT XL-5-F02-42-ST-50IW |
| 1 | 121500 | TRANSFORMER-IGNITION,120V PRI, 10,000V SEC,DONGAN A10-LA22 |
| 1 | 174526 | FILTER,RFI,120/250VAC @ 3A,0.2 5 QUICK CONNECT,CORCOM 3VW1 |
| 1 | 289960 | MODULE-THERMOCOUPLE/MV,8 CHANN ELS,24VDC,SLC 500,A-B 1746-NT8 |
| 1 | 251731 | MODULE-INPUT,120 VAC,16 INPUTS ,SLC 500,A-B 1746-IA16 |
| 1 | 253172 | MODULE-ANALOG INPUTS,4 CHAN,A/ V,24VDC,SLC 500,A-B 1746-NI4 |
| 1 | 122431 | VALVE-SOLENOID,PILOT,2-WAY,0.5 O NPT,110/120V,NC,ASCO 8214G20 |
| 1 | 251732 | MODULE-OUTPUT,120 VAC,16 OUTPU TS,SLC 500,A-B 1746-0A16 |
| 1 | 120944 | REGULATOR-MINATURE,0.125NPT,AR ROW R161-P |
| 1 | 284929 | REGULATOR-PRESS,0.50 NPT,12.0- 28.0 WC,ORN,EQUIMETER 043-180 |
| 1 | 253173 | MODULE-ANALOG OUT,4 CHAN,0-20M A,24VDC,SLC 500,A-B 1746-N04I |
| 1 | 254526 | MODULE-ANALOG,2 INPUT/2 OUTPUT ,A-B 1746-NI041 |
| 1 | 291346 | PEN,PLOTTER,PURPLE,MICRO 1000C HART RECORDER,YOKOGAWA B9902A |
| 1 | 255542 | SWITCH-PRESS,GAS/AIR,30-150MBA R,12-60WC,KROMSCHRODER,DG 150T |
| 1 | 290596 | TRANSMITTER-PRESS,0-100PSI,4-2 0MA,ASH,K1-7-MO2-42-C1-100 |
| 1 | 253179 | MOTOR-ACTIONATOR,10-150 DEG,60 SEC,HONEYWELL M740A1046 S&C |
| 1 | 299175 | REGULATOR,PRECISION,2-150 PSI, .250 NPT,PARKER FRL 3550 1040P |
| 1 | 281102 | REGULATOR/FILTER,COMPRESSED AI R,GRAINGER 6B312 |
| 1 | 294402 | PEN,RED,MICRO 1000 CHART RECORDER,YOKOGAWA B9902AM |
| 1 | 282265 | RECORDER-CHART,STRIP,1 POINT,M ICRO-R1000,YOKOGAWA 436001 |
| 1 | 260554 | TRANSMITTER,PRESSURE,0-5WC,4- 20MA,ASHCROFT,ASH-XL-DP-050 |
| 1 | 269131 | TRANSMITTER-PRESS,0-15WC,4-20M A,ASHCROFT XL-5-F02-42-ST-15IW |

## PERFORMANCE WARRANTY

### GUARANTEE

MEGTEC Systems makes the following Performance Warranty:

If all of the performance conditions, as defined in the performance tabulation, are satisfied, then the oxidation equipment:

**Total Reduced Sulfur**

...will reduce the concentration of sulfur measured at the oxidizer stack by 99% or to a lower limit of 10 ppmv.

**Hydrocarbons**

...will reduce the concentration of gaseous phase hydrocarbons measured at the inlet of the oxidizer as compared to the concentration of gaseous phase hydrocarbons measured at the outlet (i.e.: discharge stack) of the oxidizer by 99% or to a lower limit of 40 ppmv average as $C_1$ as verified by U.S. EPA test methods 25A. The Performance Conditions are defined in this specification under the heading of "Design Criteria". The equipment must be operated no lower than 1600° F oxidation temperature.

**Oxides of Nitrogen (NOx)**

...when operated on natural gas and according to equipment specifications, the equipment will perform such that the total concentration of NOx as measured (i.e. uncorrected to 3% oxygen) at the discharge stack will not exceed 25 ppmv, 95% thermal efficiency average NOx as $NO_2$.

This guarantee is predicated upon an inlet NOx concentration of 0 ppmv and no nitrogen containing hydrocarbons or ammonia type compounds are in the process exhaust.

**Carbon Monoxide**

...when operated on natural gas and according to equipment specifications, the equipment will perform such that it will reduce the concentration of carbon monoxide measured (uncorrected to 3% oxygen) at the oxidizer stack to a lower limit of 20 ppmv average.

## PERFORMANCE WARRANTY

### CRITERIA

- The length of term for this guarantee is twelve (12) months (one (1) year) from date of start-up, not to exceed eighteen (18) months from shipment date by MEGTEC Systems.
- MEGTEC Systems reserves the right to adjust the oxidation temperature within 100° F of design set point to achieve conformance.
- For the purposes of this warranty, U.S. EPA Method 25A (FID) or equivalent must be used unless another test method is mutually agreed upon. U.S. EPA Method 18 should be used to measure and subtract methane.
- Use of the oxidizer must be in accordance with MEGTEC Systems operating instructions. Guaranteed performance is based on the use of the solvent description listed in the proposal.
- Non-conformance with this warranty shall be demonstrated to the satisfaction of MEGTEC Systems by and at the expense of the buyer. MEGTEC Systems reserves the right to assist in the development of testing protocol in cooperation with the BUYER and their assigned consultants and/or testing contractor.

**Note:** *Compounds such as, but not limited to, heavy metals, halogens, sulfur, can degradate the ceramic fiber insulation and oxidizer internal components. These compounds will void the warranty if found in process stream. These can originate from chlorinated solvents, fluorides, et cetera.*

## INSTALLATION AND FIELD SERVICE

### INSTALLATION SUPERVISION, START-UP AND TRAINING

MEGTEC Systems proposes to furnish start-up as indicated below.

- One (1) installation engineer for five (5) consecutive ten (10) hour days will be provided for installation supervision. This quotation also includes one (1) round trip travel and incurred lodging expenses.
- One (1) field service representative for seven (7) consecutive ten (10) hour days will be provided for start-up and training. This quotation also includes one (1) round trip travel and incurred lodging expenses.
- To ensure that a field service representative is available, please contact us at least fourteen (14) days prior to your scheduled start-up.
- To prepare for start-up services the equipment should be fully installed according to specifications and all utilities should be complete, operable and in compliance with local codes.
- Our equipment will be checked mechanically and electrically and all operational data will be verified. A copy of the data form will be provided to the customer. Associated equipment by others should be functional to the point that it will enable us to completely test our equipment.
- Operational and basic maintenance training will be provided for user personnel by the field service representative upon completion of start-up. Twenty (20) hours of training includes four (4) 4-hour segments covering four (4) shifts.
- The service rates found on the following page will apply to any hours required beyond the normal eight hour day or for delays encountered that are not attributable to our equipment.

### OTHER SERVICE OFFERINGS

- $5 million revolving spare parts inventory available
- 24 hour emergency parts and service assistance available 365 days a year
- Regional service centers located in California, Florida, Maryland, New Jersey, West Virginia, Wisconsin and Ontario, Canada. Overseas service is available through offices in England, France, Germany, Singapore, Australia, Sweden and Hong Kong

## FIELD SERVICE RATES

### EQUIPMENT SERVICE RATES

Start-up services, installation supervision, and service calls are provided at the following rates:

| | | |
|---|---|---|
| **Straight Time** | $ 95.00/hour | Up to 8 hours per day on weekdays |
| **Time & One-Half** | $140.00/hour | Over 8 hours up to 12 hours on weekdays; Up to 8 hours on Saturday |
| **Premium Time** | $186.00/hour | Over 12 hours on week-days; over 8 hours Saturday; Sunday and Holidays |
| **Travel Time** | $ 75.00/hour | Travel will be based on actual hours |
| **Weekend & Holiday Travel Time** | $115.00/hour | Same as above |
| **Weekend Layover** | 8 Hrs straight time/day | Plus actual expenses |
| **Field Training** | $105.00/hour (straight time) | Customer plant training |
| **24/7 Technical & Modem (Effective June 1, 2001)** | MEGTEC Systems provides 24-hour, 365/day on-line real time modem & phone technical support for a charge of $150.00/per incident after warranty. An incident is defined as the time required to resolve one (1) problem. | |

- *MEGTEC Systems offers preventive maintenance programs, which can be tailored to meet your requirements. Please contact us at 920-336-5715 for details*
- *The above prices are subject to change without notice.*
- *All service calls are subject to a four (4) hour minimum billing plus travel.*

**Expenses** Expenses will be invoiced as incurred, plus a 6% service charge. These may include:

**Actual**: Airfare, lodging, car rental, and general expenses
Meal allowance billed at federal per diem
**At Rate**: Company Car - $40.00/day.

## CUSTOMER RESPONSIBILITY

The following responsibilities are borne by the customer unless included in a MEGTEC Systems installation package offered with this document.

- If power capacitors are installed in your facility, please notify MEGTEC Systems at once as an isolation transformer may be necessary.
- Any special regulatory codes must be submitted to MEGTEC Systems before or with order placement.
- Fuel and vent piping to MEGTEC Systems connection points sized in accordance to MEGTEC Systems specifications.
- Electrical services to MEGTEC Systems connection points sized in accordance to MEGTEC Systems specifications.
- Natural gas @ 5 psi ± ¼ psig with 950 Btu/$ft^3$.
- Instrument quality compressed air @ 80 – 100 psig, -40° F dew point, and 5 CFM (per oxidizer) to MEGTEC Systems connection points sized in accordance to MEGTEC Systems specifications.
- Exhaust duct from process to inlet of oxidizer unit. If the run exceeds 75 feet (23 meters) with three (3) or more elbows, please notify MEGTEC Systems for fan sizing verification.
- Modifications to any existing equipment, building structures or other obstructions at the installation site.
- Wiring inside of non-MEGTEC Systems equipment and termination of wires related to the interface between non-MEGTEC Systems manufactured equipment and the proposed MEGTEC Systems equipment.
- Hand railing, ladder, service platform and heat insulation if required by OSHA.
- Roof or floor supports, as required.
- Flashing for through-roof ductwork
- Provide information / documentation identifying any special codes, permits or requirements specific to the installation site. Costs incurred to meet requirements not identified to MEGTEC Systems prior to this proposal will be the responsibility of the customer.
- Necessary engineering drawings and information related to non-MEGTEC Systems-manufactured equipment for interface between process and MEGTEC Systems equipment.
- EPA type air permit testing
- Clear and unobstructed access to the worksite for installation is required

## CUSTOMER RESPONSIBILITY

- Area lighting unless specifically in the electrical installation scope
- Soils testing unless specifically referenced in the general installation scope
- **Noise – OSHA Compliance**
- Data on the noise levels of rotating equipment such as fans, motors, blowers, compressors, etc., as determined by the manufacturers, will be supplied upon request. The combined noise levels of the system, in conjunction with the surroundings, cannot be predetermined. If the noise levels from the system exceed OSHA or local code requirements, MEGTEC Systems can provide sound attenuation equipment, which will be the financial responsibility of the customer.

## EXCEPTIONS

**MEGTEC SYSTEMS TAKES EXCEPTION TO THE FOLLOWING ITEMS AS NOTED:**

**Instructions To Vendors/Destruction Criteria - #4**

The MEGTEC Systems ENTERPRISE II® oxidizer system we are quoting for this project is the latest generation of regenerative oxidizers supplied by MEGTEC Systems. The design of this unit includes engineering and manufacturing practices we have developed over our 30-year history of building oxidation systems for outdoor industrial installations. Our goal is to have 24 hours, 7 days a week trouble free operation. To the extent that we do not meet this goal we have a commitment to our customer to react as fast as possible to get our equipment operational after any unanticipated fault or failure. In addition, we provide several options for preventative maintenance services to avoid any unforeseen problems.

**Instructions To Vendors/Destruction Criteria - #5**

Georgia Pacific requests Total Reduced Sulfur (TRS) emissions of less than 5 ppm averaged over a 12-hour period. MEGTEC Systems' destruction efficiency guarantee includes TRS emissions of 10 ppm maximum with a destruction efficiency of 98.5%.

**Instructions To Vendors/Vendor's Design - #7**

Georgia Pacific's specifies the use of controls and natural gas equipment for enrichment of the incoming gases to reduce NOx formation. The oxidizer will not be equipped with Natural Gas Injection since the application has the potential for particulate buildup and is designed for operation below 95% thermal efficiency.

**Instructions To Vendors/Vendor's Design - #14**

Although MEGTEC Systems has taken every precaution against acid attack, including construction materials of 316L stainless steel and the application of Therma-Cover insulation, there are still unknown variations in the tank vent loading. Therefore, MEGTEC Systems will not warranty the life of the shell for ten (10) years against any corrosion.

**Instructions To Vendor/Vendor's Design - #24**

MEGTEC Systems reserves the right to remedy any deficiencies of supplied equipment. Therefore, MEGTEC Systems takes exception to the buyer having the right to refund the entire purchase price.

**Instructions To Vendors/Vendor's Design - #26**

It has been requested that the structural steel be painted per Georgia Pacific specifications. Georgia Pacific paint specifications have not been supplied and therefore the cost is not adjusted for this.

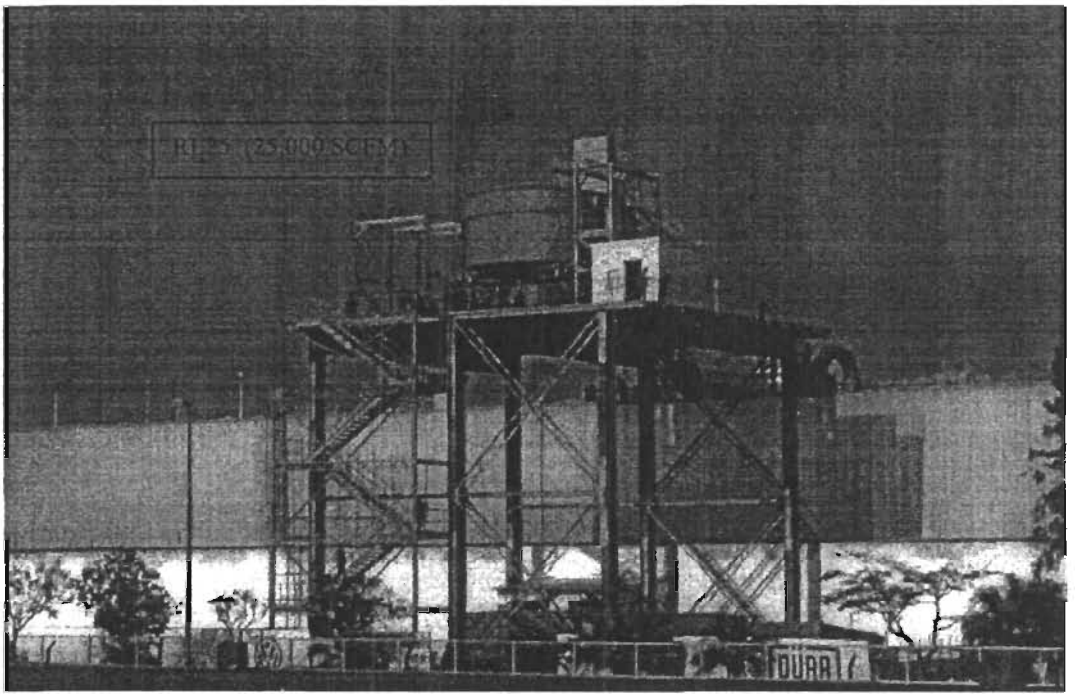
**Georgia Pacific's Purchase Order Conditions**

MEGTEC Systems takes exception to Georgia Pacific's Purchase Order Conditions. All conditions can be negotiated at time of order placement.

DÜRR

AN ENGINEERED SOLUTION
TO SUPPLY

A Durr Air Emission Control System



TO

# Georgia Pacific Corporation

(1) Wa, (2) Or, (1) Me, (1) AL, (1) Ms, (1) Ga

August 16, 2001

DURR PROPOSAL NO. 01-RLP-0816

*This proposal contains confidential and proprietary information of DURR and is not to be disclosed to any third parties without the express prior written consent of DURR.*
*This proposal is submitted solely for the purpose of enabling client to evaluate DURR's bid on the within project and shall be returned to DURR or destroyed if so requested by DURR*
1997 by DURR. All rights reserved.

**Durr Environmental, Inc.**
31285 Durr Drive, PO box 930459, Wixom, MI 48393
Telephone: (248) 668-500 / Fax: (248) 926-6570

DÜRR

Georgia Pacific Corporation
133 Peachtree St., NE (30303)
PO Box 105605
Atlanta, Ga. 30348-5605

Attention: Mr. Jeffrey W. Brown
Phone: 404-652-4615

Subject: DURR Revised Budgetary Proposal # 01-RLP-0816

Dear Jeff,

I want thanks you and your associated again for taking the time to visit our installation at Guardian. Based on our discussions, I have attached a revised budgetary proposal for a modular RL10 RTO system for your brown stock washer applications. The system can handle the full range of process flows at all the various locations you indicated.

The enclosed system, which is proposed, includes an additional spool piece to provide a three quarter (3/4) second retention time at 1600'F. It also includes 304 and nitronic stainless steel for all of the wetted surfaces, including the fan, valve, and stack. The nitronic stainless steel is used for the piston rings and stator.

I have also included an optional VER (variable energy recovery) system, which will handle VOC/HAP concentration up to four times greater than your present indicated loading.

As I indicated in our discussions, NCG streams can be direct injected into the combustion chamber. We have install systems of this type into the pharmaceutical industry.

Again, I thank you for your continued interest in our products and services, and I will be happy to meet with you and your associates to discuss our equipment and system approach in detail for each process.

Regards,

Rodney L Pennington, PE
Director of Sales
Phone 407-822-9203
Cell 407-496-1911
rpennington@de.durr-usa.com

cc: Trent Moberg (GP)
Lawrence Otwell (GP)
Robert H. Orender (GP)
Steve Lowe (Air Techniques Inc.)
Mike Anderson (Caldwell Mckay Co., Inc)
Phil Audit (A&A Engineering)
Jeff Maser (ZWM Co.)

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DÜRR

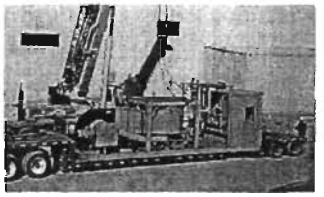
# Budget Pricing

**I) Core Dryer**

Engineer, fabricate, supply and commission one (1) pre-piped/pre-wired Durr Modular Model RL10 RTO including:

- Added spool for ¾ second @ 1600'F
- Stainless Steel construction
- VER
- all the standard features and services described below:

Budget Price, including start up ..... $455,000
Budget Price, optional installation ..... $ 20,000



All prices are in U.S. dollars and subject to Durr's Standard Conditions of Sale, installation, ductwork and structural steel support or foundation by others, unless otherwise note,

By: _____

Rodney L Pennington, PE
Director of Sales
407-822-9203

# Payment Terms

| | |
|---|---|
| 30% | of Price with Purchase Order. |
| 65% | of Price based on monthly progress payments. |
| 5% | of Price after successful performance testing. |
| -OR- | thirty days after equipment is ready for operation. |
| -OR- | ninety days after final material shipment, whichever comes first, if successful performance testing is delayed through no fault of DURR. |

# Delivery

Based on present workload, our delivery for this equipment is (24) after receipt and acceptance of your purchase order. Installation and start-up will take an additional 4 weeks.

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NOTES: All prices exclude any taxes, duties, broker fees, value added taxes, income taxes, or any other allowance.

# Standard RL Equipment

### Mechanical Components

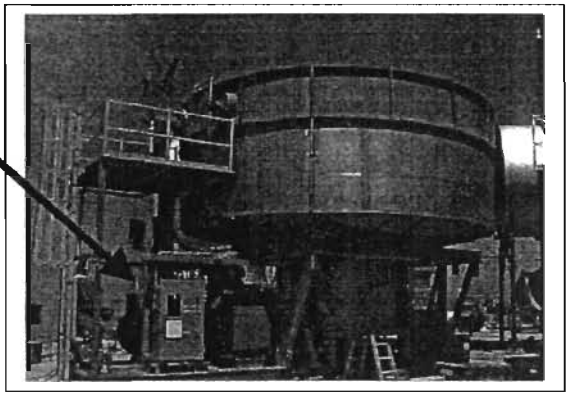
- Unitized base skid
- Pre-piped / pre-wired skid
- Rotary valve with pneumatic drive
- RTO housing
- Regenerative heat exchange 95% TER
- FM or IRI combustion system
- **Fresh air damper for purge or idle**
- Chamber flushing
- Valve sealing
- Delivered fully painted
- Expansion joints
- Nema 4 enclosure for Flex I/O

### Miscellaneous

- Two maintenance manuals
- 8 hours training course
- Start up

### Controls

- PLC controls
- Digital Flex I/O cards
- Analog Flex I/O cards
- T/C cards
- Control loops
- Self checking UV flame safeguard
- Labeled terminals and wires
- Power distribution
- Area lighting
- Pressure volume control
- Motor starters
- 120 V transformer



# Optional RL Equipment

| | Included | Not included | Optional Price |
|---|---|---|---|
| • Installation | | | X |
| • Foundations | | X | |
| • 3O4 /nitronic SS wetted surfaces, valve, fan, and stack | X | | |
| • Positive draft fan and motor | X | | |
| • Induced draft fan and motor | | X | |
| • Variable Frequency Drive (VFD) | X | | |
| • Free-standing exhaust stack & manifolds | X | | |
| • Stack platform | | X | |

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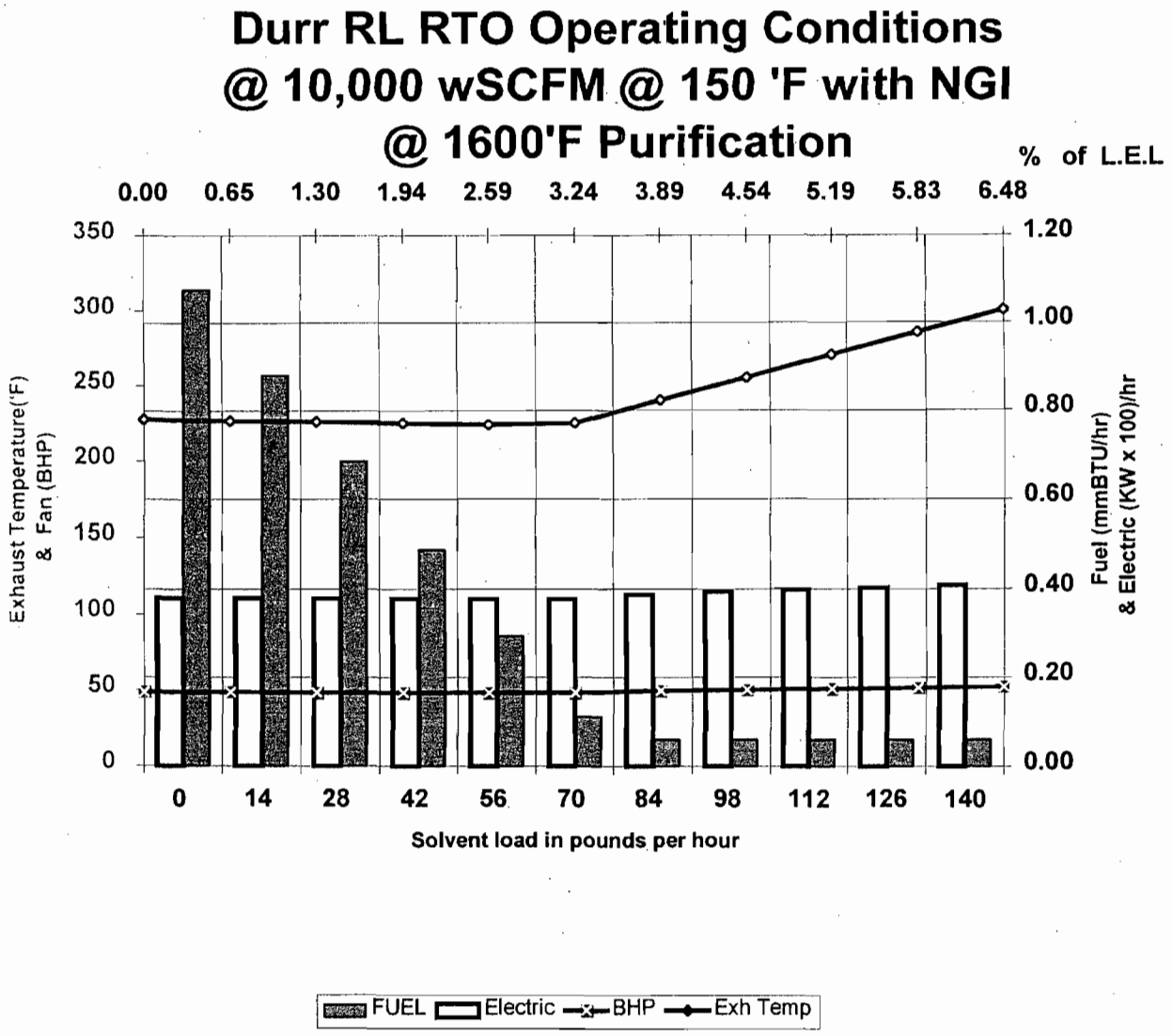
| | | | |
|---|---|---|---|
| • Re-circulation for maximum turn down | | X | |
| • Wonderware with AB PLC | X | | |
| • Natural Gas Injection | X | | |

## DURR RL Process Design Data

| | | | |
|---|---|---|---|
| **Date :** | 20-Jul-01 | **N.G.I.** | yes |
| **Data input by :** | Durr Environmental Inc. | **Thermal Efficiency** | 95 |
| **Company Name :** | GP | **Number of Units** | 1 |
| **Location:** | Various | **Type** | RTO |
| **Re-Therm Model RL** | 10 | **Proposal #** | 01-RLP-0720 |

| Process Data Input | Maximum Design | Operating Case | Units |
|---|---|---|---|
| Process Exhaust Volume | 10,000 | 10,000 | wSCFM |
| | 11,500 | 11,500 | ACFM |
| Process Exhaust Temp | 150 | 150 | deg F |
| Total Contaminants | 140 | 35 | lb/hr |
| TRS | 100 | 100 | PPMv |
| Methanol | - | 200 | PPMv |
| other | - | 150 | PPMv |
| Heat Value | 12,500 | 12,500 | BTU/lb |
| Average MW of VOC | 44 | 44 | as propane |
| Maximum BTU/HR Load | 437,500 | 437,500 | BTUs/HR |
| Solvent Auto-ignition Temp. | 450 | 450 | deg F |
| Inlet Concentration as VOC. | 2,053 | 376 | PPMv propane |
| Inlet Concentration as CH4. | 5,644 | 1,411 | PPMv CH4 |
| Approx. % of LEL | 1.6 | 1.6 | % of LEL |
| Purification Temperature | 1,800 | 1,600 | deg F |
| Inlet Static Pressure | -2.00 | -2.00 | inches W.C. |
| Site Elevation A.S.L | 100 | 100 | feet |

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# Guarantees

## VOCs

DURR guarantees that the RL will convert 99% or more of the total volatile organic in the inlet stream to carbon dioxide, water, and non-combustibles, down to a minimum of **20 PPMv measured as carbon** in the exhaust stream.

## $NO_x$

DURR guarantees that the RL outlet emissions of $NO_x$ will not exceed 10 PPMv measured as $NO_2$ (uncorrected), provided there are no $NO_x$ or nitrogen bearing compounds contained in the inlet stream to the RL.

## CO

DURR guarantees that the RL outlet emissions of CO will not exceed 50 $PPMv_v$ measured as CO (uncorrected).

## General

The following provisions apply to all of the above guarantees:

- The process exhaust flow will not exceed specified value and the process conditions are as given in the process design data page of this proposal.
- The performance will be based on five test samples taken consecutively, of which the high and low value will be discarded. The test result will be arithmetic average of the three remaining tests.
- The performance guarantees apply only during normal operation, not during any maintenance procedures.
- If DURR fails to meet the Performance Guarantee, DURR will be given reasonable time to investigate and take corrective action within the scope of this contract.
- All performance tests will be arranged and paid for by Purchaser. DURR will be notified in writing 14 days prior to the tests.
- EPA Methods 7E, 10 and 25A are used to determine $NO_x$, CO and VOC performance, respectively.
- Methane is excluded from outlet emissions.
- The RL is installed and operated in accordance with DURR's Operating and Maintenance Instructions.

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# Field Service & Installation

## Start-up and Training

Forty hours of start-up and training are included in the base equipment price. As part of the forty hours, DURR will conduct one 8-hour training course at Purchaser's site.

## Installation (Optional)

- Installation is not included unless specified as an option on the price page.
- DURR can provide complete installation services at an additional cost. Call your sales representative for pricing.

## Installation Supervision (Optional)

- No installation supervision is included unless specified as an option on the price page.
- DURR can provide a qualified representative at an additional cost. Call your sales representative for current pricing.

## Supplied by Purchaser

- Locate, supply and install foundations including anchor bolts.
- Supply the following utilities to the connection point on the RE-THERM RL unit:
- Power voltage: 480V (or 4160V), 3 Ph, 60 Hz - 1 feed required.
- Fuel: adequate supply of natural gas at 1,000 BTU/ft$^3$ and regulated to 5.0 psig steady.
- Compressed air: 10 cfm supply of clean, dry compressed air at 80 psig and a -40'F dewpoint.
- Sub-station transformers and line isolators, if required.
- Sprinkler system or other fire or explosion protection systems as may be required by insurance company, governmental or local authorities.
- System ductwork including process isolation, spill dampers, inlet manifold, outlet manifold, and pressure relief dampers unless specifically quoted and purchased from DURR.
- Insulation (if necessary) of RE-THERM inlet and outlet duct manifolds, fans and other hot exposed ductwork.
- FM or IRI approval submittals.
- Necessary permits and approvals as may be required by any and all insurance, governmental agencies or local authorities.
- Applicable sales, use, excise or similar taxes.

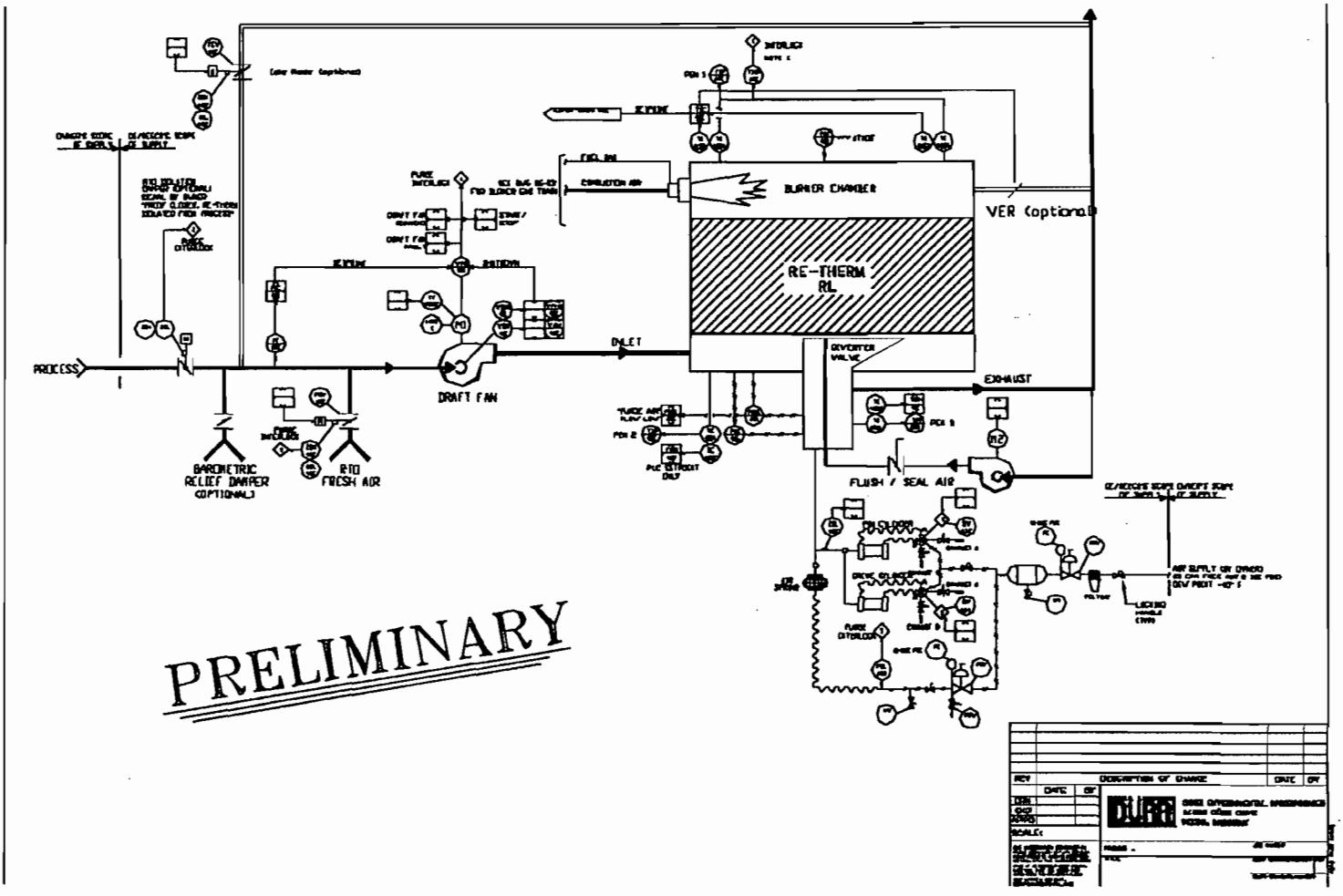
## Additional Field Services

- Additional field services are available, if necessary, at DURR's standard start-up/instructional service rates. Please contact your sales representative for current pricing.

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DÜRR

# Typical P&ID




This proposal contains confidential and proprietary information of DURR, and is not to be disclosed to any third parties without the express prior written consent of DURR.

EISENMANN CORPORATION
BUDGETARY PROPOSAL NO. A82-068

# COMPACT VALVELESS REGENERATIVE THERMAL OXIDIZER

FOR

# GEORGIA PACIFIC
# ATLANTA, GA

SEPTEMBER 6, 2001

# TABLE OF CONTENTS

GENERAL TECHNICAL DATA ..... 3
GENERAL SYSTEM DESCRIPTION ..... 4
UTILITY DATA ..... 5
OPERATING COSTS ..... 6
GUARANTEES ..... 7
ADVANTAGES OVER OTHER RTO SYSTEMS ..... 8
SCOPE OF DELIVERY ..... 9
BUDGETARY PRICING ..... 10

# GENERAL TECHNICAL DATA

Operating Conditions

| | | |
|---|---|---|
| Exhaust Flow Rate | : | 8,310 scfm (10,000 acfm) |
| Exhaust Inlet Temperature | : | 160°F |
| Combustion Temperature | : | 1,500°F |
| Burner Operating (No VOC) | : | 1.4 MMBtu/hr |
| Burner Installed | : | 4 MMBtu/hr |
| Fan Motor Operating (Incl. -2.0" W.C. Inlet & +1" W.C. for Stack) | : | 42 bhp |
| Fan Motor Installed | : | 50 hp |
| Fan Motor Turndown (Max. to Min.) | : | 60 Hz to 15 Hz |
| System Pressure Drop | : | 13.5 inches W.C. |
| System Destruction Efficiency | : | 99% |
| System Thermal Efficiency | : | 93% |
| Clean Air Outlet Temperature | : | 94°F+ above inlet |
| System Weight | : | 60 tons |
| Dimensions | : | 12 feet x 38 feet |

# GENERAL SYSTEM DESCRIPTION

The process stream from the system exhaust vents is collected and sent to the VRTO-C system.

The process fan is operated by a VFD, which maintains a constant pressure in the duct. The fan directs the flow to the inlet of the VRTO-C.

Once within the VRTO-C unit, the exhaust will be directed by the rotating distributor to the appropriate sections of hot ceramic heat exchanger media. The heat exchanger bed is comprised of eight separate chambers. At any given moment, the exhaust moves upward through three and downward through three. The remaining chambers act as a sealed buffer between dirty and clean air. The exhaust will pass vertically upward through media taking on the heat and raising the air temperature close to the combustion temperature.

In the combustion area, the burner will provide additional energy to reach the temperature of approximately 1,500°F. This operating temperature oxidizes the VOCs and cleans the air. The clean heated air passes down through separate sections of the exchanger media returning its heat back to the system. A continuous purge cleanses the chambers before allowing cleaned air to exhaust through.

The patented EISENMANN rotating distributor continuously turns, shifting which section of the media is in the upward, downward or purge cycle. In this manner, a constant thermal efficiency and pressure drop is maintained.

The cleaned exhaust then passes from the VRTO-C to the EISENMANN provided 50 ft. clean air stack.

Vessel material of construction 316L.

# UTILITY DATA

## Electrical

Operating Conditions

VRTO-C Supply Fan

| | | |
|---|---|---|
| Quantity | : | 1 |
| Operating | : | 1 x 42 bhp @ 460 vac |
| Connected | : | 1 x 50 hp @ 460 vac |

Combustion Blower

| | | |
|---|---|---|
| Quantity | : | 1 |
| Operating | : | 1 x 8.0 bhp @ 460 vac |
| Connected | : | 1 x 15.0 hp @ 460 vac |

Air Distributor Drives

| | | |
|---|---|---|
| Quantity | : | 1 |
| Operating | : | 1 x 0.75 bhp @ 460 vac |
| Connected | : | 1 x 1.0 hp @ 460 vac |

## Natural Gas

VRTO Burner

| | | |
|---|---|---|
| Quantity | : | 1 |
| Operating (No VOC) | : | 1 x 1.4 MMBtu/hr |
| Connected | : | 1 x 4 MMBtu/hr |

**Compressed Air** : None

**Water** : None

**Ventilation** : None

**Steam** : None

# OPERATING COSTS

## Natural Gas

| | | |
|---|---|---|
| Rate | : | $5.00 per MMBtu |
| Total Btu (Including VOC) | : | 1.4 MMBtu/hr |
| Hourly Cost | : | $ 7.00 per hour |

## Electrical Power

| | | |
|---|---|---|
| Rate | : | $0.05 per kW |
| Total Operating | : | 51 bhp/38 kW |
| Hourly Cost | : | $ 1.90 |

## Yearly Maintenance Costs

Routine maintenance requirements, 50 man hours.
Yearly Eisenmann supervised inspection, 2 man days at rates shown on page 9. Parts, materials, labor and equipment not included.

# GUARANTEES

## 100% Uptime Guarantee

EISENMANN guarantees that the VRTO will be able to treat exhaust 100% of the time when the system is operated in accordance to EISENMANN's operating and maintenance manual and within the design parameters of the system. In the event that the VRTO system is unable to treat exhaust during the base one (1) year warranty period, EISENMANN will extend the warranty an additional 3 months on the VRTO housing, ceramic and insulation for every occurrence during the base warranty period. The total warranty period with any extension(s) is limited to five (5) years after initial start-up. Supporting documentation will be required prior to the extension of the warranty.

## 24/7/365 Response Emergency Response

EISENMANN provides 24/7/365, 24 hours a day and 7 days a week, response to emergency calls. On calls outside of the normal business hours of 8 a.m. to 5 p.m. CST, Monday through Friday, the emergency pager will be activated. Upon receiving a page, an EISENMANN engineer will respond to the emergency call within 60 minutes. If your call is not responded to within 60 minutes, EISENMANN will dispatch a field technician to the plant to inspect the system free of charge.

# ADVANTAGES OVER OTHER RTO SYSTEMS

- EISENMANN's patented design is the only damperless, single vessel unit proven in the market. A rotating distributor shifts the exhaust through the heat exchanger eliminating the pressure shocks associated with dampers. Standard EISENMANN design guarantees inlet pressure fluctuations of less than +/- 0.10 inches wc fluctuation. Typically, less than +/-0.05 inches wc is achieved. Multiple vessel RTOs with dampers and valves achieve no better than +/-0.50 inches wc.

- The high maintenance associated with damper type RTOs is eliminated. Valved or dampered systems require activation of valves every two minutes at the minimum. During vessel "switchover", untreated fumes may escape to the exhaust stack. The EISENMANN system replaces the pneumatics, actuators, dampers, linkage and lubricants with a simple rotating distributor that is driven by one exterior mounted 0.75 Bhp motor and gearbox. The inner shell and wedge walls (heat transfer area) of the vessel are constructed of 309 stainless steel for a long service life.

- A simpler design with fewer moving parts results in higher uptime reliability.

- The damperless design enables the fan to be located at the inlet to the oxidizer which reduces the cost of the fan and lowers the motor sizing by up to 15%.

- The EISENMANN VRTO-C offers consistent VOC removal efficiency. A damper RTOs removal efficiency deteriorates over time because of poor seating of the dampers. The VRTO-C will have the same DRE after 50,000 hours of operation.

# SCOPE OF DELIVERY

By EISENMANN

- Skid Mounted Compact Valveless Regenerative Thermal Oxidizer - Complete with fuel gas burner, forced draft fan and VFD, structured ceramic media, rotary exhaust distributor and insulation
- Interconnecting ductwork between EISENMANN supplied components
- Flexible connectors to allow for thermal expansion as required
- Insulation and cladding to maintain OSHA standards
- Turnkey control panel with graphic interface
- Clean air stack
- Mechanical and electrical installation
- Installation supervision and start-up
- Freight to Alabama site

By Others

- Concrete pad
- Gas drops (5 psi) to the skid connection point
- Required power connection to tie-in points
- Exhaust duct from the process equipment to the fan inlet
- Emissions testing and certification
- DCS connection
- Fan inlet flexible connector and isolation damper

Per Diem Costs

Per diem (8 hour day) time:

- $ 1,000 per day Monday through Friday
- $ 1,500 Saturdays
- $ 2,000 Sundays

Plus travel and living expenses will be billed at cost.

Drawings

This is the typical drawing list from our VRTO-C operating and maintenance manual.

- VRTO-C flow schematic
- Block schematic
- General arrangement
- Lower section assembly
- Gas train

# BUDGETARY PRICING

## Base Price

Supply one (1) compact valveless regenerative thermal oxidizer (VRTO-C) as described in this proposal including site supervision and training. The system is designed for 8,310 scfm @ 160°F.

| | | |
|---|---|---|
| Total Lump Sum Equipment, Design, Freight and Installation ..... | $ | 450,000.00 |

## Option 1 – Budgetary Option Pricing

Three (3) year spare parts. Rotor drive motor and gear box, drive shaft, rotor support bearing, damper actuator, high temperature grease, door gasket, process fan bearings, flame rod, burner spark plug, combustion thermal couple.

| | | |
|---|---|---|
| Option 1..... | $ | 25,000.00 |

## Delivery

| | | |
|---|---|---|
| Delivery to Site | : | 14 weeks |
| Installation | : | 1 week |
| Start-Up and Training | : | 1 week |
| Total | : | 16 weeks |

EISENMANN CORPORATION

Wade S. Klos
Sales Group Leader
Clean Air Technology

Howard Hohl
Sales Manager
Clean Air Technology

**Brown, Jeffrey W.**

**From:** HHohl@aol.com

**Sent:** Friday, September 07, 2001 5:04 PM

**To:** Brown, Joe E.; jonbake@bellsouth.net; wade.klos@eisenmann.com; mark.west@eisenmann.com; egmcgee@hotmail.com

**Subject:** Georgia Pacific MACT I, Phase 2 Budgetary A82-068

Jeff:

Here is our budgetary proposal to abate vapors from a series of brownstock washers and storage tanks. The vent stream will be mostly methanol with small amounts of TRS compounds.

We look forward to speaking with you in the near future. Our local contact is Mr. Jon Baker with Crocker and Assoc. Jon can be reached at 770.246.6195. In the interim if you have any questions or comments please do not hesitate to contact Eisenmann direct at the numbers shown below.

Thank you.

Howard Hohl
DIRECT PH: 630.681.9604
CELL PH: 630.215.3979
CORP PH: 815.455.4100, x6066

# GEORGIA-PACIFIC PREVIOUSLY SUBMITTED RESPONSES

Dana Bugh

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

January 3, 2003

Mr. Syed Arif
State of Florida
Department of Environmental Protection
2600 Blair Stone Road
Twin Towers Office Building
Tallahassee, Florida 32399

Re: DEP File No. 1070005-019-AC (PSD-FL-264A)
Georgia-Pacific Palatka Operations
No. 3 Bleach Plant

Dear Mr. Arif,

The following is in response to your request for additional information dated November 26, 2002. Please note that the items are listed in the same order as in the letter mentioned above for convenience.

1. **Request**: *Please provide the total pulp production at the facility for the years 1999, 2000 and 2001. Also, give a breakdown of where this pulp was utilized in the facility (bleached and unbleached areas). Additionally, provide a detailed accounting of this pulp when utilized in the tissue-making mill. If additional pulp was bought during those years, please include that in the accounting. The Department is expecting a complete material balance of the pulp produced in the facility and the pulp bought by the facility when compared to the material shipped from the facility.*

   **Response**: Please see Table 1 (see Attachment A). Note that pulp produced is back calculated from actual paper machine production. The mill also purchases both pulp and finished tissue in "parent" rolls. The purchased pulp, along with the virgin pulp, is utilized in manufacturing product at the Palatka Mill. The tissue "parent" rolls are converted into finished goods at the Mill – these rolls are only processed in the converting area of the Mill and do not add additional production to the pulp mill, bleach plant, or machine areas.

2. **Request**: *Please give a detailed accounting of how much of softwood and hardwood was utilized in the total pulp production at the facility for the years 1999, 2000 and 2001. How are the two types of woods segregated when feeding*

*to the digesters? How is the pulp kept segregated and is there any blending of the pulp taking place prior to making final product.*

**Response**: Please see Table 1. Hardwood and softwood chips are segregated into different chip silos prior to use, and are cooked separately in the digesters. The subsequent pulp is also segregated by species in different high-density pulp storage towers and is blended just prior to the paper machines as needed for the various paper grades.

3. **Request**: *During the plant trip on November 12, the No. 3 Bleach Plant was operating at 30 tph. Please indicate if the production rate was 30 ADTBP per hour.*

   **Response**: The production rate was 30 unbleached oven-dry standard tons per hour as measured going into the pre-bleach washer.

4. **Request**: *During the plant trip on November 12, the facility personnel talked about a chart at the No. 3 Bleach Plant presentation, which indicated reduced usage of $ClO_2$ and increased usage of oxygen and hydrogen peroxide to get the same bleach ability. If testing was done to authenticate this fact, please provide the necessary documents. Also, provide a detailed written description as well as the chart showed to the Department.*

   **Response:** No lab simulated testing was done to authenticate the results of the work done in reducing $ClO_2$ by using more hydrogen peroxide. No permanent changes to oxygen application rates were made during this time period based on trial and error results. The results presented were based on lb/ton application rates as measured by the inline instrumentation, and were obtained by trial and error experimentation.

   Charts 1 and 2 below illustrate the trial and error work that was completed, demonstrating a shift of work from $ClO_2$ in the first stage to hydrogen peroxide in the second stage. The last six weeks of data that were in the original presentation have been omitted due to an instrumentation failure that was identified subsequent to DEP's visit. (note, this paragraph needs to be indented to match the prior paragraph)

**Chart 1**

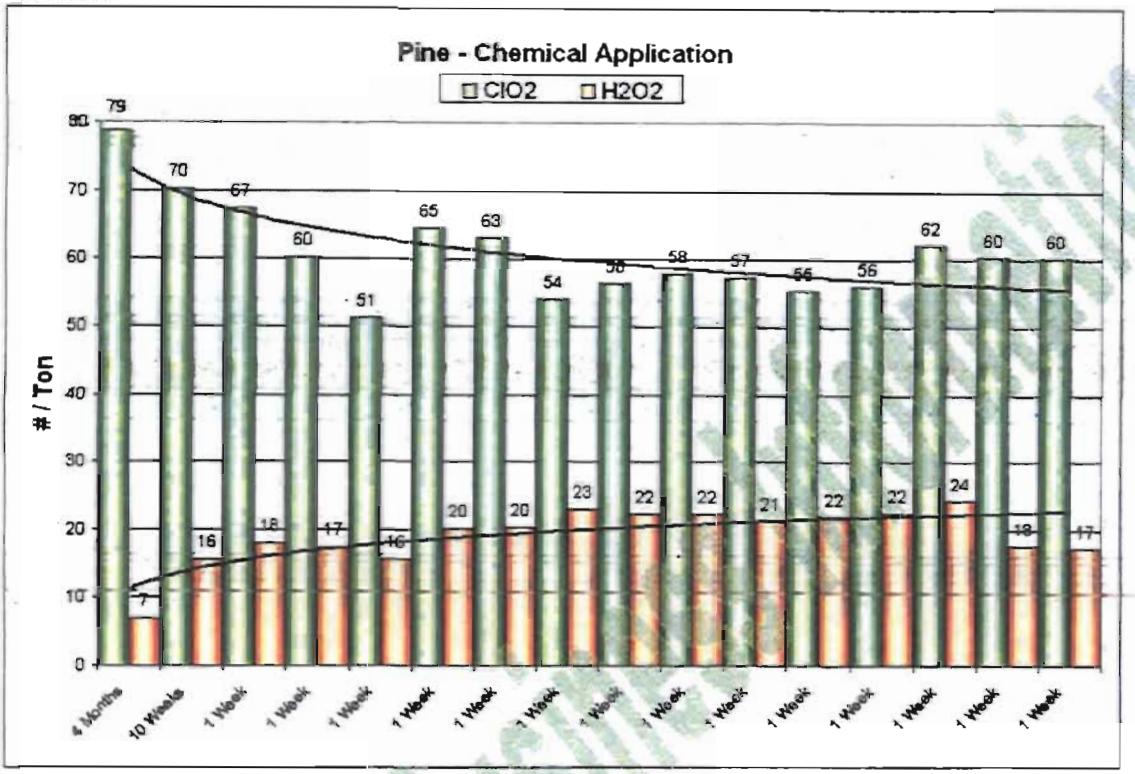
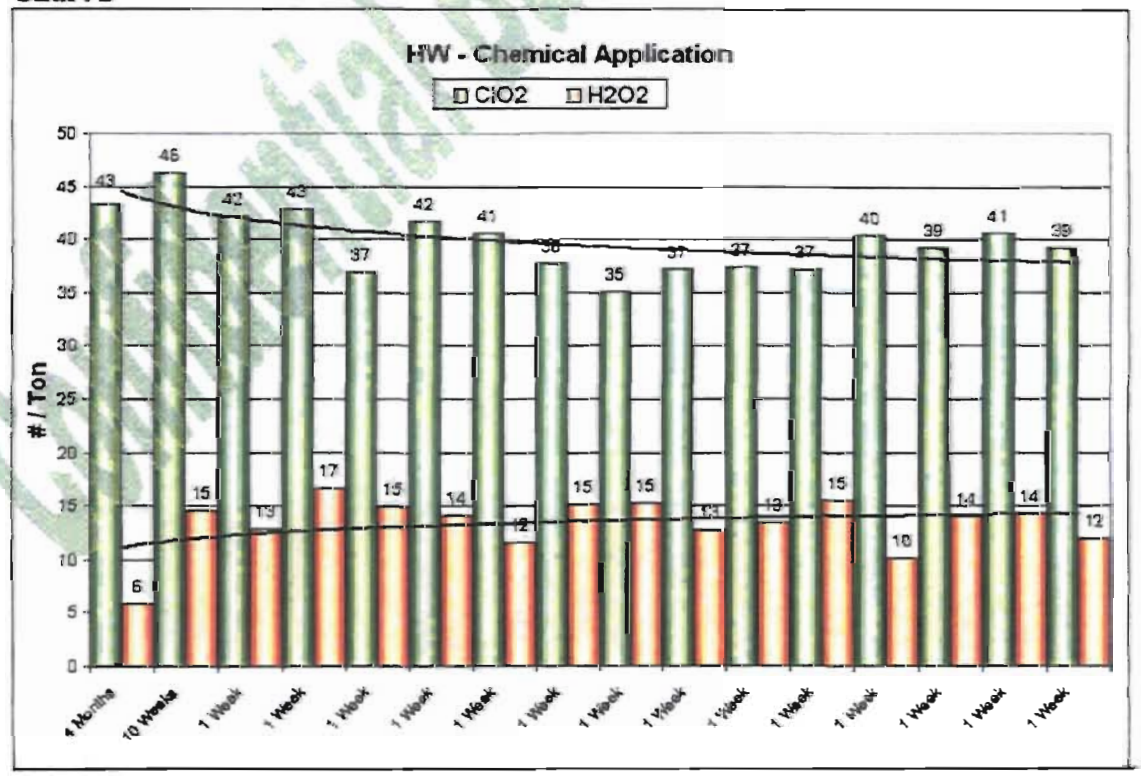



**Chart 2**



5. **Request**: *Please indicate if 100% of softwood pulp or 100% of hardwood pulp is processed through the bleach plant at any given time. Are there occasions when a mix of the two types of wood pulp is processed at the same time? What indicators are available in the control room to help the operators know what type and how much of either hardwood or softwood pulp is being processed.*

   **Response:** Softwood and hardwood are almost always processed in the bleach plant separately and are never intentionally mixed. However, the grade mix required by the machines requires the bleach plant to make frequent species changes. Therefore, it is not uncommon for more than one species to be in different stages of bleaching within the bleach plant at a given point in time. The bleach plant was designed to minimize mixing; however, there is a small amount of inadvertent mixing (typically 10~20 ADTBP) that occurs with each transition. The operators are able to approximately monitor the location of each species volumetrically in the bleach plant by tracking the origin of the pulp flow since the pulp is segregated in different pulp storage towers. This allows the distributed control system (DCS) to display the current species in each sequence of bleaching, allowing the operator to make adjustments as required.

6. **Request**: *Please explain how the $ClO_2$ application rate to the pulp is monitored. If data is kept on the application rate, how often is it recorded?*

   **Response**: Both the $ClO_2$ flow rate and strength are measured continuously by inline instrumentation. The pulp tonnage rate is measured by inline flow and consistency measurement instrumentation as well. This information is then converted into a lb/ton application rate. Operators record $ClO_2$ application information on their log sheets on an hourly basis during normal operation.

7. **Request**: *Please provide a copy of the initial and annual compliance tests done for this plant. The report should include information on the production rate of the bleach plant during the compliance tests.*

   **Response**: The reports are attached (Attachment B).

8. **Request**: *The Department is in receipt of daily pulp production data covering a period from January 2000 until October 2002 (34 months). The daily bleached pulp production data indicates a highest daily production rate of 1197.9 tons on June 30, 2002, and a highest monthly average of 884 tons per day in September 2002. Please explain the reasons for not achieving the permitted production rates of 1702 tons daily maximum and 1350 tons per day monthly average for the No. 3 Bleach Plant.*

   **Response:** The Bleach Plant, as built, is capable of producing 1440 bleached air-dry standard tons per day rather than the initial design rate of 1702 tons per day. As such, this update has been reflected in the more recent application.

Current grade mix on the paper machines does not require us to produce at the "as built", maximum rate. However, market conditions change frequently based on customer preferences and economic conditions. Therefore, the bleach plant was designed and built to meet these changing market conditions, and G-P wishes to be permitted for such operations.

9. **Request**: *Please provide detail test reports of the series of tests conducted in October 2002 to measure actual CO emissions from the plant.*

   **Response**: See Attachment C.

10. **Request**: *Please provide the $ClO_2$ application rate for the series of tests conducted in October 2002.*

    **Response**: See Attachment C. (See yellow page).

11. **Request**: *Please list the pertinent information (% $ClO_2$ applied, kappa number, temperature etc.) that a compliance inspector should gather during an inspection of a bleach plant to ensure that the source is complying with the permitted CO emission limits. How will these parameters or others provide assurance that the limit is not exceeded?*

    **Response**: Emissions data for carbon monoxide emissions from bleach plant scrubbers first became available to the pulp and paper industry through the National Council for Air and Stream Improvement, Inc. (NCASI). NCASI Technical Bulletin 760 (TB 760) (July 1998) provides information on carbon monoxide emissions associated with oxygen delignification and chlorine dioxide bleaching of wood pulp. In numerous sections of the document, NCASI repeatedly states that the operating parameter correlations are not strong, and in many cases are non-existent (in the case of hardwood bleaching). For example, in the Introduction to TB 760, it is stated that, "Data from mill-conducted tests for CO emissions from 14 bleach plants at kraft pulp mills have already been reported in NCASI Technical Bulletin No. 701 (NCASI 1995). These data showed tremendous variability between mills, with CO emissions ranging from 0.003 to 1.73 lb per air dry ton of bleached pulp (lb/ADTBP). The causes for this variability were, however, unclear."

    Further, later in TB 760, when comparing CO emissions between two mills (Mills B and C),NCASI specifically states that, "The magnitude of CO emissions at Mill C appear comparable to those recorded at Mill B. This is in spite of $ClO_2$ application rates in this mill being less than half of those at Mill B." In the concluding paragraph of this same section, NCASI states that, "The available literature suggests that the lignin content of the brownstock entering the bleach plant and the $ClO_2$ charge would be the two main parameters controlling CO formation. However, since the $ClO_2$ charge for a desired pulp brightness is determined by the lignin content or kappa number of pulp entering the bleaching

sequence, the $ClO_2$ charge by itself would be expected to be the controlling parameter in CO formation...A general trend of increasing CO emissions with increasing percent $ClO_2$ applied is seen, but the correlation is not strong".

In recent conversations, NCASI staff have strongly discouraged Georgia-Pacific from using the NCASI data from TB 760 in establishing emission factors. In TB 760, NCASI has attempted to simply present data for varying operating configurations (*e.g.*, bleach plant stages/configurations, percent chlorine dioxide applied, wood species, presence/absence of oxygen delignification, etc.). While some trends appear, as they state clearly and repeatedly in TB 760, the correlations are not strong.

Given this information, and general lack of data, Georgia-Pacific feels strongly that it is not appropriate to establish parametric values to be used in demonstrating compliance. This is not only supported by testing at the Palatka Mill, but by the full array of mills that was tested by NCASI. Georgia-Pacific feels that the annual stack-testing requirement should be sufficient to demonstrate compliance with the emission limit. If additional information becomes available in the industry in the future, indicating that the correlations are stronger, it might be possible to revisit this possibility. However, at this time, the correlations are simply not developed.

For the same reasons stated above (*e.g.*, lack of correlation with operating parameters), Georgia-Pacific felt that it was necessary to incorporate a safety margin into the emission factors that were utilized in the permit application. TB 760 indicates that, for given testing scenarios and runs, the emission values can vary considerably - the standard deviations that are presented in TB 760 are often very high.

12. **Request**: *Please explain if there is a nexus between $ClO_2$ application rate and HAP emissions from a bleach plant. If a nexus exists, how is it being applied to keep HAP emissions to a minimum from the plant?*

**Response**: In attempting to answer this question, Georgia-Pacific has reviewed various literature that is readily available in the industry, primarily through NCASI. NCASI Technical Bulletin 701 (TB 701) states that, "Volatile organic and chlorinated compounds most prominent in bleach plant emissions included $Cl_2$, $ClO_2$, methanol ($CH_3OH$) and chloroform ($CHCl_3$)". Of these, only $ClO_2$ is not a regulated hazardous air pollutant (HAP) under Section 112(d) of the Clean Air Act.

For the most prominent of these, methanol, TB 701 states that, "Emissions of methanol from bleach plant vents are affected by various factors including (a) the type of wood pulped (hardwood vs softwood), (b) $O_2$ delignification preceding the bleach plant, (c) percent substitution by $ClO_2$, (d) amount of methanol in $ClO_2$ solution used in bleaching, and (e) degree of removal of methanol from pulp in

brownstock washing." NCASI does not identify $ClO_2$ application rate as a contributing factor to methanol formation. In Technical Bulletin 666 (TB 666), NCASI discusses some of these other factors in more detail. For example, with regard to $ClO_2$ substitution rate, TB 666 states that, "These data show, however, that when the impact of methanol entering with the pulp and the $ClO_2$ liquor was eliminated, the amount of methanol generated in the bleach plant decreased with increasing levels of $ClO_2$ substitution. This decrease in methanol formation was gradual up to 70 percent $ClO_2$ substitution but was very significant at 100 percent $ClO_2$ substitution". The Cluster Rule targets methanol emission reductions at the brownstock washers. Therefore, we expect that the quantity of methanol entering the bleach plant with the pulp will be reduced as the Cluster Rule is fully implemented at the Palatka Mill (by April 2006).

For chloroform, TB 701 states that, "The bleaching sequence (which influences the bleaching chemicals used) and level of bleaching (final brightness) are expected to affect emissions of $Cl_2$, $ClO_2$, and $CHCl_3$...The use of hypochlorite is perhaps the single largest factor influencing the formation and emission of $CHCl_3$ from bleach plant vents". The preamble to the Cluster Rule, which is targeted at reducing HAPs in the bleach plant and other mill areas, states that, "...the technology basis for MACT control of chloroform is complete chlorine dioxide substitution and elimination of hypochlorite as a bleaching agent. These process modifications were determined to reduce chloroform emissions significantly". Again, there is confirmation of the fact that the primary contributor to the formation of chloroform, a chlorinated HAP, is the use of hypochlorite in bleaching. In order to comply with the MACT/Cluster Rule requirements for reducing HAPs, the Palatka Mill practices 100 percent chlorine dioxide substitution. Hypochlorite bleaching is not utilized. Variation in $ClO_2$ application rate was not identified by NCASI or EPA (as part of the MACT development process) as a significant contributing factor to the formation or reduction of chloroform. It should also be noted that the Cluster Rule establishes a very tight control level for chlorinated HAPs of 0.002 pound per ton of oven-dried pulp (lb/ODTP). Based on recent testing, measured levels at the Palatka Mill were roughly an order of magnitude lower.

13. **Request**: *Please explain how the quantity of lignin in the pulp entering the bleach plant is being monitored and what role, if any, is that playing in the $ClO_2$ application rate.*

**Response**: Kappa number has been proven to be a good relative indicator of lignin content in pulp. An inline kappa analyzer measures the kappa number of the pulp entering the bleach plant. The DCS uses this kappa measurement as one of the criteria for determining $ClO_2$ application rate, but final pulp brightness is the principal parameter used to control the operation of the Bleach Plant. (question – do we want to say something about the fact that final pulp brightness

is something that is dictated by the customer and the specific product being manufactured.

14. **Request**: *The application pages under Section I, Page 20 proposes 3-hour average basis for monitoring pH of the gas scrubbing medium, fan amperage of the bleaching system vent gas fan and the scrubber recirculation flow. Please indicate if continuous monitoring of these parameters is required in 40 CFR 60, Subpart S. If so, EPA will have to approve this request.*

    **Response:** Continuous monitoring is required by 40 CFR 63.453 (c ). Paragraph (n) of this same section requires that the Administrator approve the rationale for the selected operating parameter value, and monitoring frequency, and averaging time. Attachment C includes information provided to both the Department and the Administrator relative to this provision. The Northeast District worked with EPA on specific language in the draft Title V Permit Revision recently provided to us incorporating the parameter values, monitoring frequency, and averaging time (see Attachment D).

The responses to the remaining items (Nos. 15-20) in your letter dated November 26, 2002 will be provided under separate cover. We have contracted with an outside engineering firm to finalize our BACT analysis and expect to have the final response to the Department by February 1, 2003.

With the "completed responses" provided above, and those regarding the BACT analysis to be provided by February 1, we believe we will have fulfilled our obligation to submit a "complete application" no later than February 1, as required by paragraph 17 of the November 8, 2002 Consent Order and consistent with Rules 62-212.400 and 62-4.055. Please let me know promptly if the Department disagrees, so that we can consider whether we need to seek an extension to the Consent Order deadline.

If you have any further questions, please do not hesitate to call me at (386) 329-0918.

Sincerely,

Myra J. Carpenter

Myra J. Carpenter
Environmental Superintendent

Cc: W.M. Jernigan
T. Wyles
M. Aguilar
S.Matchett

# Attachment A

## Georgia-Pacific Palatka Pulp & Paper Operations
### Analysis of Material Shipments to Pulp Tons

***Material Shipments out of Mill***

| | 1999 | 2000 | 2001 |
|---|---|---|---|
| Kraft Shipments | 317,527 | 302,430 | 284,872 |
| Tissue Shipments | 244,152 | 240,394 | 219,563 |
| Total | 561,679 | 542,824 | 504,435 |
| Inventory Change | (7,436) | 7,141 | 6,840 |
| Net Shipments +/- Inventory Change | 554,243 | 549,965 | 511,275 |
| Purchased Paper Consumed | 19,833 | 19,697 | 6,853 |
| Net Tons Requiring Fiber | 534,410 | 530,268 | 504,422 |

***Pulp Tons Utilized***

| | | | |
|---|---|---|---|
| Hard Pine Pulp | 272,878 | 267,656 | 235,545 |
| Soft Pine Pulp | 192,533 | 179,778 | 183,869 |
| Hardwood Pulp | 111,674 | 133,276 | 134,049 |
| Total Production | 577,085 | 580,710 | 553,463 |
| Average Moisture Loss of 5% | 28,854 | 29,036 | 27,673 |
| Bleaching Loss of 10% | 27,380 | 28,176 | 28,580 |
| Net Pulp Tons | 520,850 | 523,499 | 497,210 |
| Purchased Pulp | 11,574 | 5,557 | 5,403 |
| Total Pulp Consumed | 532,424 | 529,056 | 502,613 |
| Variance | 1,986 | 1,212 | 1,809 |

**Note:**
Bleached Pulp Tons by Year 273,803 281,756 285,801
Variance reflects less than 0.5% of total shipments out of mill

Confidential Business Information

# Attachment B

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

November 13, 2002

VIA FAX (904) 448-4363

Mr. Christopher L. Kirts, P.E.
State of Florida
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256-7590

RE: Georgia-Pacific Corporation
Facility 1070005

Dear Mr. Kirts:

As you know, the Palatka mill conducted an initial performance test on the bleach plant scrubber stack in May 2001 and submitted the throughput rates and stack test results to the Department on June 11, 2001. The mill's submittal did not include other detailed information about chemical application rates, Kappa number, or the specific production mix (in terms of hardwood/softwood) being run at the time.

Enclosed is a table that contains additional information about the three test runs from that event. Also enclosed is a stack test report from the first three stack tests that were conducted during the week of October 28, 2002. Georgia-Pacific considers information about its chemical application rates, Kappa number, and other detailed production parameters to be confidential business information, pursuant to Section 403.111, F.S. This data relates to secret processes or secret methods of manufacture or production and is exempted from the public records act. G-P respectfully requests that you not copy or distribute it except to others in DEP who need to see it.

I hereby certify, based on the information and belief formed after reasonable inquiry, that the statements made and data contained in this document are true, accurate, and complete.

Feel free to call Myra Carpenter if you have any questions about this information. She can be reached at (386) 329-0918.

Sincerely,

Theodore D. Kennedy

Theodore D. Kennedy
Vice President

tk

cc: W. M. Jernigan
S. Matchett

# MAY 25, 2001 PRODUCTION DATA FOR TESTS

| Times | |
|---|---|
| 5/25/01 21:50 | Run 1 |
| 5/25/01 22:49 | |
| 5/25/01 23:02 | Run 2 |
| 5/26/01 0:01 | |
| 5/26/01 0:12 | Run 3 |
| 5/26/01 0:42 | |
| 5/26/01 1:43 | |
| 5/26/01 2:13 | |

| | | Do Stage | | | | Eop Stage | | D1 Stage | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ADTBPH | %SW | %HW | Kappa | %ClO2 | %SW | %HW | %SW | %HW | %ClO2 |
| Run 1 | 50.0 | 0 | 100 | 13.4 | 0.8 | 44.1 | 55.9 | 100 | 0 | 1.0 |
| Run 2 | 52.6 | 0 | 100 | 13.2 | 0.8 | 0 | 100 | 67.9 | 32.1 | 1.0 |
| Run 3 | 49.4 | 0 | 100 | 13.8 | 0.8 | 0 | 100 | 8.0 | 92.0 | 0.9 |

Notes: ADTBPH is air-dried tons of bleached pulp per hour
Kappa is the pre-washer kappa
%ClO2 is the %ClO2 applied in that stage

**Please note that the Kappa and Chemical Application Rates are considered Confidential Business Information.**

# Attachment C

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O Box 919
Palatka, FL 32178-0919
(386) 325-2001

**Best Available Copy**

November 13, 2002

VIA FAX (904) 448-4363

Mr Christopher L. Kirts, P E.
State of Florida
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256-7590

RE Georgia-Pacific Corporation
Facility 1070005

Dear Mr Kirts

As you know, the Palatka mill conducted an initial performance test on the b each plant scrubber stack in May 2001 and submitted the throughput rates and stack test results to the Department on June 11, 2001. The mill's submittal did not include other detailed information about chemical application rates, Kappa number, or the specific production mix (in terms of hardwood/softwood) being run at the time.

Enclosed is a table that contains additional information about the three test runs from that event. Also enclosed is a stack test report from the first three stack tests that were conducted during the week of October 28, 2002. Georgia-Pacific considers information about its chemical application rates, Kappa number, and other detailed production parameters to be confidential business information, pursuant to Section 403.111, F.S. This data relates to secret processes or secret methods of manufacture or production and is exempted from the public records act. G-P respectfully requests that you not copy or distribute it except to others in DEP who need to see it.

I hereby certify, based on the information and belief formed after reasonable inquiry, that the statements made and data contained in this document are true, accurate, and complete.

Feel free to call Myra Carpenter if you have any questions about th s information. She can be reached at (386) 329-0918.

Sincerely,

Theodore D. Kennedy

Theodore D Kennedy
Vice President

tk

cc W. M Jernigan
S Maichell

# MAY 25, 2001 PRODUCTION DATA FOR TESTS

| Times | |
|---|---|
| 5/25/01 21:50 | Run 1 |
| 5/25/01 22:49 | |
| 5/25/01 23:02 | Run 2 |
| 5/26/01 0:01 | |
| 5/26/01 0:12 | Run 3 |
| 5/26/01 0:42 | |
| 5/26/01 1:43 | Run 3 continued |
| 5/26/01 2:13 | |

| | | Do Stage | | | | Eop Stage | | D1 Stage | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ADTBPH | %SW | %HW | Kappa | %ClO2 | %SW | %HW | %SW | %HW | %ClO2 |
| Run 1 | 50.0 | 0 | 100 | 13.4 | 0.8 | 44.1 | 55.9 | 100 | 0 | 1.0 |
| Run 2 | 52.6 | 0 | 100 | 13.2 | 0.8 | 0 | 100 | 67.9 | 32.1 | 1.0 |
| Run 3 | 49.4 | 0 | 100 | 13.8 | 0.8 | 0 | 100 | 8.0 | 92.0 | 0.9 |

Notes
ADTBPH is air dried tons of bleached pulp per hour
Kappa is the pre-washer kappa
%ClO2 is the %ClO2 applied in that stage on weight basis

**Please note that the Kappa and Chemical Application Rates are considered Confidential Business Information**

# TEST REPORT
# On
# STACK EMISSIONS

From the

## BLEACH PLANT WET SCRUBBER OUTLET

In service at

## GEORGIA-PACIFIC PALATKA OPERATIONS

Located in

PALATKA, PUTNAM COUNTY, FLORIDA

Prepared for

# GEORGIA-PACIFIC CORPORATION

Test Completion Date: October 28th, 2002
Report Submittal Date: November 8th, 2002

Cubix Project No. 7382-FL1

Prepared by

Cubix Corporation

CORPORATE HEADQUARTERS
9225 US Hwy. 183 South, Austin, TX 78747

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## INTRODUCTION

Emission testing was conducted on a Bleach Plant wet scrubber at the Georgia-Pacific Corporation (GaPac) Palatka Operations facility located on County Road 216 in Palatka, Putnam County, Florida. Carbon monoxide (CO) and other combustion products were measured in the outlet of the scrubber stack. Cubix Corporation, Southeast Regional Office conducted these tests on October 28th, 2002.

The purpose of this testing was to determine the CO emission rates of the scrubber while bleaching softwood in lieu of hardwood as an engineering study. Three one-hour test runs were conducted on the unit documenting process operating data, emission concentrations, and mass emission rates.

The tests followed the principles of the procedures set forth in the Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 1, 2, 3a, 4, and 10. Table 1 summarizes the background information pertinent to these tests.

This report has been reviewed and is approved for submittal by the following representative:

Cubix Corporation

**TABLE 1**
**Background Data**

| | |
|---|---|
| Source Owner: | **Georgia-Pacific Corporation**<br>County Road 216<br>Palatka, Florida 32177<br>Attention: Joe E. Taylor<br>(386) 329-0027 Phone<br>(386) 328-0014 Facsimile<br>Email: JETAYLOR@GAPAC.com |
| Test Contractor: | **Cubix Corporation, SE Regional Office**<br>3709 SW 42nd Avenue, Suite 2<br>Gainesville, Florida 32608<br>Attention: Roger Osier, Project Foreman<br>(352) 378-0332 Phone<br>(352) 378-0354 Facsimile<br>Email: rosier@cubixcorp.com |
| Process Description: | This pulp and paper mill produces both natural and bleached Kraft paper grades. Wood pulp is processed at the Bleach Plant in the manufacture of bleached paper products. The process utilizes chlorine dioxide ($ClO_2$) for the bleaching of pulp. Emissions from all stages of the bleaching process are sent to an alkaline wet scrubber. |
| Test Date(s): | October 28th, 2002. |
| Location: | Georgia-Pacific Palatka Operations is located on County Road 216 in Palatka, Putnam County, Florida. |
| Emission Sampling Point: | The Bleach Plant scrubber (outlet) stack has two 3" diameter flanged NPT sample ports located 90° to each other in the vertical stack before venting to atmosphere, see Appendix A for stack diagram. |
| Test Participants: | **Georgia-Pacific Corporation**<br>Joe Taylor, Test Coordinator |

Test Participants (continued):

**Cubix Corporation**
Roger Paul Osier, Project Foreman
James Hastings, Field Technician

Test Methods:

Environmental Protection Agency (EPA) Method 1 was used for selection of velocity traverse point locations.

EPA Method 2 was used for conducting stack gas pitot tube measurements used in determination of stack gas velocity.

EPA Method 3a was used for determination of oxygen ($O_2$) and carbon dioxide ($CO_2$) concentrations.

EPA Method 4 was used for determination of stack gas moisture content.

EPA Method 10 was used for determination of carbon monoxide (CO) concentrations.

## SUMMARY OF RESULTS

GaPac owns and operates Georgia-Pacific Palatka Operations facility in Palatka, Putnam County, Florida. At this facility a wet scrubber is used to collect and control emissions from the Bleach Plant in the bleaching process of wood pulp. The emissions from this scrubber are the subject of this report.

Table 2 is a summary of the testing results for the emissions from the wet scrubber. The summary table contains data recorded during the test from the process feed rate and scrubber operation as supplied by GaPac personnel, ambient conditions, and the measured emissions. The emission rates for CO are reported in terms of parts per million by volume (ppmv) on a dry basis and pounds per hour (lbs/hr).

# TABLE 2: Summary of Results
# Bleach Plant Scrubber - Softwood Testing

| Test Run No.: | Run 1 | Run 2 | Run 3 | |
|---|---|---|---|---|
| Date | 10/28/02 | 10/28/02 | 10/28/02 | |
| Start Time | 09:34 | 11:27 | 13:17 | |
| Stop Time | 10:34 | 12:27 | 14:17 | |
| **Unit Operation** | | | | **Averages** |
| Wood Type | Softwood | Softwood | Softwood | - |
| Production Rate (adtbph) | 49.7 | 49.7 | 35.0 | **44.8** |
| #$ClO_2$ (adtbp) | 45.8 | 46.8 | 49.9 | **47.5** |
| **Ambient Conditions** | | | | |
| Atmospheric Pressure ( "Hg) | 29.98 | 29.96 | 29.91 | **29.95** |
| Temperature (°F) : Dry bulb | 80.5 | 84.2 | 87.6 | **84.1** |
| (°F): Wet bulb | 75.5 | 74.3 | 74.8 | **74.8** |
| Humidity (lbs moisture/lb air) | 0.0174 | 0.0155 | 0.0151 | **0.0160** |
| **Measured Emissions** | | | | |
| CO (ppmv, dry basis) | 955.3 | 1083.6 | 951.3 | **996.7** |
| $O_2$ (% volume, dry basis) | 20.76 | 20.67 | 20.69 | **20.71** |
| $CO_2$ (% volume, dry basis) | 1.04 | 1.22 | 1.03 | **1.10** |
| **Stack Volumetric Flow Rates** | | | | |
| via Pitot Tube (SCFH, dry basis) | 7.70E+05 | 8.06E+05 | 8.19E+05 | **7.98E+05** |
| **Mass Emission Rates** | | | | |
| CO (lbs/hr) | 53.5 | 63.5 | 56.7 | **57.9** |

Please note that Cl02 Application Rate is considered Confidential Business Information

Three one-hour test runs were conducted for each required EPA test method on the wet scrubber outlet. CO, $O_2$, and $CO_2$ emissions were continuously monitored during each of these runs. Moisture content was determined gravimetrically during each test run using a chilled water impingement system. Stack velocity measurements were performed during each test run.

Pollutant mass emission rates were calculated using the volumetric flow rates determined by EPA Methods 1-4. Examples of mass emission rate calculations and other calculations necessary for the presentation of the results of this section are contained in Appendix B.

Appendix A contains all field data sheets used during these tests. Appendix B contains examples of all calculations necessary for the reduction of the data presented in this report. Operational data obtained during the testing is presented in Appendix C. Records of quality assurance activities are in Appendix D. Certifications of calibration gases and equipment used to conduct tests at this facility are in Appendix E. Appendix F contains a copy of the logged data records of the analyzer monitored emission concentrations.

## PROCESS DESCRIPTION

Georgia-Pacific Corporation owns and operates the Georgia-Pacific Palatka Operations facility. In operation since 1947, this pulp and paper mill produces natural and bleached Kraft paper grades. The emissions from the outlet of the wet scrubber located at the Bleach Plant, a stage of the manufacture of bleached Kraft paper products, were measured as an engineering study to determine the effects of bleaching softwood pulp in lieu of hardwood pulp in the system. This section of the report provides a brief description of the process and the wet scrubber outlet.

The bleaching process is an elemental chlorine-free (ECF) process. The process utilizes $ClO_2$ for the pulp bleaching process. No elemental chlorine or hypochlorite salts are used in the process. The $ClO_2$ is produced on site.

The bleaching process consists of the staged introduction of $ClO_2$ to the pulp slurry followed by washing of the bleached pulp. G-P Palatka utilizes a 3-stage bleach plant for this process. The pulp comes across a pre-washer, followed by the D0 stage where $ClO_2$ is introduced, the E or extraction stage, and the D1 stage where additional $ClO_2$ is applied. The off gases from all stages of the process are collected and passed through a wet scrubber utilizing an alkaline scrubbing solution.

Sample ports meeting the criteria of EPA Method 1 were located in a straight vertical section of the scrubber stack outlet. The sample ports were greater than 2 stack diameters upstream from the nearest flow disturbance, the elbow just prior to the stack outlet, and greater than 8 diameters downstream from the nearest flow disturbance. Access to the stack was made available via a permanent steel frame platform equipped with a caged safety ladder. The diameter of the exhaust stack was 41.75 inches. Appendix A contains a field sketch of the stack configuration and sample port locations.

GaPac personnel provided operational data from the process instrumentation. Data sets were recorded during each test run; the average of this data was recorded in the summary table. Copies of the original data are contained in Appendix C of this report.

## ANALYTICAL TECHNIQUE

The emissions from a bleach plant scrubber were measured to determine the quantity of emissions being emitted to the atmosphere under various operating conditions. The sampling and analysis procedures used during these tests conformed with those outlined in The Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 1, 2, 3a, 4, and 10. This section of the report describes the analytical techniques and procedures used during the testing.

The test matrix for the scrubber outlet consisted of three one-hour test runs following each test method specified by GaPac. The stack gas was analyzed for CO, $O_2$, and $CO_2$ by continuous instrumental monitors. All exhaust gas analyses were performed on a dry basis. Table 3 lists the instruments and detection principles used for these analyses.

Provisions were made to introduce the calibration gases to the instrumental monitors via two paths: 1) directly to the instruments via the sample manifold quick-connects and rotameters, and 2) through the complete sampling system including the sample probe, filter, heat trace, condenser, sample line, manifold, and rotameters. The former method was used for quick, convenient calibration checks. The latter method was used to demonstrate that the sample was not altered due to leakage, reactions, or adsorption within the sampling system (sample system bias check). An $O_2$ standard calibration gas was introduced into the $O_2$ analyzer directly. Then the response from the $O_2$ analyzer was noted as the calibration gas was introduced at the probe. Any difference between the two responses in the instrument was attributed to the bias of the sample system. Following the span gas bias check, a zero gas bias check was performed on the $O_2$ analyzer using nitrogen to check for any zero gas bias of the sample system. In accordance with EPA Method 3a, this span and zero bias check procedure was repeated for the $CO_2$ analyzer. This procedure was also used for the CO analyzer although not required by EPA Method 10.

As shown in Figure 1, a 1-inch diameter stainless steel probe was inserted into the sample port of the stack. The gas sample was continuously pulled through the probe and transported via a 100-foot long, $^3/_8$-inch diameter heat-traced Teflon® line into the mobile laboratory using a stainless steel/Teflon® diaphragm pump. At the pump exit the pressurized sample was pushed into a heated sample manifold. The bulk of the gas stream then passed into a stainless steel minimum contact condenser to dry the sample stream and into the (dry) sample manifold. From the manifold, the sample was partitioned to the analyzers through glass and stainless steel rotameters for flow control of the sample.

Instrumental monitors were housed in an air-conditioned trailer-mounted mobile laboratory. Gaseous calibration standards were provided in aluminum cylinders with concentrations certified by the vendor. EPA Protocol No. 1 was used to determine the cylinder concentrations where applicable (i.e., $NO_x$ calibration gases).

EPA Method 1 was used to determine the velocity traverse point locations. Prior to conducting the tests, a cyclonic flow check was conducted. No significant cyclonic flow was encountered. The stack met the minimum criteria set forth in the method. Pitot tube measurements were made at eight (8) separate traverse points in each stack cross section for a total of sixteen (16) traverse points. The location of the sample ports and the pitot tube traverse point distances for the scrubber stack are denoted in the "Circular Stack Sampling Traverse Point Layout" data sheet, see Appendix A.

EPA Method 2 was used for determination of stack gas velocity during each run. A pitot tube and inclined gauge oil manometer were used to measure the differential pressure at each traverse point. The stack temperature was determined with a K-type thermocouple and digital thermometer.

The stack gas analyses for $CO_2$ and $O_2$ concentrations were performed in accordance with procedures set forth in EPA Method 3a. Instrumental analyses were used in lieu of an Orsat or Fyrite procedure due to the greater accuracy and precision provided by the instruments. The $CO_2$ analyzer was based on the principle of infrared absorption. The $O_2$ analyzer operated using a paramagnetic detector.

EPA Method 4 was used to measure the moisture content of the stack gas. A chilled water impingement system was used in conjunction with a calibrated dry gas meter to pull a sample greater than 21 scf coincident with each test run. A K-type (chromel-alumel) thermocouple was used in conjunction with a digital thermometer to determine the exit temperatures in the chilled water impingement sampling train. This parameter is measured to ensure that the gas stream is cooled to a minimum of 68 degrees Fahrenheit as required by sampling methodology. Determination of the moisture content was necessary to determine stack gas molecular weights and volumetric flow rates.

CO emission concentrations were quantified in accordance with procedures set forth in EPA Method 10. A continuous non-dispersive infrared (NDIR) analyzer was used for this purpose. This reference method analyzer was equipped with a gas correlation filter that removes most interference from moisture, $CO_2$, and other combustion products.

All data from the continuous monitoring instruments were logged into a computer file in 1-minute intervals and rolling 1-minute averages. A data logging system with a computer generated display screen monitored, recorded and averaged the emission concentrations. The program controlling the logging of data was also

used to log QA data. See Appendix F of this report for copies of the raw data and Appendix D for the QA data.

Cubix personnel collected ambient absolute pressure, temperature and humidity data. A wet/dry bulb sling psychrometer was used to determine ambient temperature and humidity conditions. An aircraft-type aneroid barometer (altimeter) was used to measure absolute atmospheric pressure.

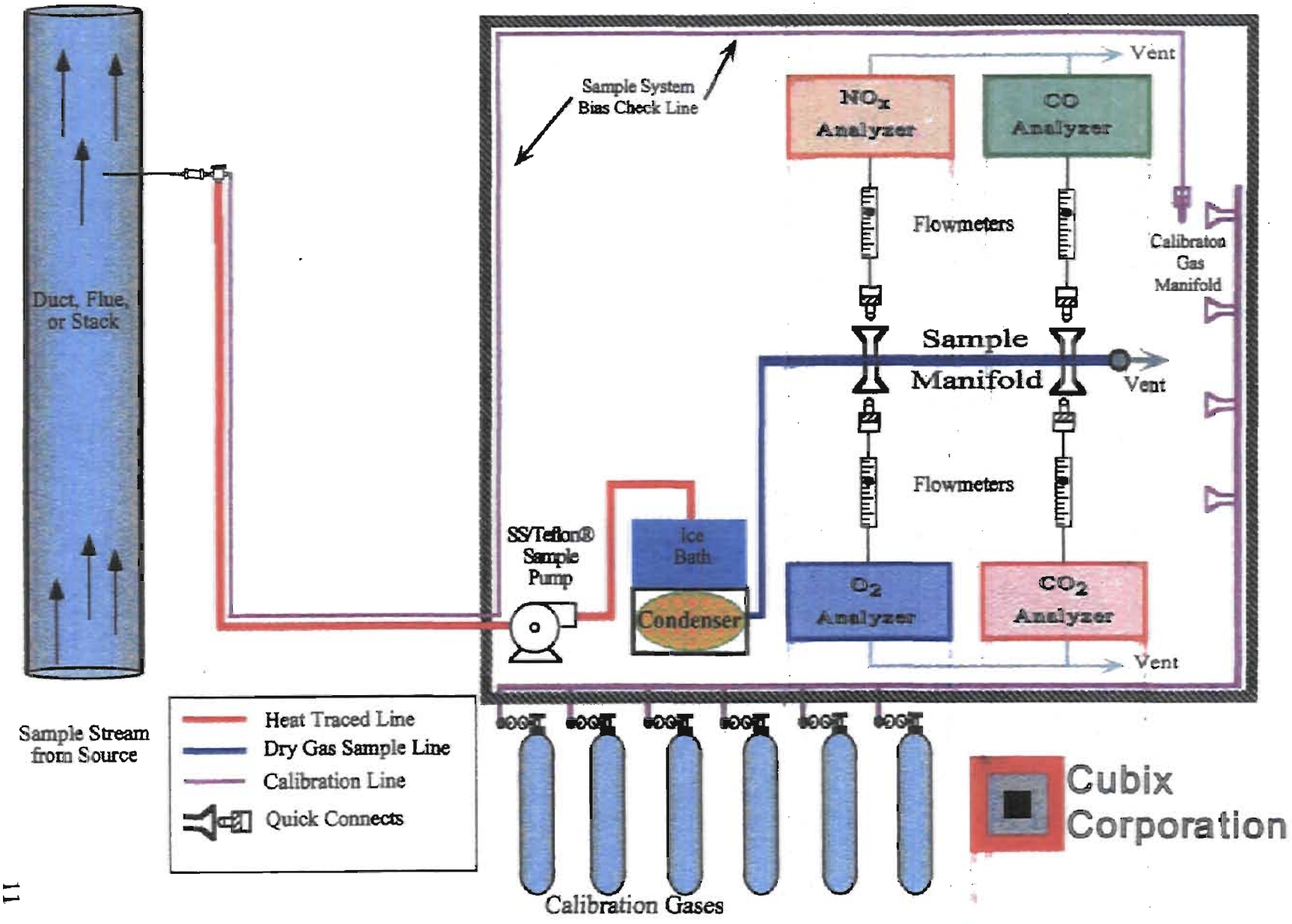
Emission calculations were conducted by a computer spreadsheet as shown in Table 2 of this report. Example calculations were performed manually using a hand-held calculator in order to verify the formulas used in the spreadsheet. Example calculations are in Appendix B of this report.

# TABLE 3
## ANALYTICAL INSTRUMENTATION

| Parameter | Model and Manufacturer | Common Use Ranges | Sensitivity | Response Time (sec.) | Detection Principle |
|---|---|---|---|---|---|
| CO | TECO Model 48C | 0-1 ppm<br>0-10 ppm<br>0-30 ppm<br>0-50, 0-100 ppm<br>0-200 ppm<br>0-500 ppm<br>0-1000 ppm | 0.1 ppm | 60 | Infrared absorption, gas filter correlation detector, micro-processor based linearization. |
| $CO_2$ | Servomex 1400 | 0-5%<br>0-10%<br>0-15% | 0.025%<br>0.05%<br>0.075% | < 10 | Non-dispersive infrared absorption, electronic linearization of a logarithmic signal (Beer's Law) |
| $O_2$ | Servomex 1400 | 0-5%<br>0-10%<br>0-25% | 0.02%<br>0.02%<br>0.02% | < 10 | Paramagnetic cell detector, inherently linear. |

**NOTE:** Higher ranges available by sample dilution.
Other ranges available via signal attenuation.

# FIGURE 1
## INSTRUMENTAL SAMPLE SYSTEM DIAGRAM



## QUALITY ASSURANCE ACTIVITIES

A number of quality assurance activities were undertaken before, during and after this testing project. This section of the report in conjunction with the documentation in Appendix D describes each of those activities.

Each instrument's response was checked and adjusted in the field prior to the collection of data via a multi-point calibration. The instrument's linearity was checked by first adjusting the instrument's zero and span responses to zero nitrogen and an upscale calibration gas in the range of the expected concentrations. The instrument response was then challenged with other calibration gases of known concentration. For CO, $O_2$, and $CO_2$, the instrument's response was accepted as being linear if the response of the other calibration gases agreed within ±2% span of the predicted values. The responses of the infrared absorption type CO and $CO_2$ analyzers are made linear through electronic suppression.

System bias checks were performed both before and after the sampling system was used for emissions testing. The sampling system's integrity was tested by comparing the responses of the $O_2$ analyzer to a calibration gas (and a zero gas) introduced via two paths as previously described in the *Analytical Techniques* section of this report. This system bias test was performed to assure that no alteration of the sample had occurred during the test due to leakage, reactions, or absorption. Similarly, system bias checks were performed with CO and $CO_2$ for added assurance of sample system integrity. Examination of the logged QA data records and Instrumental Analysis Quality Assurance Data worksheet in Appendix D shows that the analyzer response via both sample paths agreed within ±5%.

The residence time of the sampling and measurement system was estimated using the pump flow rate and the sampling system volume. The pump's rated flow rate is 0.8 scfm at 5 psig. The sampling system volume was approximately 0.175 scf. Therefore, the minimum sample residence time was approximately 13 seconds.

Cubix Corporation and instrument vendors conducted interference response tests on the CO, $O_2$, and $CO_2$ analyzers. The sum of the interference responses for $H_2O$, $C_3H_8$, CO, $CO_2$ and $O_2$ is less than 2 percent of the applicable full-scale span value. The instruments used for the tests meet the performance specifications for EPA Methods 3a and 10. The results of the interference tests are available in Appendix D of this report.

The sampling system was leak checked by demonstrating that it could hold a vacuum greater than 15 inches of mercury (Hg) for at least 1 minute with a decline of less than 1 inch Hg. A leak test was conducted after the sample system was set

up and before testing began and after testing was completed before the system was dismantled. This test was conducted to insure that ambient air was not diluting the sampling system. The actual vacuum was greater than 24 inches Hg during the leak tests with no leakage detected.

As a minimum, before and after each test run, the analyzers were checked for zero and span drift. This allows test runs to be bracketed by calibrations and documents the precision of the data just collected. Calibration gases were introduced to the analyzers through the entire sampling system. Based on the applicable test method, the criterion for acceptable data is that each instrument drifts no more than ±3% of the full-scale response. Appendix D contains quality assurance tables and logged QA calibration records that summarize the zero and span checks that were performed for each test run. The worksheets also contain the data used to correct the data for drift per EPA Method 6c, Equation 6c-1. $O_2$ and $CO_2$ emissions data were corrected for drift as required by the test methods. CO emissions data was also corrected for drift to provide more accurate results and consistent quality assurance procedures.

The control gases used to calibrate the instruments were analyzed and certified by the compressed gas vendors to ±1% accuracy for each calibration gas. EPA Protocol No. 1 was used, where applicable (i.e., $NO_X$ gases), to assign the concentration values traceable to the National Institute of Standards and Technology (NIST), Standard Reference Materials (SRM's). The gas calibration sheets as prepared by the vendor are contained in Appendix E.

The pitot tube tips used during the testing were visually inspected to insure that they met the criteria of EPA Method 2. The pitot tube lines were leak checked in the field in accordance with EPA Method 2 guidelines each time connection to the oil manometer was made.

The working dry gas meter used for the moisture train was calibrated prior to testing in accordance with EPA Method 4. A laboratory grade dry gas meter calibrated against a NIST reference instrument, a bell prover, was used for this calibration. Calibration certification documentation of the working meter can be found in Appendix E.

Appendix E also contains calibration data on ancillary measurement equipment used during this testing. The altimeter/barometer was used for determination of atmospheric pressure. Thermometers and thermocouples were used to determine stack gas temperatures and moisture train temperatures.

Cubix collected and reported the enclosed test data in accordance with the procedures and quality assurance activities described in this test report. Cubix makes no warranty as to the suitability of the test methods. Cubix assumes no liability relating to the interpretation and use of the test data by others.

# APPENDIX A:
# FIELD DATA SHEETS

# Sign In Sheet

Job Name: GEORGIA-PACIFIC - PALATKA PLANT Date(s): OCTOBER 28, 2002

Job Number: CUBIX # 7382 Permit No. NA

Plant Name/Location: GEORGIA-PACIFIC Corp. PALATKA OPERATIONS / CR 216 PALATKA, PUTNAM Co, F

Emission Source(s): BLEACH PLANT WET SCRUBBER

PARTICIPANTS:

| | |
|---|---|
| Cubix Corporation | Test Contractor |
| GEORGIA PACIFIC Corp. | Owner/Operator |
| NA | Regulatory Agency |
| | |
| | |

| Name | Affiliation | Position | Phone Number | Job Safety Review(Y/N) |
|---|---|---|---|---|
| Roger Paul Osier | CUBIX | PROJECT FOREMAN | (352)378-0332 | Y |
| Jim Hastings | CUBIX | FIELD TECH. | (352)378-0332 | Y |
| Joe Taylor | GEORGIA PACIFIC | TEST COORDINATOR | (386)329-0027 | Y |
| | | | | |
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# Cubix Corporation
# Air Emission Testing Job Safety Analysis

| | |
|---|---|
| Date: | October 27th and 28th, 2002 |
| Mobile Lab/Cubix Crew: | T-13/LJB, RPO, DLD, and JTH |
| Client: | Georgia-Pacific Corporation |
| Job #/Contact: | 7382-FL1/Joe Taylor |
| Plant Name: | Georgia-Pacific Palatka Operations |
| Unit Name(s): | Bleach Pplant Scrubber |
| Location (city/state): | Palatka, Florida |

*Description of Testing Activities:*

Set-up on 10/27/02. Tested wet scrubber outlet stack at the Bleach Plant on 10/28/02.

**Permits Required**

| | |
|---|---|
| Hot Work | Check |
| Cold Work | Check |
| Lock & Tag | Check |
| Scaffolding | Check |
| Crane/Lift | Check |
| Line Break | Check |

Comments: No permits required in area where we were working.

**Personal Protective Equipment Required**

| | | | |
|---|---|---|---|
| hard hat | Check | acid suit | Check |
| ear plugs/muffs | Check | rubber boots | Check |
| safety glasses | Check | monogoggles | Check |
| steel toed shoes | Check | face shield | Check |
| gloves | Check | safety harness | Check |
| hot gloves | Check | respirator | Check |

**Emergency Response**

| | | |
|---|---|---|
| Safe Haven: | Upwind | (Control room? Plant office? |
| Wind Direction: | East | N NE E SE S SW W NW |
| Evacuation Route: | Upwind | front gate? Back gate? Crosswind? |
| Assembly Points: | Down the road | office? Down the road? |
| Plant Map Reviewed: | Not Applicable | Yes or No or Not Applicable |

**Phone No's. & Alarm Knowledge** (list type of sound)

| | | | |
|---|---|---|---|
| Plant Contact Ph.: | 386-329-0027 | Evacuate: | |
| Control Room Ph.: | | Fire: | |
| Emergency Ph.: | 911 | All Clear: | |
| Other: | | Poison Gas: | yes |

*If facility has no alarms, verify communication with control room*

**Emergency Equipment Locations Identified**

| | | | |
|---|---|---|---|
| Emergency Shut Off | Located | Not Applicable | manual emergency trip |
| Fire Extinguisher | Located | Not Applicable | Cubix Mobile Lab & Plant Ext. |
| Safety Showers | Located | Not Applicable | required for plant? |
| Escape Air Pack | Located | Not Applicable | required for plant? |

There was a plant alarm for chlorine gas but they didn't know what the alarm sounded like...They said we would know if we heard it.

## JOB HAZARD IDENTIFIED

**Hazardous Material** (in plant area)

(flammability, reactivity, health hazards)

List Hazmat?? ClO2.

## PRECAUTIONS TO BE IMPLEMENTED

| | | |
|---|---|---|
| Cubix MSDS in Mobile Lab | Yes | No |
| Plant MSDS reviewed??? | Yes | Not Available |

**Environmental Hazards**

| | | | | **Protective Equipment** | | **Protective Actions** | |
|---|---|---|---|---|---|---|---|
| airborne particulate | Present | No Hazard | Comments: Difficult access to stack and sample ports. | respirator | Check | OTHER | Check |
| burn hazard | Present | No Hazard | | work gloves | Check | shade/cool breaks | Check |
| rain / fog | Present | No Hazard | | rain protect elect. equip. | Check | rain gear | Check |
| electrical shock | Present | No Hazard | | inspect extension cords | Check | secure/protect ext.cords | Check |
| heat stress | Present | No Hazard | | hot gloves | Check | warm up breaks | Check |
| cold weather/frostbite | Present | No Hazard | | cold weather clothing | Check | liquid intake | Check |
| inadequate lighting | Present | No Hazard | | flash light/head lamp | Check | night lighting | Check |
| noise | Present | No Hazard | | hearing protection | Check | hard hat liner | Check |
| poor access/egress | Present | No Hazard | | housekeeping | Check | alternate route | Check |

**Chemical Hazards** (check hazards that are present at jobsite)

| | | | | **Respiratory Safety Equip** | | **Protective Clothing** | |
|---|---|---|---|---|---|---|---|
| asfixiation | Check | carcinogen | Check | supplied fresh air | Check | fire suit | Check |
| poison gas | Check | chemical burns | Check | SCBA | Check | acid suit | Check |
| chemical eye exposure | Check | chemical skin exposure | Check | respirator (correct type?) | Check | rubber boots | Check |
| flammable gas | Check | flamable liquid | Check | escape pack | Check | monogoggles | Check |
| strong acid | Check | strong base | Check | exposure dosiometer | Check | face shield | Check |
| OTHER | Check | | | OTHER | Check | OTHER | Check |

**Equipment Lifting & Fall Hazard**

| | | | **Inspections and Protective Actions** | | | |
|---|---|---|---|---|---|---|
| test equipment hoisting (pulley/boom) | Required | Not Applicable | equipment secure | Check | clear lift zone | Check |
| portable ladder | Required | Not Applicable | operator certification | Check | rope inspection | Check |
| man lift (cherry picker) | Required | Not Applicable | guy lines | Check | body harness | Check |
| personnel basket (crane) | Required | Not Applicable | radios/handsignals | Check | guard rails, toe plates | Check |
| Plant Stairs & Ladders | Required | Not Applicable | housekeeping | Check | ladder tie-off | Check |
| rigging sample lines, umbilicle | Required | Not Applicable | lines secure | Check | monorails secure | Check |
| scaffold | Required | Not Applicable | secure tools | Check | hard hats | Check |

Best Available Copy

# Circular Stack Sampling Traverse Point Layout

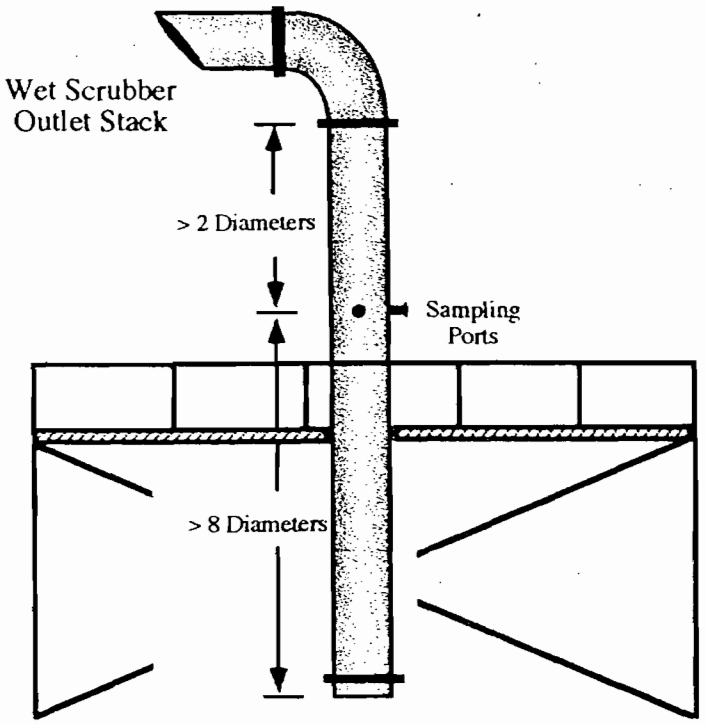
## (EPA Method 1, Velocity Measurement Traverse Points)

Date: October 27th, 2002
Client: Georgia-Pacific Corporation
Plant: G-P Palatka Operations
Source: Bleach Plant Scrubber
Technician(s): RPO, JTH

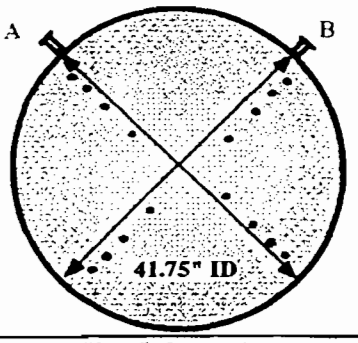
Port + Stack ID (in): 51.25
Port Extension (in): 9.50
Stack ID (in): 41.75
Stack Area (ft²): 9.507
Duct Diameters **upstream** from flow disturbance (A): > 2
Duct Diameters **downstream** from flow disturbance (B): >8
*Total Required Traverse Points*: 16
No. of Traverse Points per Diameter: 8

**Stack Diagram**

(Draw side view showing major components, dimensions, upstream downstream flow disturbances)




**Cross Section**

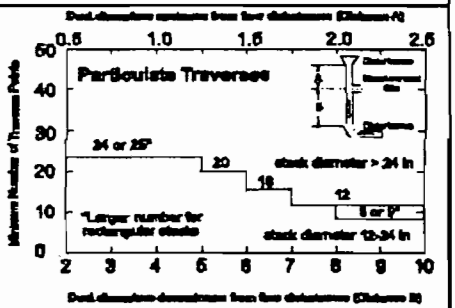


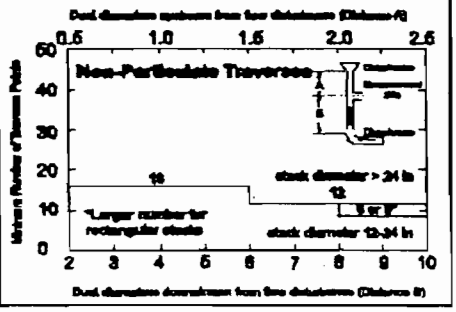

**Unit Information**

Bleach Plant Scrubber
Wet scrubber that uses an alkaline solution.

| Traverse Point Number | Number of Traverse Points on a Diameter 4 | 6 | 8 | 12 | *Calculated Traverse Point | *Traverse Point with Port Extension |
|---|---|---|---|---|---|---|
| 1 | 6.7 | 4.4 | 3.2 | 2.1 | 1.34 | 10.84 |
| 2 | 25.0 | 14.6 | 10.5 | 6.7 | 4.38 | 13.88 |
| 3 | 75.0 | 29.6 | 19.4 | 11.8 | 8.10 | 17.60 |
| 4 | 93.3 | 70.4 | 32.3 | 17.7 | 13.49 | 22.99 |
| 5 | | 85.4 | 67.7 | 25.0 | 28.26 | 37.76 |
| 6 | | 95.6 | 80.6 | 35.6 | 33.65 | 43.15 |
| 7 | | | 89.5 | 64.4 | 37.37 | 46.87 |
| 8 | | | 96.8 | 75.0 | 40.41 | 49.91 |
| 9 | | | | 82.3 | | |
| 10 | | | | 88.2 | | |
| 11 | | | | 93.3 | | |
| 12 | | | | 97.9 | | |

**Stack diameters > 24 in shall have no traverse points located within 1-inch of the stack wall*
**Stack diameters ≤ 24 in shall have no traverse points located within 0.5-inch of the stack wall*



# EPA Methods 1 through 4: Velocity, Moisture Content, Molecular Weight, and Volumetric Flow Rates

| Test Run No: | Run 1 | Run 2 | Run 3 |
|---|---|---|---|
| Date | 10/28/02 | 10/28/02 | 10/28/02 |
| Start Time (Moisture Run Times) | 09:42 | 11:33 | 13:24 |
| Stop Time (Moisture Run Times) | 10:27 | 12:14 | 14:05 |
| **Stack Moisture & Molecular Wt. via EPA Methods 3a & 4** | | | |
| $O_2$ (% volume, dry basis) | 20.76 | 20.67 | 20.69 |
| $CO_2$ (% volume, dry basis) | 1.04 | 1.22 | 1.03 |
| Beginning Meter Reading ($ft^3$) | 675.970 | 703.905 | 739.319 |
| Ending Meter Reading ($ft^3$) | 703.495 | 726.224 | 762.465 |
| Beginning Impingers Weight (g) | 2235.2 | 2262.1 | 2285.0 |
| Ending Impingers Weight (g) | 2262.1 | 2285.0 | 2316.9 |
| Dry Gas Meter Factor ($K_d$) | 0.9869 | 0.9869 | 0.9869 |
| Dry Gas Meter Temperature (°F begin) | 96 | 84 | 88 |
| Dry Gas Meter Temperature (°F end) | 90.6 | 90 | 95 |
| Atmospheric Pressure ("Hg, absolute) | 29.98 | 29.96 | 29.91 |
| Volume of Water Vapor Collected (SCF) | 1.268 | 1.080 | 1.504 |
| Volume of Air Metered (SCF) | 25.964 | 21.281 | 21.851 |
| Stack Gas Moisture (% volume) | 4.66 | 4.83 | 4.50 |
| Dry Gas Fraction | 0.9534 | 0.9517 | 0.9550 |
| Stack Gas Molecular Wt. (lbs/lb-mole) | 28.48 | 28.49 | 28.50 |
| **Stack Flow Rate via Pitot Tube** | | | |
| ΔP #1 | 0.13 | 0.14 | 0.18 |
| ΔP #2 | 0.18 | 0.19 | 0.19 |
| ΔP #3 | 0.22 | 0.23 | 0.22 |
| ΔP #4 | 0.20 | 0.25 | 0.22 |
| ΔP #5 | 0.24 | 0.27 | 0.23 |
| ΔP #6 | 0.24 | 0.24 | 0.23 |
| ΔP #7 | 0.18 | 0.24 | 0.25 |
| ΔP #8 | 0.18 | 0.22 | 0.25 |
| ΔP #9 | 0.18 | 0.17 | 0.19 |
| ΔP #10 | 0.20 | 0.19 | 0.22 |
| ΔP #11 | 0.21 | 0.23 | 0.23 |
| ΔP #12 | 0.22 | 0.22 | 0.25 |
| ΔP #13 | 0.19 | 0.19 | 0.21 |
| ΔP #14 | 0.20 | 0.23 | 0.22 |
| ΔP #15 | 0.18 | 0.22 | 0.21 |
| ΔP #16 | 0.16 | 0.22 | 0.23 |
| Pitot Tube Factor | 0.84 | 0.84 | 0.84 |
| Sum of Square Root of ΔP's | 7.0355 | 7.4085 | 7.5071 |
| Number of Traverse Points | 16 | 16 | 16 |
| Average Square Root of ΔP's | 0.439721 | 0.463030 | 0.469191 |
| Average Temperature (°F) | 126.8 | 130.9 | 130.8 |
| Static Pressure ( "$H_2O$) | -0.28 | -0.14 | -0.18 |
| Stack Diameter (inches) | 41.75 | 41.75 | 41.75 |
| Stack Area ($ft^2$) | 9.507 | 9.507 | 9.507 |
| Stack Velocity (ft/min) | 1571 | 1660 | 1683 |
| Stack Flow, wet (ACFM) | 14936 | 15783 | 16005 |
| **Average Stack Flow, dry (SCFH)** | **7.70E+05** | **8.06E+05** | **8.19E+05** |

# MOISTURE & VELOCITY FIELD DATA SHEET

Date: 10-28-02
Plant: G-P Pulpka Plant
Source: Chlorine Plant Scrubber
Technicians: RPO, JTH
Atm. Pressure: 29.98 "Hg (Pb)
Test Run No.: Run 1

Dry Gas Meter ID: T-10 EQUIMETER
Dry Gas Meter Factor: 0.9869 (Kd)
Pitot Tube No/Type: #2110 .7'x3/8"OD SS ST-TYPE
Pitot Tube Factor: 0.84
Static Pressure: -.28 "$H_2O$ (Pg)
Ave. Stack Temp. 126.8 °F (Ts)

## Collection Data

| | | |
|---|---|---|
| Sample Box | 1 | |
| Leak Check ≤ 0.02 $ft^3$/min | | |
| Pre-Test Leak Check | 0.000 $ft^3$/min<br>24.2 "Hg Vac. | |
| Post-Test Leak Check | 0.000 $ft^3$/min<br>25.0 "Hg Vac. | |
| | Initial | Final |
| Time | 9:42 | 10.27 |
| DGM Reading ($ft^3$ or L) | 675.970 | 703.495 |
| DGM Average Temp (°F) | 96 | 90.6 |
| Last Impinger Temp. (°F) | 66 | 62.4 |
| DGM Flow Rate | 40 | 48 |
| $O_2$ (% vol.) | | |
| $CO_2$ (% vol.) | | |

## Velocity System Leak Check

| Leak Check ≤ 0.1 "$H_2O$/min at a pressure ≥ 3.0 "$H_2O$ | + | − | |
|---|---|---|---|
| Pre-Test Leak Check | 0.0 | 0.0 | "$H_2O$/min |
| | 3.6 | 4.6 | "$H_2O$ Pres. |
| Post-Test Leak Check | 0.0 | 0.0 | "$H_2O$/min |
| | 4.2 | 4.1 | "$H_2O$ Pres. |

## Impingment System

| Impinger | Contents | Initial Weight | Final Weight |
|---|---|---|---|
| 1 | Di $H_2O$ | 545.7 | 565.0 |
| 2 | Di $H_2O$ | 557.5 | 559.8 |
| 3 | Empty | 485.9 | 486.5 |
| 4 | SiGel | 646.1 | 650.8 |
| 5 | | | |
| 6 | | | |
| Totals | | 2235.2 | 2262.1 |

## Velocity Traverse Data
### with Stack Temperature and Cyclonic Flow Check

| Point | ΔP ("$H_2O$) | °F | α | Point | ΔP ("$H_2O$) | °F | α |
|---|---|---|---|---|---|---|---|
| 1-1 | .13 | 125 | 5 | 2-1 | .18 | 122 | 10 |
| 1-2 | .18 | 125 | 10 | 2-2 | .20 | 123 | 10 |
| 1-3 | .22 | 125 | 10 | 2-3 | .21 | 127 | 7 |
| 1-4 | .20 | 126 | 5 | 2-4 | .22 | 128 | 5 |
| 1-5 | .24 | 126 | 6 | 2-5 | .19 | 130 | 6 |
| 1-6 | .24 | 126 | 8 | 2-6 | .20 | 130 | 6 |
| 1-7 | .18 | 126 | 8 | 2-7 | .18 | 132 | 8 |
| 1-8 | .18 | 126 | 10 | 2-8 | .16 | 132 | 10 |

# MOISTURE & VELOCITY FIELD DATA SHEET

Date: 10-28-2002
Plant: G-P PRATKA PLANT
Source: Chlorine Plant Scrubber
Technicians: RPO, JTH
Atm. Pressure: 29.96 " Hg (Pb)
Test Run No.: RUN 2

Dry Gas Meter ID: T-10 EQUIMETER
Dry Gas Meter Factor: 0.9869 (Kd)
Pitot Tube No/Type: #2110 7'x3/8" OD SS S-TYPE
Pitot Tube Factor: 0.84
Static Pressure: -.14 "$H_2O$ (Pg)
Ave. Stack Temp. 130.9 °F (Ts)

## Collection Data

| | | |
|---|---|---|
| Sample Box | 1 | |
| Leak Check ≤ 0.02 $ft^3$/min | | |
| Pre-Test Leak Check | 0.000 ft³/min<br>22.5 "Hg Vac. | |
| Post-Test Leak Check | 0.000 ft³/min<br>23.0 "Hg Vac. | |
| | Initial | Final |
| Time | 1133 | 1214 |
| DGM Reading ( $ft^3$ or L) | 703.905 | 726.224 |
| DGM Average Temp (°F) | 84 | 90 |
| Last Impinger Temp. (°F) | 67 | 58 |
| DGM Flow Rate | 40 | 40 |
| $O_2$ (% vol.) | | |
| $CO_2$ (% vol.) | | |

## Velocity System Leak Check

| Leak Check ≤ 0.1 "$H_2O$/min at a pressure ≥ 3.0 "$H_2O$ | | |
|---|---|---|
| Pre-Test Leak Check | ± 0.0 | = 0.0 "$H_2O$/min<br>3.6 46 "$H_2O$ Pres. |
| Post-Test Leak Check | ± 0.0 | = 0.0 "$H_2O$/min<br>4.2 4.1 "$H_2O$ Pres. |

## Impingment System

| Impinger | Contents | Initial Weight | Final Weight |
|---|---|---|---|
| 1 | DI $H_2O$ | 566.0 | 582.6 |
| 2 | DI $H_2O$ | 559.8 | 561.7 |
| 3 | MT | 486.5 | 486.8 |
| 4 | Si GEL | 650.8 | 653.9 |
| 5 | | | |
| 6 | | | |
| Totals | | 2262.1 | 2285.0 |

## Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

| Point | ΔP ("$H_2O$) | °F | α | Point | ΔP ("$H_2O$) | °F | α |
|---|---|---|---|---|---|---|---|
| 1-1 | .14 | 129 | | 2-1 | .17 | 133 | |
| 1-2 | .19 | 129 | | 2-2 | .19 | 133 | |
| 1-3 | .23 | 131 | | 2-3 | .23 | 133 | |
| 1-4 | .25 | 132 | | 2-4 | .22 | 133 | |
| 1-5 | .27 | 133 | | 2-5 | .19 | 131 | |
| 1-6 | .24 | 134 | | 2-6 | .23 | 130 | |
| 1-7 | .24 | 134 | | 2-7 | .22 | 125 | |
| 1-8 | .22 | 133 | ↓ | 2-8 | .22 | 121 | ↓ |

# MOISTURE & VELOCITY FIELD DATA SHEET

Date: 10-28-2002
Plant: GP PALATKA PLANT
Source: Chlorine Plant Scrubber
Technicians: RPO, JTH
Atm. Pressure: 29.91 "Hg (Pb)
Test Run No.: RUN 3

Dry Gas Meter ID: T-10 EQUIMETER
Dry Gas Meter Factor: 0.9869 (Kd)
Pitot Tube No/Type: #2110 7'x3/8"OD SS S-TYPE
Pitot Tube Factor: 0.84
Static Pressure: .1 - .18 "$H_2O$ (Ps)
Ave. Stack Temp. 130.8 °F (Ts)

## Collection Data

| | | |
|---|---|---|
| Sample Box | 1 | |
| Leak Check ≤ 0.02 $ft^3$/min | | |
| Pre-Test Leak Check | 0.000 $ft^3$/min<br>25.0 "Hg Vac. | |
| Post-Test Leak Check | 0.000 $ft^3$/min<br>25.5 "Hg Vac. | |
| | Initial | Final |
| Time | 13:24 | 14:05 |
| DGM Reading ($ft^3$ or L) | 739.319 | 762.465 |
| DGM Average Temp (°F) | 88 | 95 |
| Last Impinger Temp. (°F) | 66 | 64 |
| DGM Flow Rate | 40 | 40 |
| $O_2$ (% vol.) | | |
| $CO_2$ (% vol.) | | |

## Impingment System

| Impinger | Contents | Initial Weight | Final Weight |
|---|---|---|---|
| 1 | Di $H_2O$ | ~~582.6~~ | 605.0 |
| 2 | Di $H_2O$ | 561.7 | 565.6 |
| 3 | MT | 486.8 | 487.7 |
| 4 | SiGel | 653.9 | 658.6 |
| 5 | | | |
| 6 | | | |
| Totals | | 2285 | 2316.9 |

## Velocity System Leak Check

| Leak Check ≤ 0.1 "$H_2O$/min at a pressure ≥ 3.0 "$H_2O$ | + | − | |
|---|---|---|---|
| Pre-Test Leak Check | 0.0 | 0.0 | "$H_2O$/min |
| | 3.6 | 4.6 | "$H_2O$ Pres. |
| Post-Test Leak Check | 0.0 | 0.0 | "$H_2O$/min |
| | 4.2 | 4.1 | "$H_2O$ Pres. |

## Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

| Point | ΔP ("$H_2O$) | °F | α | Point | ΔP ("$H_2O$) | °F | α |
|---|---|---|---|---|---|---|---|
| 1-1 | .18 | 129 | | 2-1 | .19 | 130 | |
| 1-2 | .19 | 129 | | 2-2 | .22 | 130 | |
| 1-3 | .22 | 131 | | 2-3 | .23 | 131 | |
| 1-4 | .22 | 131 | | 2-4 | .25 | 132 | |
| 1-5 | .23 | 131 | | 2-5 | .21 | 131 | |
| 1-6 | .23 | 132 | | 2-6 | .22 | 131 | |
| 1-7 | .25 | 131 | | 2-7 | .21 | 131 | |
| 1-8 | ~~.23~~ .25 | 131 | ↓ | 2-8 | .23 | 131 | ↓ |

# APPENDIX B:
# EXAMPLE CALCULATIONS

# EXAMPLE CALCULATIONS

## Moisture Content via EPA Method 4

*refers to Test Run # 1*

| | | | |
|---|---|---|---|
| $M_{WC}$ | = | net impinger weight gain = 2262.1 g – 2235.2 g | = 26.9 g |
| Y | = | dry gas meter correction factor | = 0.9869 |
| $V_m$ | = | volume metered = (703.495 – 675.970) | = 27.525 $ft^3$ |
| $P_{atm}$ | = | atmospheric pressure | = 29.98 "Hg |
| $P_{met}$ | = | average meter pressure = $P_{atm}$ | = 29.98 "Hg |
| $T_{met}$ | = | average meter temperature = 93.3° F + 460 °F | = 553.3° R |
| $K_2$ | = | conversion factor, water weight to vapor | = 0.04715 $ft^3/g$ |
| $K_3$ | = | standard temp, pressure (STP) correction factor | = 17.64° R/ "Hg |

$V_{WC}$ = total volume of water vapor collected at STP

$= K_2 \times M_{WC}$

$= (0.04715 \times 26.9)$

$= 1.2683\ ft^3$

$V_{m(std)}$ = total volume metered at STP

$$= K_3 \times Y \times V_m \times \frac{P_{met}}{T_{met}}$$

$$= 17.64 \times 0.9869 \times 27.525 \times \frac{29.98}{553.3}$$

$$= 25.964\ ft^3$$

$B_{ws}$ = moisture content by EPA Method 4

$$= \frac{V_{WC}}{V_{WC} + V_{STP}}$$

$$= \frac{1.2683}{1.2683 + 25.964}$$

$B_{ws}$ = **0.04657**

= **4.66 % moisture**

## Stack Gas Molecular Weight

*Refers to Test Run # 1*

| | | | |
|---|---|---|---|
| $MW_{H_2O}$ | = | molecular wt of $H_2O$ | = 18 lb/lb-mole |
| $MW_{CO_2}$ | = | molecular wt of $CO_2$ | = 44 lb/lb-mole |
| $MW_{O_2}$ | = | molecular wt of $O_2$ | = 32 lb/lb-mole |
| $MW_{N_2}$ | = | molecular wt of $N_2$ | = 28 lb/lb-mole |
| $C_{CO_2}$ | = | concentration of $CO_2$ | = 0.0104 (from analyzer) |
| $C_{O_2}$ | = | concentration of $O_2$ | = 0.2076 (from analyzer) |
| $C_{N_2}$ | = | concentration of $N_2$ | = 1 - ($C_{CO_2}$ + $C_{O_2}$) = 0.782 |
| $F_d$ | = | dry gas fraction = 1 - $B_{ws}$ | = 0.95343 |

**MW** = molecular weight of stack gas (lb/lb-mole)

= wt. of $H_2O$ + wt. of $CO_2$ + wt. of $O_2$ + wt. of $N_2$

= $(MW_{H_2O} \times B_{ws}) + (F_d \times ((MW_{CO_2} \times C_{CO_2}) + (MW_{O_2} \times C_{O_2}) + (MW_{N_2} \times C_{N_2})))$

= $(18 \times 0.04657) + (0.95343 \times ((44 \times 0.0104) + (32 \times 0.2076) + (28 \times 0.782)))$

**MW = 28.48(4) lb/lb-mole**

## Stack Gas Flow Rate via Pitot Tube, $Q_d$

*Refers to Test Run # 1*

$C_p$ = pitot tube coefficient = 0.84

$\Delta P$ = pressure difference in stack as measured (in. $H_2O$)

$\sqrt{\Delta P_{av}}$ = average of square root of $\Delta P$'s = 0.439721

$T_s$ = ave. stack temperature = 126.8° F + 460 = 586.8° R

$P_{atm}$ = site corrected atmospheric pressure = 29.98 "Hg

$P_g$ = stack static pressure (in. $H_2O$) = -0.28 "$H_2O$

$P_s$ = absolute stack pressure

$= P_{atm} + (P_g/13.6)$ = 29.959 "Hg

$K_p$ = pitot tube constant $= 85.49 \frac{ft}{sec}\left(\frac{(lb/lb-mole)(in.Hg)}{(°R)(in.H_2O)}\right)^{\frac{1}{2}}$

$T_{std}$ = absolute Temperature = 528° R

$P_{std}$ = standard atmospheric pressure = 29.92 "Hg

$V_s$ = stack velocity (ft/sec)

$$= K_p \times C_p \times \sqrt{\Delta P_{av}} \times \sqrt{\frac{T_s}{(P_s \times MW)}}$$

$$= 85.49 \times 0.84 \times 0.439721 \times \sqrt{\frac{586.8}{(29.959 \times 28.484)}}$$

$$= 26.185 \text{ ft/sec} \times 60 \text{ sec/min}$$

$V_s$ = 1571.1 ft/min

$Q_a$ = stack flow rate ($ft^3$/min, actual)

$= V \times A$, where A = area of stack = 9.507 $ft^2$

$Q_a$ = 1571.1 x 9.507 = 14936.4 $ft^3$/min

$Q_d$ = average stack flow rate on a dry basis at standard conditions (DSCFH)

$$= \frac{Q_a \times T_{std} \times P_s}{T_s \times P_{std}} \times F_d \times 60$$

$$= \frac{14936.4 \times 528 \times 29.959}{586.8 \times 29.92} \times 0.95343 \times 60$$

**$Q_d$ = $7.698 \times 10^5$ DSCFH, Average Flow**

## Correction of $O_2$ Gas Concentrations, $CO_2$

*Refers to Test Run # 1*

Analytical instruments tend to drift in their calibrations over time and with changes in atmospheric conditions. Span and zero gas bias drift checks (calibrations) were conducted prior to and following each test. The results of these calibrations were used to bracket and thus correct the raw gas concentrations into corrected (more accurate) gas concentrations. The calculation used for these correction is 40 CFR 60, Appendix A, Method 6c, Equation 6c-1. This correction is required for $CO_2$ exhaust concentrations when using Method 3a. Cubix also conducts this correction for EPA Method 10 in order to present more accurate and consistent test results.

$U_{O_2}$ = analyzer $O_2$ gas concentration, uncorrected for drift and bias
$U_{O_2}$ = 20.52 ppmv, uncorrected
$C_O$ = Average of initial/final zero gas concentrations
= -0.04 ppmv
$C_m$ = Average of initial/final span gas concentrations
= 11.785 ppmv
$C_{ma}$ = Actual upscale cylinder span gas concentrations
= 11.94 ppmv

$C_{O_2}$ = Effluent $O_2$ gas concentration, ppmv corrected

$$= (U_{O_2} - C_O) \times \frac{C_{ma}}{C_m - C_O}$$

$$= (20.52 + 0.04) \times \frac{11.94}{11.785 + 0.04}$$

**$C_{O_2}$ = 20.76 ppmv $O_2$, dry basis corrected**

## CO Mass Emission Rate (lbs/hr)

*Refers to Test Run # 1*

$C_{CO}$ = observed concentration of CO = 955.3 ppmv

$MW_{CO}$ = 28.01 lb/lb-mole for carbon monoxide
for ideal gas, 385.15 SCF = 1.0 lb/mole

$Q_d$ = $7.698 \times 10^5$ SCFH (from ave. pitot tube volumetric flow)

$E_{CO}$ = mass emission rate of CO in (lb/hr)

$$= C_{CO} \times 10^{-6} \times Q_d \times \frac{MW_{CO}}{385.15}$$

$$= 955.3 \times 10^{-6} \times 7.698 \times 10^5 \times \frac{28.01}{385.15}$$

$E_{CO}$ = **53.5 lbs/hr**

# APPENDIX C:
# OPERATIONAL DATA

# PRODUCTION RATE DATA

| RUN | DATE | TIME | SPECIES | PRODUCTION RATE, adtbph | #ClO2/adtbp |
|---|---|---|---|---|---|
| 1 | 10/28/02 | 0934-1034 | softwood | 49.7 | 45.8 |
| 2 | 10/28/02 | 1127-1227 | softwood | 49.7 | 46.8 |
| 3 | 10/28/02 | 1317-1417 | softwood | 35.0 | 49.9 |

Please note that the Chemical Application Rate is considered Confidential Business Information

# APPENDIX D:
# QUALITY ASSURANCE ACTIVITIES

# Quality Assurance Activities
## Calibration Error, Bias, and Drift Checks

| Linearity Check | CO | $O_2$ | $CO_2$ |
|---|---|---|---|
| Analyzer Range (ppmv), $O_2$ & $CO_2$ in % vol | 1250.0 | 25.00 | 15.00 |
| Strip Chart Offset | 0.0 | 10.0 | 2.0 |
| Low Level Certified Value (ppm or % vol) | 253.0 | 4.53 | 4.48 |
| Mid Level Certified Value (ppm or % vol) | 441.0 | 11.94 | 7.99 |
| High Level Certified Value (ppm or % vol) | 885.0 | 20.90 | 12.62 |
| Zero Target (% Chart) | 0.0 | 10.0 | 2.0 |
| Low Level Target (% Chart) | 20.2 | 28.1 | 31.9 |
| Mid Level Target (% Chart) | 35.3 | 57.8 | 55.3 |
| High Level Target (% Chart) | 70.8 | 93.6 | 86.1 |
| Zero Observed (% Chart) | 0.0 | 10.0 | 2.0 |
| Low Level Observed (% Chart) | 19.6 | 28.0 | 32.1 |
| Mid Level Observed (% Chart) | 34.5 | 57.8 | 55.5 |
| High Level Observed (% Chart) | 71.2 | 93.6 | 86.1 |
| Zero Observed (ppm or % vol) | 0.33 | 0.00 | 0.00 |
| Low Level Observed (ppm or % vol) | 244.64 | 4.50 | 4.52 |
| Mid Level Observed (ppm or % vol) | 430.65 | 11.95 | 8.02 |
| High Level Observed (ppm or % vol) | 889.46 | 20.90 | 12.62 |
| % Difference From Zero to Target | 0.0 | 0.0 | 0.0 |
| % Difference From Low to Target | 0.7 | 0.1 | -0.3 |
| % Difference From Mid to Target | 0.8 | 0.0 | -0.2 |
| % Difference From High to Target | -0.4 | 0.0 | 0.0 |
| EPA Allowable % Difference from Target | ±2% Span | ±2% Span | ±2% Span |

| Test Run 1 | CO | $O_2$ | $CO_2$ |
|---|---|---|---|
| Analyzer Range (ppm), $O_2$ & $CO_2$ in % | 1250.0 | 25.00 | 15.00 |
| Calibration Gas Certified Value (ppm or %) | 885 | 11.94 | 7.99 |
| Strip Chart Offset | 0.0 | 10.0 | 2.0 |
| Target Calibration Gas (Chart %) | 70.8 | 57.8 | 55.3 |
| Actual Zero Gas from Direct (Chart %) | 0.0 | 10.0 | 2.0 |
| Actual Calibration Gas from Direct (Chart %) | 71.2 | 57.8 | 55.5 |
| Initial Readings | | | |
| Zero Gas (chart %) | -0.2 | 9.9 | 2.4 |
| Calibration Gas (chart %) | 71.0 | 57.1 | 54.9 |
| Zero Gas (ppmv) | -2.97 | -0.03 | 0.06 |
| Calibration Gas (ppmv) | 887.15 | 11.77 | 7.94 |
| Final Readings | | | |
| Zero Gas (chart %) | -0.2 | 9.8 | 2.3 |
| Calibration Gas (chart %) | 71.1 | 57.2 | 55.2 |
| Zero Gas (ppmv) | -2.97 | -0.05 | 0.04 |
| Calibration Gas (ppmv) | 888.80 | 11.80 | 7.98 |
| Bias and Drift Calculations | | | |
| Zero Bias (% Chart) (Run-Direct Cal) ≤5% | -0.3 | -0.2 | 0.3 |
| Calibration Bias (% Chart) ≤5% | -0.1 | -0.6 | -0.3 |
| Zero Drift (Chart %) (Run-Run) ≤3% | 0.0 | 0.1 | 0.1 |
| Calibration Drift (Chart %) ≤3% | -0.1 | -0.1 | -0.3 |
| Run Results | | | |
| Raw Results (chart %) | 76.7 | 92.1 | 9.2 |
| Raw Results (ppmv or % vol) | 958.7 | 20.52 | 1.08 |
| Corrected Results (ppmv or % vol) from % chart | 955.3 | 20.76 | 1.04 |

# Quality Assurance Activities
## Calibration Error, Bias, and Drift Checks

| Test Run 2 | CO | $O_2$ | $CO_2$ |
|---|---|---|---|
| Analyzer Range (ppm), $O_2$ & $CO_2$ in % | 1250.0 | 25.00 | 15.00 |
| Calibration Gas Certified Value (ppm or %) | 885 | 20.90 | 4.48 |
| Strip Chart Offset | 0.0 | 10.0 | 2.0 |
| Target Calibration Gas (Chart %) | 70.8 | 93.6 | 31.9 |
| Actual Zero Gas from Direct (Chart %) | 0.0 | 10.0 | 2.0 |
| Actual Calibration Gas from Direct (Chart %) | 71.2 | 93.6 | 32.1 |
| Initial Readings | | | |
| Zero Gas (chart %) | -0.2 | 9.8 | 2.3 |
| Calibration Gas (chart %) | 71.1 | 92.8 | 32.0 |
| Zero Gas (ppmv) | -2.97 | -0.05 | 0.04 |
| Calibration Gas (ppmv) | 888.80 | 20.70 | 4.50 |
| Final Readings | | | |
| Zero Gas (chart %) | -0.1 | 9.9 | 2.4 |
| Calibration Gas (chart %) | 71.4 | 92.5 | 31.9 |
| Zero Gas (ppmv) | -1.40 | -0.03 | 0.06 |
| Calibration Gas (ppmv) | 893.00 | 20.62 | 4.48 |
| Bias and Drift Calculations | | | |
| Zero Bias (% Chart) (Run-Direct Cal) ≤5% | -0.1 | -0.1 | 0.4 |
| Calibration Bias (% Chart) ≤5% | 0.3 | -1.1 | -0.3 |
| Zero Drift (Chart %) (Run-Run) ≤3% | -0.1 | -0.1 | -0.1 |
| Calibration Drift (Chart %) ≤3% | -0.3 | 0.3 | 0.1 |
| Run Results | | | |
| Raw Results (chart %) | 87.3 | 91.7 | 10.4 |
| Raw Results (ppmv or % vol) | 1091.3 | 20.43 | 1.26 |
| Corrected Results (ppmv or % vol) from % chart | 1083.6 | 20.67 | 1.22 |

| Test Run 3 | CO | $O_2$ | $CO_2$ |
|---|---|---|---|
| Analyzer Range (ppm), $O_2$ & $CO_2$ in % | 1250.0 | 25.00 | 15.00 |
| Calibration Gas Certified Value (ppm or %) | 885 | 20.90 | 4.48 |
| Strip Chart Offset | 0.0 | 10.0 | 2.0 |
| Target Calibration Gas (Chart %) | 70.8 | 93.6 | 31.9 |
| Actual Zero Gas from Direct (Chart %) | 0.0 | 10.0 | 2.0 |
| Actual Calibration Gas from Direct (Chart %) | 71.2 | 93.6 | 32.1 |
| Initial Readings | | | |
| Zero Gas (chart %) | -0.1 | 9.9 | 2.4 |
| Calibration Gas (chart %) | 71.4 | 92.5 | 31.9 |
| Zero Gas (ppmv) | -1.40 | -0.03 | 0.06 |
| Calibration Gas (ppmv) | 893.00 | 20.62 | 4.48 |
| Final Readings | | | |
| Zero Gas (chart %) | -0.1 | 9.9 | 2.3 |
| Calibration Gas (chart %) | 69.8 | 92.2 | 31.9 |
| Zero Gas (ppmv) | -1.40 | -0.03 | 0.04 |
| Calibration Gas (ppmv) | 873.00 | 20.55 | 4.48 |
| Bias and Drift Calculations | | | |
| Zero Bias (% Chart) (Run-Direct Cal) ≤5% | -0.1 | -0.1 | 0.3 |
| Calibration Bias (% Chart) ≤5% | -1.3 | -1.4 | -0.3 |
| Zero Drift (Chart %) (Run-Run) ≤3% | 0.0 | 0.0 | 0.1 |
| Calibration Drift (Chart %) ≤3% | 1.6 | 0.3 | 0.0 |
| Run Results | | | |
| Raw Results (chart %) | 75.9 | 91.5 | 9.1 |
| Raw Results (ppmv or % vol) | 949.3 | 20.38 | 1.07 |
| Corrected Results (ppmv or % vol) from % chart | 951.3 | 20.69 | 1.03 |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged QA Calibration Records

Run 1 10/28/02 9:34:18 10:34:18

| Initial Linearity Test | Zero | Low | Mid | Span | L-Lin | M-Lin | S-Lin |
|---|---|---|---|---|---|---|---|
| CO (ppmv) | 0.33 | 244.64 | 430.65 | 889.46 | 0.67 | 0.83 | -0.36 |
| O2 (% vol) | 0.00 | 4.50 | 20.90 | 11.95 | 0.12 | 0.00 | -0.04 |
| CO2 (% vol) | 0.00 | 4.52 | 12.62 | 8.02 | -0.27 | 0.00 | -0.20 |

| Initial and Final Bias and Drift | I-Zero | I-Span | F-Zero | F-Span | Z-Bias | S-Bias | Z-Drift | S-Drift |
|---|---|---|---|---|---|---|---|---|
| CO (ppmv) | -2.97 | 887.15 | -2.97 | 888.80 | -0.26 | -0.05 | 0.00 | -0.13 |
| O2 (% vol) | -0.03 | 11.77 | -0.05 | 11.80 | -0.20 | -0.60 | 0.08 | -0.12 |
| CO2 (% vol) | 0.06 | 7.94 | 0.04 | 7.98 | 0.27 | -0.27 | 0.13 | -0.27 |

| Run Results and Cal Gases Used | Raw | Corrected | Ranges | Low Gas | Mid Gas | Span Gas |
|---|---|---|---|---|---|---|
| CO (ppmv) | 958.7 | 955.3 | 1250.0 | 253.0 | 441.0 | 885.0 |
| O2 (% vol) | 20.52 | 20.76 | 25.00 | 4.53 | 20.90 | 11.94 |
| CO2 (% vol) | 1.08 | 1.04 | 15.00 | 4.48 | 12.62 | 7.99 |

Run 2 10/28/02 11:27:39 12:27:39

| Initial Linearity Test | Zero | Low | Mid | Span | L-Lin | M-Lin | S-Lin |
|---|---|---|---|---|---|---|---|
| CO (ppmv) | 0.33 | 244.64 | 430.65 | 889.46 | 0.67 | 0.83 | -0.36 |
| O2 (% vol) | 0.00 | 4.50 | 11.95 | 20.90 | 0.12 | -0.04 | 0.00 |
| CO2 (% vol) | 0.00 | 8.02 | 12.62 | 4.52 | -0.20 | 0.00 | -0.27 |

| Initial and Final Bias and Drift | I-Zero | I-Span | F-Zero | F-Span | Z-Bias | S-Bias | Z-Drift | S-Drift |
|---|---|---|---|---|---|---|---|---|
| CO (ppmv) | -2.97 | 888.80 | -1.40 | 893.00 | -0.14 | 0.28 | -0.13 | -0.34 |
| O2 (% vol) | -0.05 | 20.70 | -0.03 | 20.62 | -0.12 | -1.12 | -0.08 | 0.32 |
| CO2 (% vol) | 0.04 | 4.50 | 0.06 | 4.48 | 0.40 | -0.27 | -0.13 | 0.13 |

| Run Results and Cal Gases Used | Raw | Corrected | Ranges | Low Gas | Mid Gas | Span Gas |
|---|---|---|---|---|---|---|
| CO (ppmv) | 1091.3 | 1083.6 | 1250.0 | 253.0 | 441.0 | 885.0 |
| O2 (% vol) | 20.43 | 20.67 | 25.00 | 4.53 | 11.94 | 20.90 |
| CO2 (% vol) | 1.26 | 1.22 | 15.00 | 7.99 | 12.62 | 4.48 |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged QA Calibration Records

Run 3 10/28/02 13:17:44 PM 14:17:44 PM

| Initial Linearity Test | Zero | Low | Mid | Span | L-Lin | M-Lin | S-Lin |
|---|---|---|---|---|---|---|---|
| CO (ppmv) | 0.33 | 244.64 | 430.65 | 889.46 | 0.67 | 0.83 | -0.36 |
| O2 (% vol) | 0.00 | 4.50 | 11.95 | 20.90 | 0.12 | -0.04 | 0.00 |
| CO2 (% vol) | 0.00 | 8.02 | 12.62 | 4.52 | -0.20 | 0.00 | -0.27 |

| Initial and Final Bias and Drift | I-Zero | I-Span | F-Zero | F-Span | Z-Bias | S-Bias | Z-Drift | S-Drift |
|---|---|---|---|---|---|---|---|---|
| CO (ppmv) | -1.40 | 893.00 | -1.40 | 873.00 | -0.14 | -1.32 | 0.00 | 1.60 |
| O2 (% vol) | -0.03 | 20.62 | -0.03 | 20.55 | -0.12 | -1.40 | 0.00 | 0.28 |
| CO2 (% vol) | 0.06 | 4.48 | 0.04 | 4.48 | 0.27 | -0.27 | 0.13 | 0.00 |

| Run Results and Cal Gases Used | Raw | Corrected | Ranges | Low Gas | Mid Gas | Span Gas |
|---|---|---|---|---|---|---|
| CO (ppmv) | 949.3 | 951.3 | 1250.0 | 253.0 | 441.0 | 885.0 |
| O2 (% vol) | 20.38 | 20.69 | 25.00 | 4.53 | 11.94 | 20.90 |
| CO2 (% vol) | 1.07 | 1.03 | 15.00 | 7.99 | 12.62 | 4.48 |

# Instrumental Analyses
# Quality Assurance Data

| | |
|---|---|
| **Date:** | **October 28, 2002** |
| **Company:** | **Georgia-Pacific Corporation** |
| **Facility:** | **Georgia-Pacific Palatka Operations** |
| **Source ID:** | **Bleach Plany Wet Scrubber** |
| **Location:** | **Patatka, Putnam County, Florida** |
| **Technicians:** | **RPO, JTH** |

**Instrumental Sample System Leak Checks**

| Date | Run Number | Vacuum (inches Hg) | Leak Rate (inches Hg/min) | Pass |
|---|---|---|---|---|
| 10/27/02 | Set-Up | 24.8 | 0.0 | yes |
| 10/28/02 | pre Run 1 | 24.0 | 0.0 | yes |
| 10/28/02 | post Run 3 | 24.2 | 0.0 | yes |

Leak check criteria less than 1.0" Hg Vac. Decline at greater than 15.0" Hg Vac.

# Continuous Emission Analyzer
# Interference Response Tests

## Analyzer Interference Response Checks

*(Frequency: Prior to initial use of sampling system or after alteration or modification.)*

*Test Date:* *September 27, 2002* *Technician:* *RPO*
*Mobile Lab:* *T-13* *Location:* *Gainesville, Florida*

| Analyzer | Manufacturer | Model | Serial Number | Detection Method/Comments |
|---|---|---|---|---|
| $NO_x$ Analyzer | TECO | 42C | 42CHL-69541-363 | Chemiluminescence with Ozone |
| CO Analyzer | TECO | 48C | 48C-70472-365 | Infrared Absorption/GFC Detector |
| $O_2$ Analyzer | Servomex | 1440 | 1420C/2647 | Paramagnetic Cell Detector |
| $CO_2$ Analyzer | Servomex | 1440 | 01415/2537 | Infrared Absorption/ Solid State Detector |
| THC | California Analytical | 300-HFID CE | 4J11003 | Flame Ionization Detector |

| Interferrent Test Gases | | Analyzer Response (ppmv or % as applicable) | | | | |
|---|---|---|---|---|---|---|
| Type Gas | Conc. | $NO_x$ 0-25 ppmv | CO 0-50 ppmv | $O_2$ 0-25% vol | $CO_2$ 0-15% vol | THC 0-100 ppmv |
| CO/Methane in air | 885/919 | 0.1 ppmv | | | 0.00 % | |
| Propane in air | 2000 | 0.1 ppmv | 0.4 ppmv | | 0.03 % | |
| $SO_2$ in $N_2$ | 4400 | 0.2 ppmv | -0.3 ppmv | 0.00 % | 0.00 % | no data |
| Air | dry instrument | < 0.1 ppmv | 0.4 ppmv | | 0.03 % | no data |
| Nitrogen | pre-purified | 0.0 ppmv | 0.3 ppmv | 0.00 % | 0.00 % | no data |
| Air | UHC, CO free | 0.0 ppmv | 0.0 ppmv | | 0.01 % | no data |
| $CO_2$/ $O_2$ | 4.54%/20.8% | < 0.1 ppmv | -0.2 ppmv | | | no data |
| $CO_2$/ $O_2$ | 8.004%/11.91% | < 0.1 ppmv | -0.4 ppmv | | | no data |
| $CO_2$/ $O_2$ | 12.62%/4.53% | < 0.1 ppmv | -0.6 ppmv | | | no data |
| $NO_x$ in $N_2$ | 1209 | | 0.4 ppmv | 0.18 % | 0.03 % | no data |

**APPENDIX E:**
CALIBRATION CERTIFICATIONS

**SPECTRA GASES INC.**
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE
PROCEDURE # : G1

**CUSTOMER:** Cubix Corporation
**SGI ORDER # :** 0016436
**ITEM# :** 7
**P.O.# :** 2001032 T12 SID

**CYLINDER # :** CC-94787
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

**CERTIFICATION DATE:** 2/11/02
**EXPIRATION DATE:** 2/6/2005

**CERTIFICATION HISTORY**

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 1/30/02<br>2/6/02 | 252.8 ppm<br>252.5 ppm | 253 ppm | +/- 1% |
| Methane | 2/11/02 | 249 ppm | 249 ppm | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Air
**PREVIOUS CERTIFICATION DATES:** None

**REFERENCE STANDARDS**

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | GMIS-1 | CC94699 | 486 ppm |
| Methane | GMIS-1 | CC52976 | 503.3 ppm |
| | | | |
| | | | |

**INSTRUMENTATION**

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 1/8/02 |
| Methane | H. Packard 6890 | US00001434 | GC - FID | 2/5/02 |
| | | | | |
| | | | | |

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: Ted Neeme
TED NEEME

DATE: 2/11/02

**SPECTRA GASES INC.**

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



# CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Cubix Corporation
**SGI ORDER # :** 0023960
**ITEM# :** 2
**P.O.# :** 2002420

**CYLINDER # :** CC-60135
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

**CERTIFICATION DATE:** 7/19/2002
**EXPIRATION DATE:** 7/11/2005

CERTIFICATION HISTORY

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 7/11/2002<br>7/19/2002 | 441.6 ppm<br>439.9 ppm | 441 ppm | +/- 1% |
| Methane | 7/11/2002 | 445 ppm | 445 ppm | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Air

**PREVIOUS CERTIFICATION DATES:** None

REFERENCE STANDARDS

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | NTRM-81681 | CC-55779 | 994 ppm |
| Methane | GMIS-1 | CC55777 | 993.6 ppm |
| | | | |
| | | | |

INSTRUMENTATION

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 7/19/2002 |
| Methane | H. Packard 6890 | US00001434 | GC - FID | 6/24/2002 |
| | | | | |
| | | | | |

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: _____
FRED PIKULA

DATE: 7/19/2002

**SPECTRA GASES INC.**
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Cubix Corporation
**SGI ORDER # :** 0000840
**ITEM# :** 4
**P.O.# :** G-1334

**CYLINDER # :** CC126532
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

**CERTIFICATION DATE:** 1/31/2001
**EXPIRATION DATE:** 1/30/2004

**CERTIFICATION HISTORY**

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 1/23/2001<br>1/31/2001 | 885.2 ppm<br>884.4 ppm | 885 ppm | +/- 1% |
| Methane | 1/30/2001 | 919 ppm | 919 ppm | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Air

**PREVIOUS CERTIFICATION DATES:** None

**REFERENCE STANDARDS**

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | NTRM-81681 | CC55721 | 994 ppm |
| Methane | GMIS-1 | CC55777 | 994.1 ppm |
| | | | |
| | | | |

**INSTRUMENTATION**

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 1/19/2001 |
| Methane | H. Packard 6890 | US00001434 | GC - FID | 1/30/2001 |
| | | | | |
| | | | | |

**THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

**ANALYST:** FC
FRED PIKULA

**DATE:** 1/31/2001

**SPECTRA GASES INC.**

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865

## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Cubix Corporation
**SGI ORDER # :** 0021285
**ITEM# :** 1
**P.O.# :** 2002275 T10LENO

**CYLINDER # :** CC-133482
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

Begin use 7/24/02

**CERTIFICATION DATE:** 5/24/2002
**EXPIRATION DATE:** 5/24/2005

CERTIFICATION HISTORY

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Dioxide | 5/24/2002 | 4.48 % | 4.48 % | +/- 1% |
| Oxygen | 5/24/2002 | 20.9 % | 20.9 % | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**PREVIOUS CERTIFICATION DATES:** None

REFERENCE STANDARDS

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Dioxide | GMIS-1 | CC-90832 | 9.98 % |
| Oxygen | NTRM-1 | CC-83909 | 22.8 % |
| | | | |
| | | | |

INSTRUMENTATION

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Dioxide | Horiba VIA-510 | 571417045 | NDIR | 5/24/2002 |
| Oxygen | Horiba MPA-510 | 570694081 | PM | 5/20/2002 |
| | | | | |
| | | | | |

**THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

ANALYST: _____
FRED PIKULA

DATE: 5/24/2002

**SPECTRA GASES INC.**

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Cubix Corporation
**SGI ORDER # :** 0023960
**ITEM# :** 1
**P.O.# :** 2002420

**CYLINDER # :** CC-127463
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

**CERTIFICATION DATE:** 7/23/2002
**EXPIRATION DATE:** 7/23/2005

CERTIFICATION HISTORY

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Dioxide | 7/23/2002 | 7.99 % | 7.99 % | +/- 1% |
| Oxygen | 7/23/2002 | 11.94 % | 11.94 % | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Dioxide | GMIS-1 | CC-90832 | 9.98 % |
| Oxygen | NTRM-1 | CC-83909 | 22.8 % |
| | | | |
| | | | |

INSTRUMENTATION

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Dioxide | Horiba VIA-510 | 571417045 | NDIR | 6/25/2002 |
| Oxygen | Horiba MPA-510 | 570694081 | PM | 7/23/2002 |
| | | | | |
| | | | | |

**THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

ANALYST: _____
FRED PIKULA

DATE: 7/23/2002

# Scott Specialty Gases

## RATA CLASS

*Dual-Analyzed Calibration Standard*

9810 BAY AREA BLVD,PASADENA,TX 77507 Phone: 281-474-5800 Fax: 281-474-5857

## CERTIFICATE OF ACCURACY: Interference Free™ Multi-Component EPA Protocol Gas

**Assay Laboratory**

SCOTT SPECIALTY GASES
9810 BAY AREA BLVD
PASADENA,TX 77507

P.O. No.: G-1291
Project No.: 04-85228-002

**Customer**

CUBIX CORPORATION

4536 NW 20TH DRIVE
GAINESVILLE FL 32605




### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM009152 Certification Date: 4/03/00 Exp. Date: 4/03/2003
Cylinder Pressure***: 1883 PSIG

| COMPONENT | CERTIFIED CONCENTRATION (Moles) | | ANALYTICAL ACCURACY** | TRACEABILITY |
|---|---|---|---|---|
| CARBON DIOXIDE | 12.62 | % | +/- 1% | Direct NIST and NMi |
| OXYGEN | 4.53 | % | +/- 1% | Direct NIST and NMi |
| NITROGEN | BALANCE | | | |

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards

### REFERENCE STANDARD

| TYPE/SRM NO. | EXPIRATION DATE | CYLINDER NUMBER | CONCENTRATION | COMPONENT |
|---|---|---|---|---|
| NTRM | 1/01/03 | ALM042032 | 13.96 % | CO2/N2 |
| NTRM 2658 | 12/19/01 | ALM031738 | 9.680 % | OXYGEN |

### INSTRUMENTATION

| INSTRUMENT/MODEL/SERIAL# | DATE LAST CALIBRATED | ANALYTICAL PRINCIPLE |
|---|---|---|
| FTIR System/8220A/AAB9400260 | 03/28/00 | Scott Enhanced FTIR |
| MTI-A/M200/171109 | 03/21/00 | GAS CHROMATOGRAPHY |

### ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis | Second Triad Analysis | Calibration Curve

**CARBON DIOXIDE**

| | | |
|---|---|---|
| Date:04/03/00 | Response Unit:% | |
| Z1 = 0.0220 | R1 = 13.956 | T1 = 12.629 |
| R2 = 13.966 | Z2 = 0.0178 | T2 = 12.617 |
| Z3 = 0.0276 | T3 = 12.620 | R3 = 13.959 |
| Avg. Concentration: | 12.62 | % |

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999990
Constants: A = 0.000000
B = 1.000000 C = 0.000000
D = 0.000000 E = 0.000000

**OXYGEN**

| | | |
|---|---|---|
| Date:04/06/00 | Response Unit:AREA | |
| Z1 = 114.00 | R1 = 35455. | T1 = 16619. |
| R2 = 35183. | Z2 = 141.00 | T2 = 16552. |
| Z3 = 118.00 | T3 = 16573. | R3 = 35179. |
| Avg. Concentration: | 4.530 | % |

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999999418
Constants: A = -0.03442397
B = 0.000275952 C =
D = E =

APPROVED BY: _____
John Hunnicutt

Air Products and Chemicals, Inc.
5837 W. Fifth Street
Jacksonville, FL 32254
Telephone (904) 786-2663
FAX (904) 693-9128

AIR PRODUCTS

30 March, 1995

Cubix Corporation
2106 NW 67th Place
Suite 7
Gainesville, FL 32653

# CERTIFICATE OF CONFORMANCE

This document certifies that the product listed below is supplied via Air Products and Chemicals, Inc. and complies with the current minimum purity specifications of Air Products and Chemicals, Inc., Specialty Gas Department.

| | |
|---|---|
| Product | Hydrogen |
| Product Code | 3602 |
| Product | Oxygen |
| Product Code | 1602 |
| Shipper Number | 854-C-78428 |
| Product | Compressed Air |
| Product Code | 9197 |
| Product | Nitrogen |
| Product Code | 2602 |
| Shipper Number | 854-C-78440 |

E. Edward Henderson
Authorized Signature

# Dry Gas Meter Calibration

**WORKING METER**

| | |
|---|---|
| Date: | 4/12/02 |
| Prev. Calib. Date: | rebuilt |
| Location: | Cubix Austin Lab |
| Technician: | Bradley Rayhons |
| Meter Serial No: | 2962152 |
| Cubix DGM ID | T-10 |
| Prev. Calib Factor (Y): | 1.0000 |

**REFERENCE METER**

| | |
|---|---|
| Calibration Date: | 4/11/02 |
| Location: | Cubix Austin Lab |
| Technician: | Steve Oleyar |
| Meter Serial No: | P164240 |
| Cubix DGM ID | American |
| Calib. Factor (Y): | 1.0022 |

**REFERENCE METER**

| Calibration Run # | Time (min) | Start Temp (deg F) | Stop Temp (deg F) | Vol (initial) (cu ft) | Vol (final) (cu ft) | Vol. Total (cu ft) | Meter Rate (cu-ft /min) | Corr. Vol @ EPA STP (cu ft) |
|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 74 | 73.7 | 18.936 | 25.078 | 6.155 | 0.3078 | 5.998 |
| 2 | 18 | 74 | 74.5 | 26.261 | 33.362 | 7.117 | 0.3954 | 6.928 |
| 3 | 10 | 74 | 73.4 | 12.401 | 18.122 | 5.734 | 0.5734 | 5.589 |
| 4 | 11 | 74 | 74.6 | 35.001 | 42.645 | 7.661 | 0.6965 | 7.453 |
| 5 | 11 | 75 | 75.1 | 44.308 | 53.922 | 9.635 | 0.8759 | 9.367 |

**WORKING METER**

| Calibration Run # | Time (min) | Start Temp (deg F) | Stop Temp (deg F) | Vol (initial) (cu ft) | Vol (final) (cu ft) | Vol. Total (cu ft) | Meter Rate (cu-ft /min) | Corr. Vol @ EPA STP (cu ft) | Calculated DGM Factor (Y) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 75 | 73.7 | 19.158 | 25.436 | 6.278 | 0.314 | 6.108 | 0.9819 |
| 2 | 18 | 75 | 73.9 | 26.635 | 33.854 | 7.219 | 0.401 | 7.023 | 0.9866 |
| 3 | 10 | 73 | 74.6 | 12.465 | 18.285 | 5.820 | 0.582 | 5.672 | 0.9854 |
| 4 | 11 | 74 | 75.8 | 35.525 | 43.266 | 7.741 | 0.704 | 7.529 | 0.9900 |
| 5 | 11 | 76 | 73.9 | 44.957 | 54.684 | 9.727 | 0.884 | 9.455 | 0.9906 |

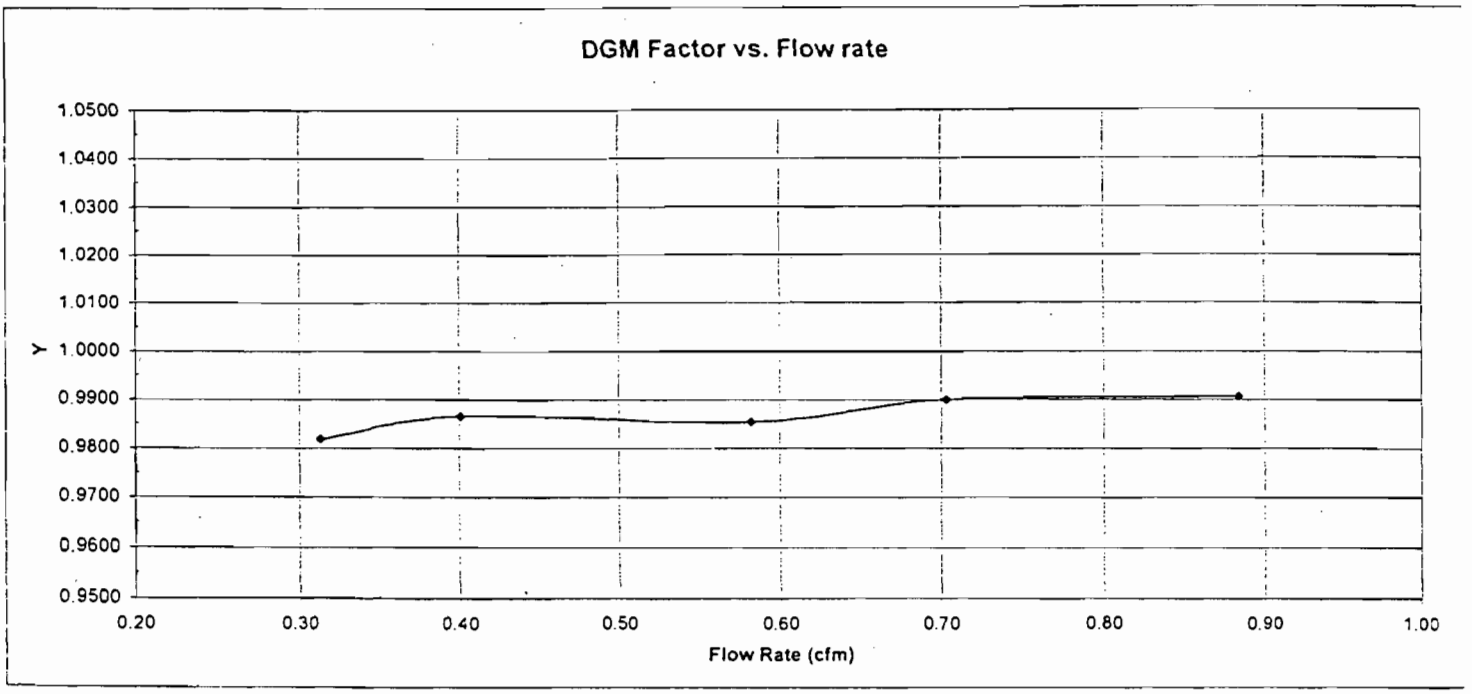
**Dry Gas Meter (DGM Factor) Calibration Test Results**

*** Average Y: 0.9869**

| | |
|---|---|
| Ave. Y w/in 5% of previous value: | *YES* |
| Ave. Y between 0.95 and 1.05: | *PASS* |
| Ind. Y values +/- 0.02 from Ave.: | *PASS* |

Criteria:

* Y- ratio of the reading of the reference meter to the working DGM. Acceptable tolerance of individual values from the average is +/- 0.02, with a value between 0.95 and 1.05.




signature

*Cubix Corporation*

# Pitot Tube Calibration Sheet

S-Type Tip Inspection (Method 2, Section 4)

**Best Available Copy**

7 ft

## Alignment Inspection

Transverse tube axis pitot-tip angle:

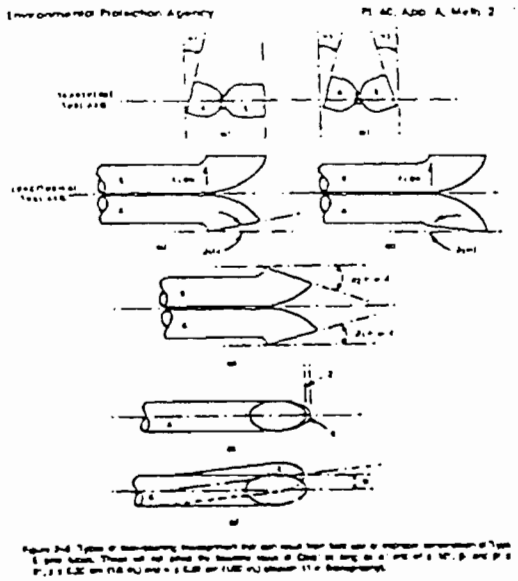
$\alpha_1 =$ 4 ° $\alpha_2 =$ 3 °

Each $\alpha$ must be less than 10° from perpendicular to the transverse tube axis

Longitudinal tube axis pitot-tip angle:

$\beta_1 =$ 2 ° $\beta_1 =$ 3 °

Each $\beta$ must be less than 5° from parrallel to the longitudinal tube axis



Pitot-tip end length alignment:

z = 0 (in or cm)

Z must be ≤ 0.32 cm (1/8 in)

Pitot-tip centriod alignment with respect to transverse axis:

w = 0 (in or cm)

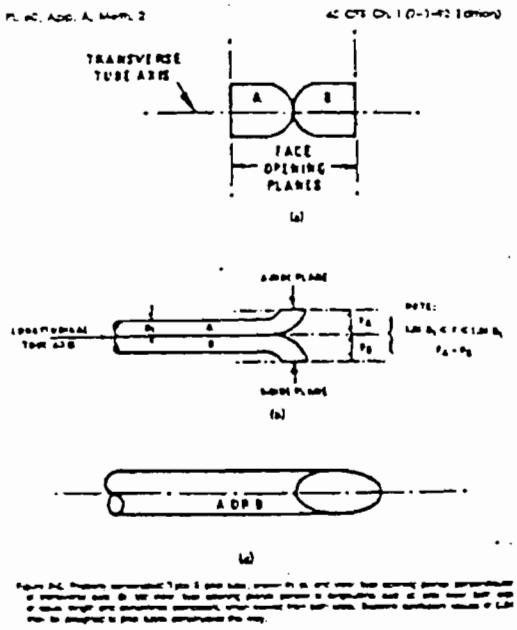
W must be ≤ 0.08 cm (1/32 in)

## Pitot Tip Dimension Check

External tubing diameter:

$D_t =$ .375 (in or cm)

$D_t$ must be between 0.48 and 0.95 cm (3/16 and 3/8 in)




Base to opening plane distance:

$P_A = P_B =$ .475 (in or cm)

$P_A$ and $P_B$ must be between 1.05 $D_t$ and 1.50 $D_t$

## Pitot Tube Coefficient

$C_p =$ 0.84 Pitot Tube: 2110 Date and Initials: 8-7-02 JH

# ALTIMETER TEST RECORD

This unit was tested and inspected IAW FAR Part 43, Appendix E, and is approved for return to service.

DATE: 3-8-02

WORK ORDER #: 3501

SCALE ERROR

| | |
|---|---|
| -1000 | -15 |
| 0 | Ø |
| + 500 | Ø |
| +1000 | +10 |
| +1500 | Ø |
| +2000 | +10 |
| +3000 | +5 |
| +4000 | Ø |
| +6000 | -5 |
| +8000 | +5 |
| +10,000 | +15 |
| +12,000 | +20 |
| +14,000 | +20 |
| +16,000 | +15 |
| +18,000 | Ø |
| +20,000 | -10 |
| +22,000 | |
| +25,000 | |
| +30,000 | |
| +35,000 | |
| +40,000 | |
| +45,000 | |
| +50,000 | |

START PRESSURE 30.06

FINAL PRESSURE 30.06

BAROMETRIC SCALE ERROR TEST

| | | | |
|---|---|---|---|
| 28.10 | Ø | 30.50 | +5 |
| 28.50 | -5 | 30.90 | Ø |
| 29.00 | Ø | 30.99 | Ø |
| 29.50 | Ø | | |
| 29.92 | Ø | | |

FRICTION TEST

| | | | |
|---|---|---|---|
| 1000 | 30 | 20,000 | 50 |
| 2000 | 30 | 25,000 | |
| 3000 | 30 | 30,000 | |
| 5000 | 30 | 35,000 | |
| 10,000 | 40 | 40,000 | |
| 15,000 | 45 | 50,000 | |

CASE LEAK TEST @ 18,000 Ø

CASE LEAK TEST @ 1,200 Ø

HYSTERESIS TEST @ 50% 20

HYSTERESIS TEST @ 40% 15

AFTER EFFECT 15

SERIAL NUMBER J5924

INSPECTOR [signature]

# TRAILER 10
## ALTIMETER/BAROMETER CALIBRATION SHEET

BFG/C 9001

**BFGoodrich**
Aerospace

Component Overhaul & Repair

817 Dessau Road
Austin, Texas 78753
512-251-3441
FAX 512-990-1271

FAA Repair Station No. UZ2R232L

CASTLEBERRY AERCOR

# Serviceable Part Tag

COMPONENT Altimeter
PART NO. 5934P-1A.83
SERIAL NO. J5924
MFG United Instr. WORK ORDER # V7076

☒ Overhaul ☐ Repair ☐ Bench Check & Test ☐ Other _____

The Aircraft Appliance identified above was overhauled, repaired, or bench tested (as per block marked) and inspected, in accordance with current Federal Aviation Administration Regulations, and is approved for return to service. Details of this component are on file at this repair station.

AUTHORIZED SIGNATURE

JAN 16 1995
DATE

| ALTIMETER SCALE ERROR | | | | | |
|---|---|---|---|---|---|
| PART NO. 5934P1A83 | | SERIAL NO. J5924 | | | |
| ALTIMETER PRESSURE | | | | | |
| TEST PT (FT) | INDICATOR READINGS AT + 25 °C | TEST PT (FT) | INDICATOR READINGS AT + 25 °C | TEST PT (FT) | INDICATOR READINGS AT + 25 °C |
| -1000 | +5 | 8,000 | +5 | 30,000 | |
| 0 0 | 0 | 10,000 | +10 | 35,000 | |
| 500 | 0 | 12,000 | +15 | 40,000 | |
| 1000 | 0 | 14,000 | +15 | 45,000 | |
| 1500 | 0 | 16,000 | +5 | 50,000 | |
| 2000 | 0 | 18,000 | 0 | 55,000 | |
| 3000 | -5 | 20,000 | -5 | 60,000 | |
| 4000 | -10 | 22,000 | | 70,000 | |
| 6000 | -10 | 25,000 | | 80,000 | |

BFG/C91C2

Best Available Copy

# NIST CALIBRATION CERTIFICATE



Catalog Number : 17005-00 Certificate Reference Number 3924899

## Instrument Tolerance

±3% full-scale

### Equipment "As Found"

| | Test Points | Reading | Deviation | O.O.T |
|---|---|---|---|---|
| Measured in: | [illegible] | [illegible] | [illegible] | ☐ |
| | 32.00 | 32.0 | 0.0000 | ☐ |
| °F | [illegible] | [illegible] | [illegible] | ☐ |
| | 110.00 | 110.0 | 0.0000 | ☐ |
| Measured in: | [illegible] | [illegible] | [illegible] | ☐ |
| | 32.00 | 32.0 | 0.0000 | ☐ |
| °F | [illegible] | [illegible] | [illegible] | ☐ |
| | 110.00 | 110.0 | 0.0000 | ☐ |
| Measured in: | [illegible] | [illegible] | [illegible] | ☐ |
| | [illegible] | [illegible] | [illegible] | ☐ |
| Measured in: | [illegible] | [illegible] | [illegible] | ☐ |
| | [illegible] | [illegible] | [illegible] | ☐ |
| Measured in: | [illegible] | [illegible] | [illegible] | ☐ |
| | [illegible] | [illegible] | [illegible] | ☐ |

### Equipment "As Left"

| Test Points | Reading | Deviation |
|---|---|---|
| [illegible] | [illegible] | [illegible] |
| 32.00 | 32.0 | 0.0000 |
| [illegible] | [illegible] | [illegible] |
| 110.00 | 110.0 | 0.0000 |
| [illegible] | [illegible] | [illegible] |
| 32.00 | 32.0 | 0.0000 |
| [illegible] | [illegible] | [illegible] |
| 110.00 | 110.0 | 0.0000 |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |

****** Note **** Check mark under the O.O.T column indicates the equipment is Out Of Tolerance.**

This certificate was performed under the climate controlled lab conditons of: **22** °C **50** %RH **29.5** "Hg

**Additional Comments:**

n/a

*This certificate shall not be reproduced except in full and requires written approval from InnoCal. * Results data shown relates only to above listed item(s) **

INNOCAL™
INNOVATIVE CALIBRATION SOLUTIONS
625 East Bunker Court, Vernon Hills, Illinois, 60061
Domestic 866-InnoCal - Fax 847-247-2984

# NIST CALIBRATION CERTIFICATE



Catalog Number : 17005-00 Certificate Reference Number 3924899

| | | | |
|---|---|---|---|
| Unit Under Test 1 : | 03312-20 | Unit Under Test 2: | n/a |
| Serial Number 1 : | 57778 | Serial Number 2: | n/a |

Certificate Completed for: Cubix Corp
3709 SW 42nd Ave
Gainsville FL 32608

InnoCal certifies that the calibration of the listed units, used procedure number MWI-17005-00 with equipment traceable to the National Institute of Standards and Technology (NIST), and the test was performed in accordance with ANSI/NCSL Z540-1, ISO Guide 25.

Best measurement uncertainty: k=2, ±0.08°C

Listed uncertainties represent the best measurement uncertainty expressed at 95% confidence level. Actual uncertainties available upon request.

Purchase Order Number: 2002615 Secondary ID #: n/a

Equipment Conditon : USED

**Calibration Standards Used**

| Manufacturer | Function Performed | Model Number | Serial Number | Due Date |
|---|---|---|---|---|
| Hart Scientific | Platinum Resistance Probe | 5680 | 1074 | 04/14/03 |
| Ertco/Hart | Temperature Indicator | 850 | 85307 | 04/14/03 |

Lab Technician: 321

Date Completed: 10/17/02 Issue Date: 10/17/02 Received Date 9/18/02

*This certificate shall not be reproduced except in full and requires written approval from InnoCal. * Results data shown relates only to above listed item(s) **

OMEGA ENGINEERING, INC.

One Omega Drive, Box 4047, Stamford, CT 06907
(203) 359-1660 – http://www.omega.com – e-mail: info@omega.com

## CERTIFICATE OF CALIBRATION

**Model** HH-25KF **Serial Number** T-233418

Omega Engineering, Inc., certifies that the above listed instrument has been calibrated using standards whose accuracy is traceable to the U.S. National Institute of Standards and Technology, and meets or exceeds its published specifications. Calibration traceability of the above listed instrument is in full compliance with ANSI/Z540-1-1994 standards and requirements.

2-1-03
*DATE*

RF
*TESTED BY*

mck
*AUTHORIZED SIGNATURE*

MD-4 ©Copyright 1998 Omega Engineering, Inc.

Placed in service: August 14, 2002
Recalibration Date: February 1, 2003
Location: Trailer 10

OMEGA ENGINEERING, INC.
An OMEGA Technologies Company

# Certificate Of Calibration

CUBIX

| | | | |
|---|---|---|---|
| Cust. P.O. #: | G1342 | Report #: | 102915471 |
| Test Item: | ASTM-1C-CC | Test Date: | 22-FEB-01 |
| Serial #: | 99293 | Recal Date: | Per System Application |

Omega Engineering, Inc. certifies that the above instrumentation has been calibrated and tested to **meet or exceed** the published specifications. This calibration and testing was performed using instrumentation and standards that are traceable to the United States National Institute of Standards and Technology. Calibration on this product was performed by an approved Supplier/ Lab of Omega Engineering, Inc. and is in compliance with **MIL-STD-45662A.**

Test Conditions: Temperature 22 C Relative Humidity 35%

**NIST Traceable Test Numbers:** 213426,264615-01

| Temperature | Thermometer Reading | Correction |
|---|---|---|
| | We certify that subject thermometer conforms to specifications and tolerances stated in A.S.T.M. Designate E-1, Table 1, No. 1C, Scale Error + or - 0.5 C Max. | |
| | | |

Richard G Patterson
**Metrology Inspector** 27-FEB-01

# APPENDIX F:
# LOGGED DATA RECORDS
# 1-MINUTE AVERAGES

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| START Run 1 | 10/28/02 | 9:34:18 | 843.3 | 20.60 | 0.88 | 843.3 | 20.60 | 0.88 |
| Run 1 | 10/28/02 | 9:35:18 | 850.0 | 20.58 | 0.94 | 846.6 | 20.60 | 0.91 |
| Run 1 | 10/28/02 | 9:36:18 | 841.2 | 20.60 | 0.94 | 844.8 | 20.60 | 0.92 |
| Run 1 | 10/28/02 | 9:37:18 | 910.5 | 20.60 | 0.96 | 861.2 | 20.60 | 0.93 |
| Run 1 | 10/28/02 | 9:38:18 | 853.2 | 20.60 | 0.96 | 859.6 | 20.60 | 0.94 |
| Run 1 | 10/28/02 | 9:39:18 | 895.1 | 20.60 | 0.94 | 865.5 | 20.60 | 0.95 |
| Run 1 | 10/28/02 | 9:40:18 | 910.5 | 20.60 | 1.00 | 871.9 | 20.60 | 0.95 |
| Run 1 | 10/28/02 | 9:41:18 | 856.6 | 20.58 | 0.96 | 870.0 | 20.60 | 0.95 |
| Run 1 | 10/28/02 | 9:42:18 | 909.4 | 20.58 | 0.94 | 874.4 | 20.60 | 0.95 |
| Run 1 | 10/28/02 | 9:43:18 | 851.1 | 20.58 | 0.94 | 872.0 | 20.59 | 0.94 |
| Run 1 | 10/28/02 | 9:44:18 | 833.5 | 20.58 | 0.90 | 868.5 | 20.59 | 0.94 |
| Run 1 | 10/28/02 | 9:45:18 | 908.3 | 20.58 | 0.92 | 871.9 | 20.59 | 0.94 |
| Run 1 | 10/28/02 | 9:46:18 | 868.7 | 20.55 | 0.98 | 871.6 | 20.59 | 0.94 |
| Run 1 | 10/28/02 | 9:47:18 | 930.3 | 20.53 | 1.00 | 875.8 | 20.59 | 0.94 |
| Run 1 | 10/28/02 | 9:48:17 | 869.8 | 20.53 | 1.02 | 875.4 | 20.58 | 0.94 |
| Run 1 | 10/28/02 | 9:49:16 | 919.3 | 20.55 | 1.04 | 878.1 | 20.58 | 0.95 |
| Run 1 | 10/28/02 | 9:50:18 | 953.4 | 20.55 | 1.06 | 882.6 | 20.58 | 0.96 |
| Run 1 | 10/28/02 | 9:51:17 | 892.9 | 20.55 | 1.04 | 883.1 | 20.58 | 0.96 |
| Run 1 | 10/28/02 | 9:52:18 | 944.6 | 20.55 | 1.04 | 886.4 | 20.57 | 0.96 |
| Run 1 | 10/28/02 | 9:53:17 | 928.1 | 20.58 | 1.06 | 888.4 | 20.57 | 0.97 |
| Run 1 | 10/28/02 | 9:54:17 | 961.1 | 20.53 | 1.08 | 891.9 | 20.57 | 0.97 |
| Run 1 | 10/28/02 | 9:55:17 | 963.3 | 20.53 | 1.12 | 895.2 | 20.57 | 0.98 |
| Run 1 | 10/28/02 | 9:56:18 | 985.5 | 20.53 | 1.12 | 899.1 | 20.57 | 0.99 |
| Run 1 | 10/28/02 | 9:57:18 | 961.1 | 20.55 | 1.14 | 901.7 | 20.57 | 0.99 |
| Run 1 | 10/28/02 | 9:58:18 | 1000.7 | 20.58 | 1.12 | 905.6 | 20.57 | 1.00 |
| Run 1 | 10/28/02 | 9:59:18 | 999.6 | 20.55 | 1.16 | 909.2 | 20.57 | 1.00 |
| Run 1 | 10/28/02 | 10:00:18 | 1015.4 | 20.58 | 1.08 | 913.2 | 20.57 | 1.01 |
| Run 1 | 10/28/02 | 10:01:18 | 997.4 | 20.55 | 1.08 | 916.2 | 20.57 | 1.01 |
| Run 1 | 10/28/02 | 10:02:18 | 964.4 | 20.55 | 1.04 | 917.8 | 20.57 | 1.01 |
| Run 1 | 10/28/02 | 10:03:18 | 1000.7 | 20.55 | 1.06 | 920.6 | 20.57 | 1.01 |
| Run 1 | 10/28/02 | 10:04:18 | 975.4 | 20.53 | 1.10 | 922.4 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:05:18 | 995.8 | 20.53 | 1.08 | 924.7 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:06:18 | 954.5 | 20.53 | 1.06 | 925.6 | 20.56 | 1.02 |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| Run 1 | 10/28/02 | 10:07:18 | 987.5 | 20.53 | 1.06 | 927.4 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:08:18 | 930.3 | 20.50 | 1.06 | 927.5 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:09:18 | 987.5 | 20.53 | 1.02 | 929.1 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:10:18 | 949.0 | 20.50 | 1.08 | 929.7 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:11:18 | 1000.7 | 20.50 | 1.08 | 931.5 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:12:18 | 1015.0 | 20.48 | 1.10 | 933.7 | 20.55 | 1.03 |
| Run 1 | 10/28/02 | 10:13:17 | 1021.3 | 20.45 | 1.10 | 935.9 | 20.55 | 1.03 |
| Run 1 | 10/28/02 | 10:14:17 | 1003.2 | 20.45 | 1.16 | 937.5 | 20.55 | 1.03 |
| Run 1 | 10/28/02 | 10:15:17 | 1000.7 | 20.45 | 1.16 | 939.0 | 20.55 | 1.03 |
| Run 1 | 10/28/02 | 10:16:17 | 1003.0 | 20.45 | 1.18 | 940.5 | 20.55 | 1.04 |
| Run 1 | 10/28/02 | 10:17:17 | 1005.7 | 20.45 | 1.22 | 942.0 | 20.54 | 1.04 |
| Run 1 | 10/28/02 | 10:18:17 | 1015.7 | 20.45 | 1.18 | 943.6 | 20.54 | 1.04 |
| Run 1 | 10/28/02 | 10:19:17 | 1008.7 | 20.45 | 1.18 | 945.0 | 20.54 | 1.05 |
| Run 1 | 10/28/02 | 10:20:17 | 1002.7 | 20.48 | 1.18 | 946.3 | 20.54 | 1.05 |
| Run 1 | 10/28/02 | 10:21:17 | 947.9 | 20.45 | 1.10 | 946.3 | 20.54 | 1.05 |
| Run 1 | 10/28/02 | 10:22:17 | 990.7 | 20.40 | 1.16 | 947.2 | 20.53 | 1.05 |
| Run 1 | 10/28/02 | 10:23:17 | 990.1 | 20.43 | 1.18 | 948.1 | 20.53 | 1.05 |
| Run 1 | 10/28/02 | 10:24:17 | 1000.3 | 20.50 | 1.16 | 949.1 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:25:17 | 1024.1 | 20.53 | 1.10 | 950.5 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:26:17 | 1035.3 | 20.50 | 1.16 | 952.1 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:27:17 | 1007.3 | 20.50 | 1.16 | 953.1 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:28:17 | 1002.0 | 20.50 | 1.18 | 954.0 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:29:17 | 1012.8 | 20.50 | 1.22 | 955.1 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:30:17 | 998.6 | 20.50 | 1.24 | 955.8 | 20.53 | 1.07 |
| Run 1 | 10/28/02 | 10:31:17 | 987.5 | 20.48 | 1.28 | 956.4 | 20.53 | 1.07 |
| Run 1 | 10/28/02 | 10:32:17 | 999.6 | 20.45 | 1.26 | 957.1 | 20.53 | 1.07 |
| Run 1 | 10/28/02 | 10:33:17 | 1000.7 | 20.43 | 1.28 | 957.8 | 20.52 | 1.08 |
| END Run 1 | 10/28/02 | 10:34:17 | 1012.4 | 20.43 | 1.32 | **958.7** | **20.52** | **1.08** |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| START Run 2 | 10/28/02 | 11:27:40 | 1012.8 | 20.43 | 1.32 | 1012.8 | 20.43 | 1.32 |
| Run 2 | 10/28/02 | 11:28:40 | 1000.8 | 20.45 | 1.28 | 1034.6 | 20.44 | 1.31 |
| Run 2 | 10/28/02 | 11:29:39 | 1043.0 | 20.45 | 1.32 | 1020.5 | 20.43 | 1.32 |
| Run 2 | 10/28/02 | 11:30:39 | 1022.8 | 20.43 | 1.32 | 1020.2 | 20.44 | 1.31 |
| Run 2 | 10/28/02 | 11:31:39 | 1047.0 | 20.43 | 1.34 | 1027.8 | 20.43 | 1.32 |
| Run 2 | 10/28/02 | 11:32:39 | 1105.0 | 20.45 | 1.30 | 1034.8 | 20.43 | 1.32 |
| Run 2 | 10/28/02 | 11:33:39 | 1049.0 | 20.48 | 1.30 | 1041.2 | 20.43 | 1.32 |
| Run 2 | 10/28/02 | 11:34:39 | 788.8 | 20.30 | 1.22 | 1040.1 | 20.44 | 1.29 |
| Run 2 | 10/28/02 | 11:35:39 | 1063.0 | 20.40 | 1.28 | 1030.5 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:36:39 | 1022.8 | 20.43 | 1.26 | 1033.0 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:37:39 | 1071.0 | 20.43 | 1.28 | 1034.2 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:38:39 | 1089.0 | 20.45 | 1.32 | 1036.9 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:39:39 | 1041.0 | 20.45 | 1.30 | 1042.5 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:40:39 | 1107.0 | 20.48 | 1.30 | 1044.7 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:41:39 | 1051.0 | 20.43 | 1.32 | 1045.3 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:42:39 | 1057.0 | 20.45 | 1.30 | 1047.6 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:43:39 | 1087.0 | 20.43 | 1.30 | 1048.9 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:44:39 | 1092.8 | 20.45 | 1.30 | 1050.3 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:45:39 | 1069.0 | 20.43 | 1.28 | 1053.1 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:46:39 | 1083.0 | 20.40 | 1.32 | 1053.8 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:47:39 | 1081.0 | 20.40 | 1.30 | 1055.6 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:48:39 | 1083.0 | 20.43 | 1.28 | 1057.1 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:49:39 | 1047.0 | 20.53 | 0.78 | 1057.6 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:50:39 | 1061.0 | 20.40 | 1.26 | 1052.9 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:51:39 | 1123.0 | 20.40 | 1.32 | 1054.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:52:39 | 1081.0 | 20.43 | 1.24 | 1057.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:53:39 | 1127.0 | 20.43 | 1.24 | 1058.8 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:54:39 | 1061.0 | 20.43 | 1.26 | 1059.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:55:39 | 1076.8 | 20.45 | 1.22 | 1060.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:56:39 | 1127.0 | 20.40 | 1.30 | 1061.0 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:57:39 | 1097.0 | 20.43 | 1.28 | 1063.2 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:58:39 | 1127.0 | 20.43 | 1.28 | 1064.7 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:59:39 | 1081.0 | 20.43 | 1.30 | 1065.7 | 20.43 | 1.28 |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| Run 2 | 10/28/02 | 12:00:39 | 1095.0 | 20.45 | 1.30 | 1066.8 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:01:39 | 1079.0 | 20.43 | 1.26 | 1067.1 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:02:39 | 1093.0 | 20.45 | 1.28 | 1067.8 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:03:39 | 1087.0 | 20.45 | 1.30 | 1067.8 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:04:39 | 1101.0 | 20.40 | 1.28 | 1069.0 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:05:39 | 1149.0 | 20.43 | 1.30 | 1070.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:06:39 | 1145.0 | 20.38 | 1.28 | 1072.7 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:07:39 | 1209.0 | 20.38 | 1.32 | 1075.0 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:08:39 | 1171.0 | 20.40 | 1.32 | 1077.7 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:09:39 | 1187.0 | 20.40 | 1.32 | 1079.9 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:10:39 | 1109.0 | 20.43 | 1.28 | 1081.8 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:11:39 | 1131.0 | 20.43 | 1.22 | 1082.9 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:12:39 | 1125.0 | 20.70 | 1.20 | 1083.4 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:13:39 | 1099.0 | 20.48 | 1.16 | 1083.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:14:39 | 1125.0 | 20.45 | 1.20 | 1083.4 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:15:39 | 1091.0 | 20.48 | 1.18 | 1084.1 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:16:39 | 1135.0 | 20.48 | 1.20 | 1084.5 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:17:39 | 1083.0 | 20.48 | 1.18 | 1085.0 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:18:39 | 1127.0 | 20.45 | 1.18 | 1085.8 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:19:38 | 1113.0 | 20.45 | 1.20 | 1086.0 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:20:38 | 1079.0 | 20.45 | 1.20 | 1086.5 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:21:38 | 1145.0 | 20.45 | 1.20 | 1087.0 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:22:38 | 1153.0 | 20.45 | 1.20 | 1087.6 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:23:38 | 1091.0 | 20.43 | 1.22 | 1088.5 | 20.43 | 1.26 |
| Run 2 | 10/28/02 | 12:24:38 | 1113.0 | 20.45 | 1.16 | 1089.4 | 20.43 | 1.26 |
| Run 2 | 10/28/02 | 12:25:38 | 1173.0 | 20.45 | 1.20 | 1089.7 | 20.43 | 1.26 |
| Run 2 | 10/28/02 | 12:26:38 | 1127.0 | 20.45 | 1.20 | 1090.3 | 20.43 | 1.26 |
| END Run 2 | 10/28/02 | 12:27:38 | 1137.0 | 20.40 | 1.26 | **1091.3** | **20.43** | **1.26** |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| START Run 3 | 10/28/02 | 13:17:45 | 1009.0 | 20.40 | 1.04 | 1009.0 | 20.40 | 1.04 |
| Run 3 | 10/28/02 | 13:18:45 | 1023.0 | 20.45 | 1.06 | 1004.8 | 20.42 | 1.06 |
| Run 3 | 10/28/02 | 13:19:45 | 969.0 | 20.45 | 1.04 | 999.4 | 20.44 | 1.04 |
| Run 3 | 10/28/02 | 13:20:45 | 991.0 | 20.45 | 1.00 | 996.6 | 20.43 | 1.04 |
| Run 3 | 10/28/02 | 13:21:45 | 983.0 | 20.45 | 0.98 | 992.1 | 20.44 | 1.03 |
| Run 3 | 10/28/02 | 13:22:45 | 979.0 | 20.43 | 1.02 | 991.8 | 20.44 | 1.02 |
| Run 3 | 10/28/02 | 13:23:45 | 991.0 | 20.43 | 1.02 | 988.9 | 20.44 | 1.02 |
| Run 3 | 10/28/02 | 13:24:45 | 957.0 | 20.43 | 1.02 | 987.7 | 20.44 | 1.02 |
| Run 3 | 10/28/02 | 13:25:45 | 1007.0 | 20.43 | 1.06 | 986.4 | 20.43 | 1.02 |
| Run 3 | 10/28/02 | 13:26:45 | 923.0 | 20.28 | 1.04 | 985.4 | 20.42 | 1.02 |
| Run 3 | 10/28/02 | 13:27:45 | 1015.0 | 20.33 | 1.04 | 985.1 | 20.41 | 1.03 |
| Run 3 | 10/28/02 | 13:28:45 | 1025.0 | 20.33 | 1.14 | 986.6 | 20.40 | 1.03 |
| Run 3 | 10/28/02 | 13:29:45 | 1039.0 | 20.38 | 1.12 | 992.9 | 20.40 | 1.04 |
| Run 3 | 10/28/02 | 13:30:45 | 1089.0 | 20.38 | 1.12 | 997.1 | 20.40 | 1.05 |
| Run 3 | 10/28/02 | 13:31:45 | 1055.0 | 20.38 | 1.14 | 1002.2 | 20.39 | 1.06 |
| Run 3 | 10/28/02 | 13:32:45 | 1093.0 | 20.38 | 1.12 | 1007.8 | 20.39 | 1.06 |
| Run 3 | 10/28/02 | 13:33:45 | 1065.0 | 20.35 | 1.14 | 1010.7 | 20.39 | 1.07 |
| Run 3 | 10/28/02 | 13:34:44 | 1015.0 | 20.35 | 1.10 | 1014.0 | 20.39 | 1.07 |
| Run 3 | 10/28/02 | 13:35:44 | 1083.0 | 20.35 | 1.14 | 1015.7 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 13:36:44 | 1007.0 | 20.35 | 1.14 | 1017.6 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 13:37:44 | 1013.0 | 20.38 | 1.08 | 1018.3 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 13:38:44 | 1025.0 | 20.35 | 1.14 | 1017.1 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 13:39:44 | 1005.0 | 20.35 | 1.12 | 1017.4 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 13:40:44 | 1037.0 | 20.33 | 1.12 | 1016.7 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 13:41:44 | 993.0 | 20.33 | 1.14 | 1016.6 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:42:44 | 999.0 | 20.33 | 1.12 | 1016.1 | 20.37 | 1.09 |
| Run 3 | 10/28/02 | 13:43:44 | 947.0 | 20.43 | 1.14 | 1013.9 | 20.37 | 1.09 |
| Run 3 | 10/28/02 | 13:44:44 | 937.0 | 20.38 | 1.12 | 1011.8 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:45:44 | 935.0 | 20.40 | 1.10 | 1008.9 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:46:44 | 911.0 | 20.40 | 1.08 | 1006.3 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:47:44 | 959.0 | 20.40 | 1.12 | 1003.6 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:48:44 | 945.0 | 20.40 | 1.14 | 1001.9 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:49:44 | 971.0 | 20.40 | 1.10 | 1000.9 | 20.38 | 1.09 |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| Run 3 | 10/28/02 | 13:50:44 | 961.0 | 20.38 | 1.16 | 999.0 | 20.38 | 1.10 |
| Run 3 | 10/28/02 | 13:51:44 | 929.0 | 20.35 | 1.08 | 998.1 | 20.38 | 1.10 |
| Run 3 | 10/28/02 | 13:52:44 | 973.0 | 20.35 | 1.08 | 996.5 | 20.38 | 1.10 |
| Run 3 | 10/28/02 | 13:53:44 | 909.0 | 20.38 | 1.12 | 994.6 | 20.38 | 1.10 |
| Run 3 | 10/28/02 | 13:54:44 | 945.0 | 20.33 | 1.06 | 993.4 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:55:44 | 933.0 | 20.33 | 1.08 | 991.5 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:56:44 | 690.8 | 20.35 | 0.98 | 988.5 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:57:44 | 927.0 | 20.33 | 1.04 | 984.3 | 20.37 | 1.09 |
| Run 3 | 10/28/02 | 13:58:44 | 873.0 | 20.35 | 1.00 | 982.1 | 20.37 | 1.09 |
| Run 3 | 10/28/02 | 13:59:44 | 891.0 | 20.38 | 1.02 | 980.0 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:00:44 | 915.0 | 20.38 | 1.06 | 977.9 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:01:44 | 861.0 | 20.38 | 1.04 | 976.3 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:02:44 | 921.0 | 20.40 | 1.06 | 974.2 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:03:44 | 855.0 | 20.38 | 1.06 | 972.2 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:04:44 | 893.0 | 20.38 | 1.02 | 970.4 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:05:44 | 849.0 | 20.38 | 1.04 | 967.8 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:06:44 | 889.0 | 20.40 | 1.04 | 966.3 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:07:44 | 917.0 | 20.40 | 1.04 | 964.7 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:08:44 | 879.0 | 20.40 | 1.06 | 963.3 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:09:44 | 903.0 | 20.38 | 1.04 | 962.1 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:10:44 | 863.0 | 20.38 | 1.08 | 960.2 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 14:11:44 | 855.0 | 20.38 | 1.02 | 958.7 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 14:12:44 | 917.0 | 20.38 | 1.06 | 957.2 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 14:13:44 | 879.0 | 20.38 | 1.06 | 956.0 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 14:14:44 | 845.0 | 20.40 | 0.96 | 954.6 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 14:15:44 | 883.0 | 20.38 | 0.98 | 952.6 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 14:16:44 | 825.0 | 20.38 | 0.96 | 951.0 | 20.38 | 1.07 |
| END Run 3 | 10/28/02 | 14:17:44 | 849.0 | 20.38 | 0.90 | **949.3** | **20.38** | **1.07** |

Continuation

of document

submitted on

March 7, 2003

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

December 13, 2002

Mr. Christopher L. Kirts
District Air Program Administrator
State of Florida
Department of Environmental Protection
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590

Re: Bleach Plant Compliance Test – October 2002
Georgia-Pacific Palatka Operations

Dear Mr. Kirts:

Continuous monitoring system (CMS) parameters, monitoring frequencies, averaging times and the rationale for selecting the CMS are required to be submitted for approval pursuant to 40 CFR 63.453 (n). This information has been updated from a previous submittal (letter dated October 25, 2002, Appendix A) reflecting recent compliance testing conducted in October 2002, which has been summarized and included in this correspondence for your review. (A copy of the test report is included as an attachment.)

The Bleach Plant scrubber collects and treats emissions from the No. 3 Bleach Plant as well as emissions from the R8/10 Chlorine Dioxide Generator. The pH of the gas scrubber effluent, the scrubber liquid influent flow rate, and the fan amps were continuously recorded during the testing. We have analyzed this information pursuant to 40 CFR 63.453 (n) as follows.

Although all runs demonstrated compliance with 40 CFR 63.445 (c) (2) by a considerable margin, four of the six runs were selected to develop operating parameter values providing the greatest operating flexibility while also demonstrating continuous compliance (see Table 1).

The average pH during these runs was 9.2 with a minimum during one run of 9.0 (see Figures 1 and 2 in Appendix B). We, therefore, propose for the Administrator's approval that we operate the scrubber effluent pH above a minimum of 9.0 as a rolling 3-hour average with a monitoring frequency of at least once every 15 minutes (see Table 2). We believe the monitoring frequency of once every 15 minutes to be appropriate because the standard deviation of the data was quite low. The average flow of the scrubber medium was 1257 gpm with a minimum of 1252 gpm. By the same rationale we propose for the Administrator's approval that we operate above a minimum flow of 1252 as a rolling 3-hour average with the same monitoring frequency described above.

Region 4 previously approved monitoring fan amperage of the bleaching system vent gas fan as an alternative monitoring parameter to 40 CFR 63.453 (c)(2) (letter dated December 22,

2000). The mill continuously monitors fan amperage and displays it as fan load on its Distributed Control System (DCS). Fan load during the time of the testing was calculated as follows (Equation 1).

$$\%Load = \frac{measured\ amps}{0.701 * full\ load\ amps} * 100 = \frac{measured\ amps}{0.701 * 25.7} * 100 = \frac{measured\ amps}{18.02} * 100$$

Please note 0.701 represents a conversion factor for ranging of the signal from the field instrumentation to the DCS.

Figure 3 reflects the fan load/amperage when the Bleach Plant goes down. Because the mill continues to run the fan the amperage goes up although the process is down. We have also taken all the belts off the fan motor to determine its "no load" amperage, 9.8 amps. Because of data variability we propose to operate the fan such that the amperage is below 19.3 and above 10.8 amps as a rolling 3-hour average. This will be converted to fan load for convenience of the operators. Note that this calculation has been simplified according to the following (Equation 2) and became effective on December 5, 2002 at 13:05.

$$\%Load = \frac{measured\ amps}{full\ load\ amps} * 100 = \frac{measured\ amps}{25.7} * 100$$

Again, we propose to monitor fan amperage/load at least once every 15 minutes. In all cases, pH, flow, and % Load data will be transferred to a plant wide information (PI) system for record keeping purposes.

We respectfully request written approval as required by 40 CFR 63.453 (n). If you have any questions about our rationale please do not hesitate to call me at (386) 329-0918.

Sincerely,

Theodore D. Kennedy
Vice President

tk

Enclosures

cc: Lee Page, EPA Region 4
William Jernigan, Atlanta
Scott Matchett, Atlanta
Cindy Barlow
Nickolai Selbach

# Appendix A

Letter Dated October 25, 2002

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

October 25, 2002

Mr. Mort Benjamin
Air Compliance Supervisor
Northeast District
Florida Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, FL 32256-7577

**Re: Cluster Rule CMS Parameters (40 CFR 63.453(n))**
**Georgia-Pacific Palatka Operations**
**1070005**

Dear Mr. Benjamin:

During a recent review of recordkeeping and reporting procedures we discovered that continuous monitoring system (CMS) parameters, monitoring frequencies, averaging times and the rationale for choosing the CMS were not submitted in a readable, concise format and summary to the Department pursuant to 40 CFR 63.453 (n).

The CMS listed in the attached tables were chosen because they indicate when there is a breach of the Closed Vent Collection System, a bypass of the Condensate Collection System, or they otherwise indicate operation outside of tested operating ranges on the condensate, low-volume-high-concentration (LVHC) and bleach plant treatment systems specifically identified in 40 CFR Subpart S. The tables show the equipment, the parameters that are monitored, the CMS tag numbers, the limits that have been evaluated and the thresholds or minimum averaging times.

Limit switches, pressure measurements, stream flows, temperatures, pH, fan load, pH and indications of valve positions are forms of CMS that are generally accepted industry-wide for monitoring for compliance.

The parameters designated as "Valve Position" or "Vent Valve Position" in the attached Tables indicate that a system is either being collected (valve "Closed") or bypassed (valve "Open") to show compliance with the requirement to collect gases from the named LVHC systems.

The incinerator temperature values were selected because data collected during the IPT of the two incinerators indicated that compliance with the treatment requirements of 63.443(d) were met at all times when the temperatures were above the chosen values. The averaging time was selected based on run times of the reference test methods. Similarly, the parameter values shown for the stripper parameters mandated under 63.453(g) were based on data gathered during the stripper characterization study.

Finally, the scrubber parameters are either mandated by the rule (see 63.453(c)) or approved as acceptable alternative monitoring. Parameter values were chosen based on data gathered during the scrubber IPTand subsequent performance tests, and when the parameters are within the designated ranges, we meet the bleach plant treatment requirements found in 63.445(c). Averaging times were selected based on normal compliance test times.

If you have any more questions concerning this issue, please do not hesitate to contact either Joe Taylor at 386-329-0027 or via e-mail at jetaylor@gapac.com or me at 386-329-0918.

Sincerely,

Theodore D Kennedy

Theodore D. Kennedy
Vice-President
Palatka Operations

Bc: S. D. Matchett (GA030-43)
W. M. Jernigan (GA030-09)

# MACT I CONTINUOUS MONITORING SYSTEMS

| Area | Parameter/Equipment | Parameter Monitored | PI Tag Number | Range/Limit | Threshold/Averaging Time |
|---|---|---|---|---|---|
| **Bleach Plant (scrubber)** | Scrubbant Recirculation Flow | Flow | 40fif31.pv | ≥ 1229 gpm | 3-hr average |
| | Scrubber Fan Load | Load | 40iif33.pv | ≥ 85% | Continuous |
| | Scrubbant Recirculation pH | PH | 40aif32.pv | ≥ 9.1 | 3-hr average |
| **Thermal Oxidizer** | Primary Incinerator Temperature | Temperature | 13ncgincin:13ttm22a.pnt | ≥ 1300° F | 3-hr rolling average |
| | Backup Incinerator Temperature | Temperature | 13ncgincin:13ttm22b.pnt | ≥ 1300° F | |
| **Steam Stripper** | Steam Flow to Stripper | Steam Flow | 13constrip:13fcc01.meas | | 3-hr rolling average |
| | Condensate Flow to Stripper | Condensate Flow | 13constrip:13fcc19.meas | N/A | 3-hr rolling average |
| | Condensate Temperature entering Column | Temperature | 13constrip:13ttc30.pnt | ≥ 160° F | 3-hr rolling average |
| **Condensate Collection** | Pre-evaporator 1st and 2nd effect foul, Pre-evaporator hotwell condensate | Flow, gpm | 13concollect:13ftk20.pnt | N/A | Daily average rolled into 15-day rolling average |
| | 1st and 2nd effect contaminated condensate, as makeup | Flow, gpm | 13concollect:13ftk03.pnt | N/A | Daily average rolled into 15-day rolling average |
| | Turpentine Decanter Underflow and Secondary Condenser condensate | Flow, gpm | 13concollect:13ftk21.pnt | N/A | Daily average rolled into 15-day rolling average |

# MACT I CONTINUOUS MONITORING SYSTEMS

| Area | Parameter/Equipment | Parameter Monitored | Loop Number | Range/Limit | Threshold/Averaging Time |
|---|---|---|---|---|---|
| Closed Vent System | #1 Blow Tank Safety Valve | Limit Switch | 05VL1VNT | Open/Closed | minute |
| | #2 Blow Tank Safety Valve | Limit Switch | 05VL2VNT | Open/Closed | minute |
| | #3 Blow Tank Safety Valve | Limit Switch | 05VL3VNT | Open/Closed | minute |
| | Secondary Condenser Vent | Limit Switch | 13D06 | Open/Closed | minute |
| | Secondary Condenser Rupture Disc | Pressure Transmitter | 13D07 | 14.5 psi | minute |
| | Secondary Condenser Rupture Disc | Pressure Transmitter | 13D61 | 14.5 psi | minute |
| | Accumulator Safety Valve | Limit Switch | 13A07 | Open/Closed | minute |
| | Accumulator Safety Valve | Limit Switch | 13A22 | Open/Closed | minute |
| | Pre-evaporator Hotwell Loop Seal | Pressure Transmitter | 13PTB23 | 14" water column | minute |
| | Pre-evaporator Hotwell Vent | Limit Switch | 13D01 | Open/Closed | minute |
| | Pre-evaporator Hotwell Rupture Disc | Pressure Switch | 13D02 | 10 psi | minute |
| | Turpentine Condenser Vent | Limit Switch | 13J01 | Open/Closed | minute |
| | Turpentine Condenser Rupture Disc | Pressure Switch | 13J02 | 10 psi | minute |
| | #1 Evaporator Hotwell Vent | Limit Switch | 13J26 | Open/Closed | minute |

# MACT I CONTINUOUS MONITORING SYSTEMS

| Area | Parameter/Equipment | Parameter Monitored | Loop Number | Range/Limit | Threshold/Averaging Time |
|---|---|---|---|---|---|
| Closed Vent System | #1 Evaporator Hotwell Rupture Disc | Pressure Switch | 13J27 | 10 psi | minute |
| | #2 Evaporator Hotwell Vent | Limit Switch | 13J21 | Open/Closed | minute |
| | #2 Evaporator Hotwell Rupture Disc | Pressure Switch | 13J22 | 10 psi | minute |
| | #3 Evaporator Hotwell Vent | Limit Switch | 13J16 | Open/Closed | minute |
| | #3 Evaporator Hotwell Rupture Disc | Pressure Switch | 13J17 | 10 psi | minute |
| | #3 Evaporator Hotwell Loop Seal | Pressure Transmitter | 11PTJ12 | 14" water column | minute |
| | #4 Evaporator Hotwell Vent | Limit Switch | 13J11 | Open/Closed | minute |
| | #4 Evaporator Hotwell Rupture Disc | Pressure Switch | 13J12 | 10 psi | minute |
| | #4 Evaporator Hotwell Rupture Disc | Pressure Switch | 13J15 | 10 psi | minute |
| | #4 Evaporator Hotwell Loop Seal | Pressure Transmitter | 68PTO46 | 14" water column | minute |
| | Stripper Feed Tank Water Seal | Water Seal | 13K09 | 8 psi | minute |
| | Stripper Feed Tank Rupture Disc | Pressure Transmitter | 13K15 | 14.5 psi | minute |
| | Stripper-off-gas to Oxidizer | Limit Switch | 13L04 | Open/Closed | minute |
| | Stripper-off-gas to Oxidizer Rupture Disc | Temperature Transmitter | 13L14 | 160° F | minute |

# MACT I CONTINUOUS MONITORING SYSTEMS

| Area | Parameter/Equipment | Parameter Monitored | Loop Number | Range/Limit | Threshold/Averaging Time |
|---|---|---|---|---|---|
| Closed Vent System | Stripper-off-gas to Boiler | Limit Switch | 59D12 | Open/Closed | |
| | Stripper-off-gas to Boiler Rupture Disc | Pressure Transmitter | 59D35 | 14.5 psi | |
| | NCG Vent to Oxidizer | Limit Switch | 13D70 | Open/Closed | |
| | NCG to Oxidizer Rupture Disc | Pressure Transmitter | 13D65 | 14.5 psi | |
| | NCG to Oxidizer Rupture Disc | Temperature Transmitter | 13D68 | 160° F | |
| | Batch NCG to Boiler Rupture Disc | Pressure Transmitter | 13D63 | 14.5 psi | |
| | NCG Vent to Boiler | Limit Switch | 59D08 | Open/Closed | |
| | NCG to Boiler Rupture Disc | Temperature Transmitter | 59D06 | 160° F | |

# Appendix B

Miscellaneous Information

# Table 1

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Start = | 10/29/02 12:18 | 10/31/02 13:32 | 10/31/02 15:50 | 10/31/02 17:10 |
| End = | 10/29/02 13:23 | 10/31/02 14:43 | 10/31/02 16:56 | 10/31/02 18:16 |

| | Do Stage | | | | | Eop Stage | | D1 Stage | | BP Scrubber | | | | | | | | R-10 Run Status | Test |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BAST/h | | | % Pine | % HW | % Pine | % HW | % Pine | % HW | Flow (gpm) | | | pH | | | Fan Load (%) | Fan Load (amps) | Fan Delta P (in H2O) | ClO2 (STPD) | Cl2 |
| | 43FYB04.PV | Maximum | STDEV | 43AYB04W.PV | Calculation | 43AYD04W.PV | Calculation | 43AYF04W.PV | Calculation | 40FIF31.PV | Minimum | STDEV | 40AIF32.PV | Minimum | STDEV | 40IIF33.PV | 40IIF33.PV | 40PIF03.PV | 37FYF14.PV | ppm |
| Run 1 | 50 | 52 | 0.6 | 100.0 | 0.0 | 100.0 | 0.0 | 100.0 | 0.0 | 1262 | 1261 | 0.6 | 9.1 | 9.0 | 0.05 | 83.9 | 15.1 | 20.9 | 0.00 | 0.233 |
| Run 2 | 50 | 52 | 0.8 | 100.0 | 0.0 | 100.0 | 0.0 | 100.0 | 0.0 | 1253 | 1252 | 1.0 | 9.3 | 9.3 | 0.01 | 85.5 | 15.4 | 21.4 | 31.6 | 0.073 |
| Run 3 | 50 | 52 | 0.6 | 100.0 | 0.0 | 100.0 | 0.0 | 100.0 | 0.0 | 1258 | 1257 | 0.8 | 9.3 | 9.3 | 0.00 | 86.4 | 15.4 | 21.4 | 37.3 | 0.020 |
| Run 4 | 50 | 52 | 0.6 | 100.0 | 0.0 | 100.0 | 0.0 | 100.0 | 0.0 | 1262 | 1260 | 0.9 | 9.3 | 9.2 | 0.02 | 85.8 | 15.4 | 21.4 | 30.3 | 0.032 |
| | | | | | | | | | | Average = | 1257 | | | 9.2 | | 85.1 | 15.3 | | | |

Table 2

| No. 3 Bleach Plant | | | | | |
|---|---|---|---|---|---|
| **Parameter** | | **Test Condition** | **Proposed Operating Value** | **Monitoring Frequency** | **Averaging Time** |
| pH, Minimum | | 9.0 | 9.0 | 5 min | 3-hr., rolling |
| Scrubber flow, Minimum | (gpm) | 1252 | 1252 | 5 min | 3-hr., rolling |
| Fan load Minimum | (amps) | 15.11[a] | 10.8[c] | 5 min | 3-hr., rolling |
| Fan load Maximum | (amps) | 15.45[b] | 19.3[d] | 5 min | 3-hr., rolling |
| Fan "No Load" | (amps) | 9.8 | | | |

[a] Equivalent to 83.9% Load, using Equation 1

[b] Equivalent to 85.8% Load, using Equation 1

[c] Equivalent to 41.9% Load using Equation 2

[d] Equivalent to75% Load using Equation 2

Figure 1

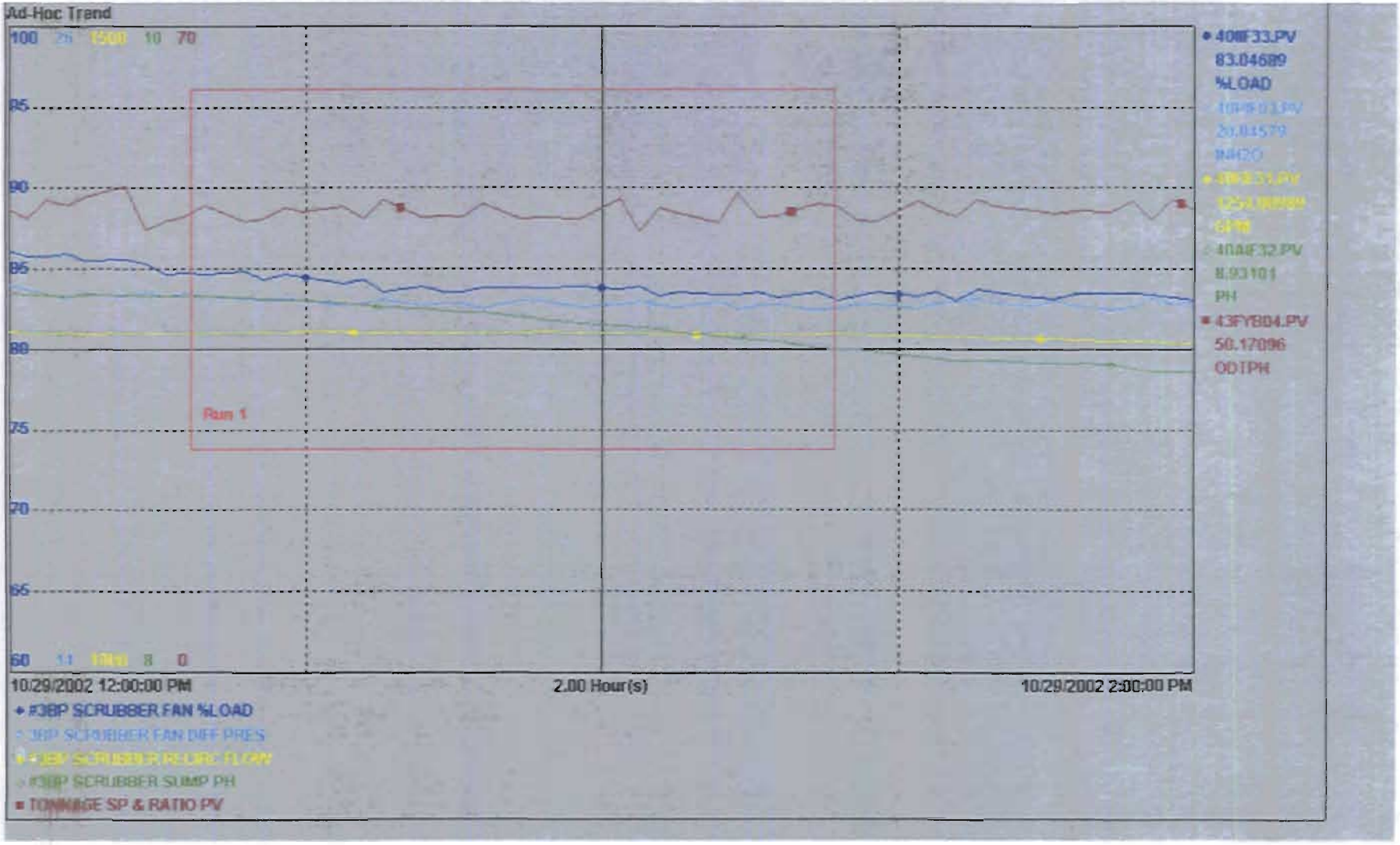

Ad-Hoc Trend
100
95
90
85
80
75
70
65
60
Run 1
10/29/2002 12:00:00 PM
2.00 Hour(s)
10/29/2002 2:00:00 PM
#38P SCRUBBER FAN %LOAD
83.04689
%LOAD
PH
50.17096
ODTPH

Figure 2

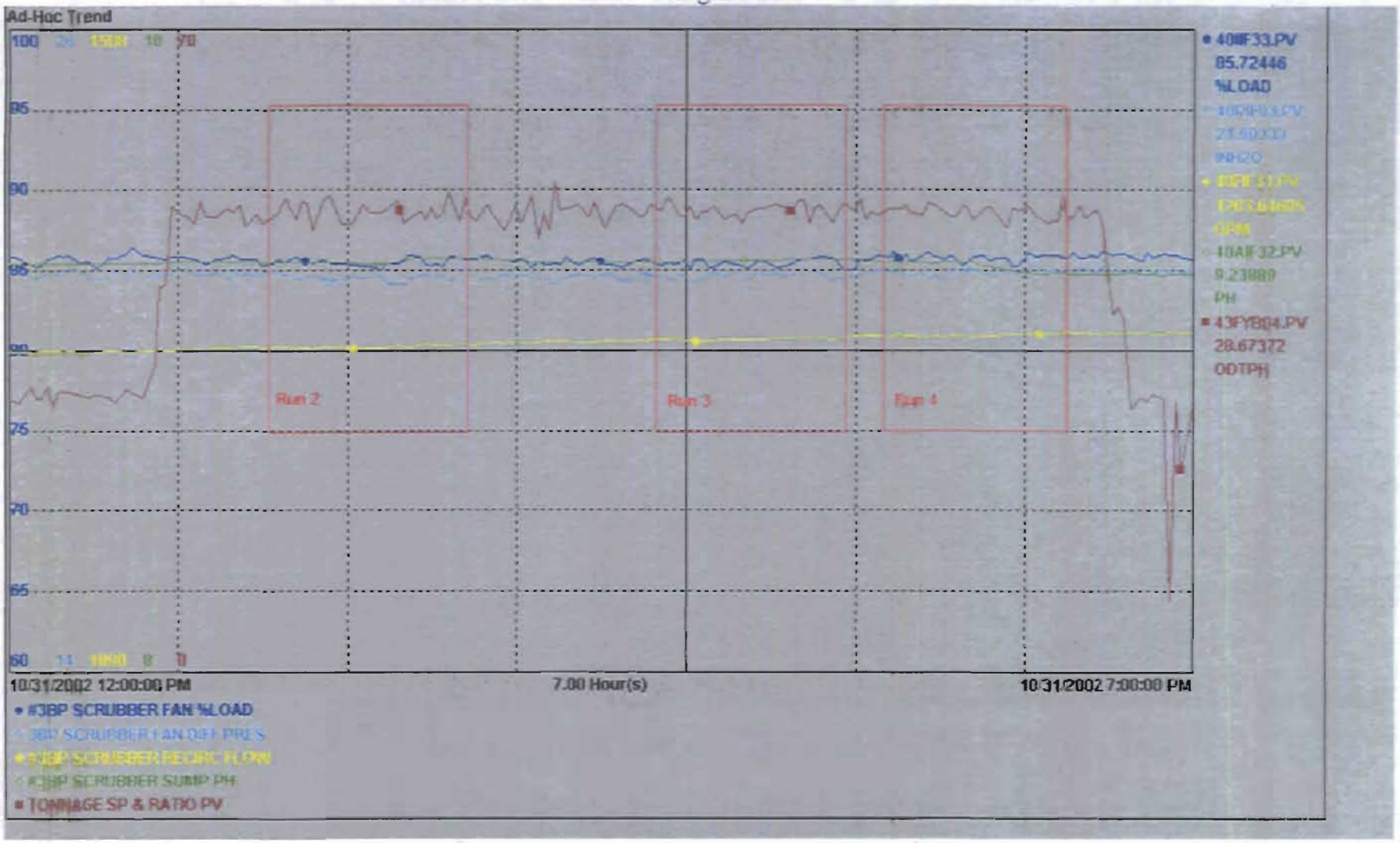
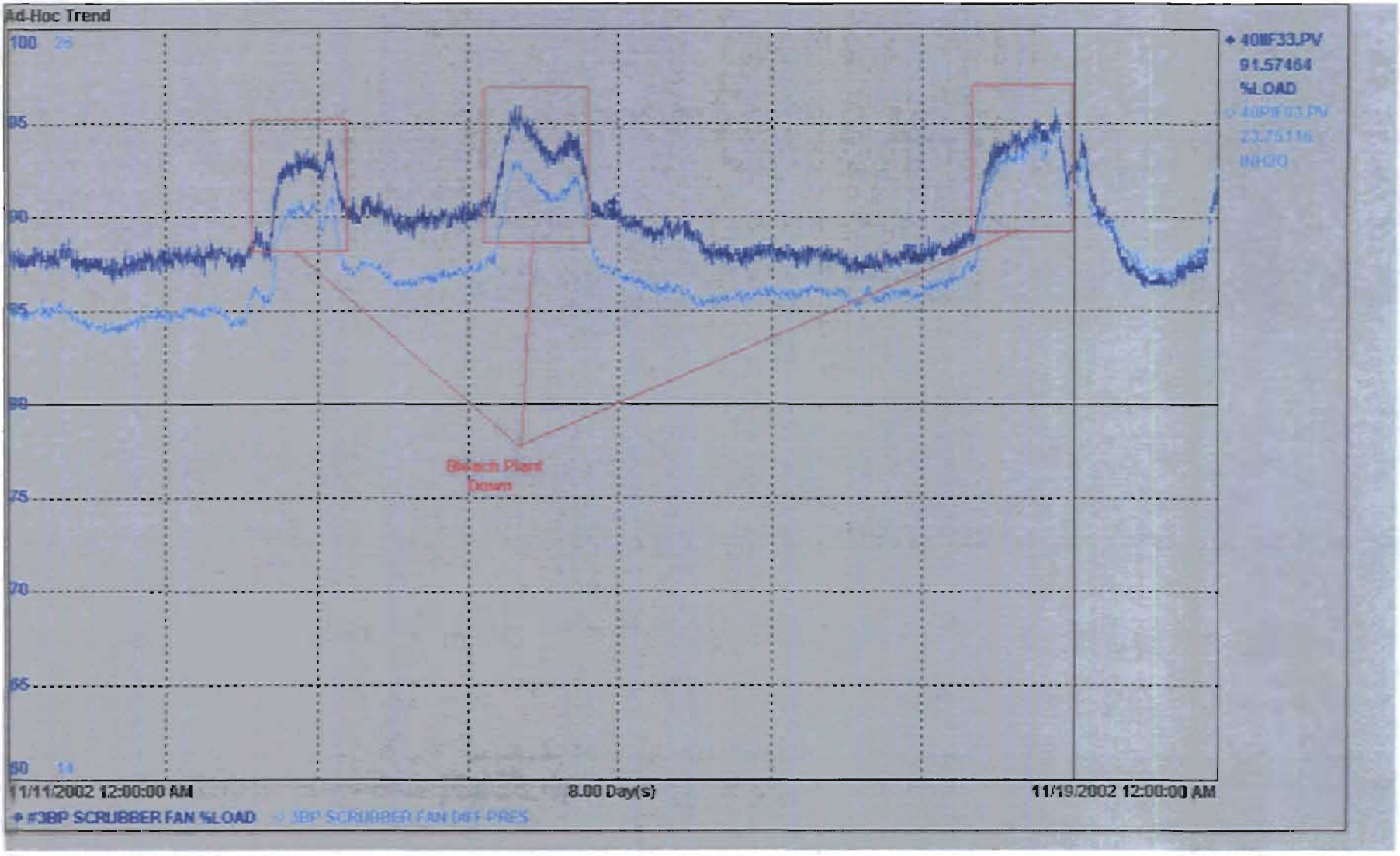

Ad-Hoc Trend
100
95
90
85
80
75
70
65
60
Run 2
Run 3
Run 4
40IF33.PV
85.72446
%LOAD
43FY804.PV
28.67372
ODTPH
10/31/2002 12:00:00 PM
7.00 Hour(s)
10/31/2002 7:00:00 PM
#3BP SCRUBBER FAN %LOAD
TONNAGE SP & RATIO PV

Figure 3


Ad-Hoc Trend
100
95
90
85
80
75
70
65
60
40IIF33.PV
91.57464
%LOAD
Bleach Plant
Down
11/11/2002 12:00:00 AM
8.00 Day(s)
11/19/2002 12:00:00 AM
#3BP SCRUBBER FAN %LOAD

# Appendix C

Raw Data
(5-minute averages)

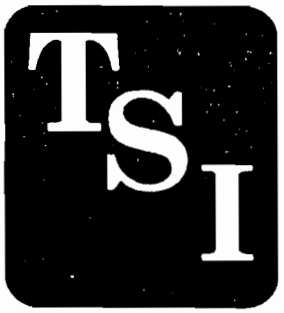
| pH Run 1 | | pH Run 2 | | pH Run 3 | | pH Run 4 | |
|---|---|---|---|---|---|---|---|
| 29-Oct-02 12:18:00 | 9.2 | 31-Oct-02 13:32:00 | 9.3 | 31-Oct-02 15:50:00 | 9.3 | 31-Oct-02 17:10:00 | 9.3 |
| 29-Oct-02 12:23:00 | 9.2 | 31-Oct-02 13:37:00 | 9.3 | 31-Oct-02 15:55:00 | 9.3 | 31-Oct-02 17:15:00 | 9.3 |
| 29-Oct-02 12:28:00 | 9.1 | 31-Oct-02 13:42:00 | 9.3 | 31-Oct-02 16:00:00 | 9.3 | 31-Oct-02 17:20:00 | 9.3 |
| 29-Oct-02 12:33:00 | 9.1 | 31-Oct-02 13:47:00 | 9.3 | 31-Oct-02 16:05:00 | 9.3 | 31-Oct-02 17:25:00 | 9.3 |
| 29-Oct-02 12:38:00 | 9.1 | 31-Oct-02 13:52:00 | 9.3 | 31-Oct-02 16:10:00 | 9.3 | 31-Oct-02 17:30:00 | 9.3 |
| 29-Oct-02 12:43:00 | 9.1 | 31-Oct-02 13:57:00 | 9.3 | 31-Oct-02 16:15:00 | 9.3 | 31-Oct-02 17:35:00 | 9.3 |
| 29-Oct-02 12:48:00 | 9.1 | 31-Oct-02 14:02:00 | 9.3 | 31-Oct-02 16:20:00 | 9.3 | 31-Oct-02 17:40:00 | 9.3 |
| 29-Oct-02 12:53:00 | 9.1 | 31-Oct-02 14:07:00 | 9.3 | 31-Oct-02 16:25:00 | 9.3 | 31-Oct-02 17:45:00 | 9.3 |
| 29-Oct-02 12:58:00 | 9.1 | 31-Oct-02 14:12:00 | 9.3 | 31-Oct-02 16:30:00 | 9.3 | 31-Oct-02 17:50:00 | 9.3 |
| 29-Oct-02 13:03:00 | 9.1 | 31-Oct-02 14:17:00 | 9.3 | 31-Oct-02 16:35:00 | 9.3 | 31-Oct-02 17:55:00 | 9.2 |
| 29-Oct-02 13:08:00 | 9.0 | 31-Oct-02 14:22:00 | 9.3 | 31-Oct-02 16:40:00 | 9.3 | 31-Oct-02 18:00:00 | 9.2 |
| 29-Oct-02 13:13:00 | 9.0 | 31-Oct-02 14:27:00 | 9.3 | 31-Oct-02 16:45:00 | 9.3 | 31-Oct-02 18:05:00 | 9.2 |
| 29-Oct-02 13:18:00 | 9.0 | 31-Oct-02 14:32:00 | 9.3 | 31-Oct-02 16:50:00 | 9.3 | 31-Oct-02 18:10:00 | 9.2 |
| | | 31-Oct-02 14:37:00 | 9.3 | | | | |

| Flow Run 1 | | Flow Run 2 | | Flow Run 3 | | Flow Run 4 | |
|---|---|---|---|---|---|---|---|
| 29-Oct-02 12:18:00 | 1263 | 31-Oct-02 13:32:00 | 1253 | 31-Oct-02 15:50:00 | 1258 | 31-Oct-02 17:10:00 | 1261 |
| 29-Oct-02 12:23:00 | 1262 | 31-Oct-02 13:37:00 | 1253 | 31-Oct-02 15:55:00 | 1258 | 31-Oct-02 17:15:00 | 1261 |
| 29-Oct-02 12:28:00 | 1263 | 31-Oct-02 13:42:00 | 1252 | 31-Oct-02 16:00:00 | 1257 | 31-Oct-02 17:20:00 | 1261 |
| 29-Oct-02 12:33:00 | 1263 | 31-Oct-02 13:47:00 | 1252 | 31-Oct-02 16:05:00 | 1257 | 31-Oct-02 17:25:00 | 1261 |
| 29-Oct-02 12:38:00 | 1263 | 31-Oct-02 13:52:00 | 1253 | 31-Oct-02 16:10:00 | 1258 | 31-Oct-02 17:30:00 | 1261 |
| 29-Oct-02 12:43:00 | 1262 | 31-Oct-02 13:57:00 | 1252 | 31-Oct-02 16:15:00 | 1258 | 31-Oct-02 17:35:00 | 1261 |
| 29-Oct-02 12:48:00 | 1263 | 31-Oct-02 14:02:00 | 1252 | 31-Oct-02 16:20:00 | 1258 | 31-Oct-02 17:40:00 | 1261 |
| 29-Oct-02 12:53:00 | 1263 | 31-Oct-02 14:07:00 | 1252 | 31-Oct-02 16:25:00 | 1259 | 31-Oct-02 17:45:00 | 1262 |
| 29-Oct-02 12:58:00 | 1262 | 31-Oct-02 14:12:00 | 1252 | 31-Oct-02 16:30:00 | 1259 | 31-Oct-02 17:50:00 | 1262 |
| 29-Oct-02 13:03:00 | 1262 | 31-Oct-02 14:17:00 | 1253 | 31-Oct-02 16:35:00 | 1260 | 31-Oct-02 17:55:00 | 1262 |
| 29-Oct-02 13:08:00 | 1261 | 31-Oct-02 14:22:00 | 1254 | 31-Oct-02 16:40:00 | 1259 | 31-Oct-02 18:00:00 | 1263 |
| 29-Oct-02 13:13:00 | 1262 | 31-Oct-02 14:27:00 | 1254 | 31-Oct-02 16:45:00 | 1259 | 31-Oct-02 18:05:00 | 1263 |
| 29-Oct-02 13:18:00 | 1261 | 31-Oct-02 14:32:00 | 1254 | 31-Oct-02 16:50:00 | 1259 | 31-Oct-02 18:10:00 | 1263 |
| | | 31-Oct-02 14:37:00 | 1255 | | | | |

| Fan Load (Amps) Run 1 | | Fan Load (Amps) Run 2 | | Fan Load (Amps) Run 3 | | Fan Load (Amps) Run 4 | |
|---|---|---|---|---|---|---|---|
| 29-Oct-02 12:18:00 | 15.26 | 31-Oct-02 13:32:00 | 15.40 | 31-Oct-02 15:50:00 | 15.37 | 31-Oct-02 17:10:00 | 15.47 |
| 29-Oct-02 12:23:00 | 15.23 | 31-Oct-02 13:37:00 | 15.44 | 31-Oct-02 15:55:00 | 15.39 | 31-Oct-02 17:15:00 | 15.44 |
| 29-Oct-02 12:28:00 | 15.20 | 31-Oct-02 13:42:00 | 15.43 | 31-Oct-02 16:00:00 | 15.39 | 31-Oct-02 17:20:00 | 15.45 |
| 29-Oct-02 12:33:00 | 15.14 | 31-Oct-02 13:47:00 | 15.41 | 31-Oct-02 16:05:00 | 15.38 | 31-Oct-02 17:25:00 | 15.48 |
| 29-Oct-02 12:38:00 | 15.09 | 31-Oct-02 13:52:00 | 15.40 | 31-Oct-02 16:10:00 | 15.38 | 31-Oct-02 17:30:00 | 15.45 |
| 29-Oct-02 12:43:00 | 15.07 | 31-Oct-02 13:57:00 | 15.38 | 31-Oct-02 16:15:00 | 15.38 | 31-Oct-02 17:35:00 | 15.39 |
| 29-Oct-02 12:48:00 | 15.10 | 31-Oct-02 14:02:00 | 15.36 | 31-Oct-02 16:20:00 | 15.36 | 31-Oct-02 17:40:00 | 15.46 |
| 29-Oct-02 12:53:00 | 15.11 | 31-Oct-02 14:07:00 | 15.34 | 31-Oct-02 16:25:00 | 15.40 | 31-Oct-02 17:45:00 | 15.45 |
| 29-Oct-02 12:58:00 | 15.10 | 31-Oct-02 14:12:00 | 15.38 | 31-Oct-02 16:30:00 | 15.35 | 31-Oct-02 17:50:00 | 15.44 |
| 29-Oct-02 13:03:00 | 15.05 | 31-Oct-02 14:17:00 | 15.43 | 31-Oct-02 16:35:00 | 15.39 | 31-Oct-02 17:55:00 | 15.38 |
| 29-Oct-02 13:08:00 | 15.03 | 31-Oct-02 14:22:00 | 15.47 | 31-Oct-02 16:40:00 | 15.43 | 31-Oct-02 18:00:00 | 15.47 |
| 29-Oct-02 13:13:00 | 15.03 | 31-Oct-02 14:27:00 | 15.38 | 31-Oct-02 16:45:00 | 15.45 | 31-Oct-02 18:05:00 | 15.48 |
| 29-Oct-02 13:18:00 | 15.03 | 31-Oct-02 14:32:00 | 15.40 | 31-Oct-02 16:50:00 | 15.42 | 31-Oct-02 18:10:00 | 15.47 |
| | | 31-Oct-02 14:37:00 | 15.45 | | | | |

| Fan Load (%) Run 1 | | Fan Load (%) Run 2 | | Fan Load (%) Run 3 | | Fan Load (%) Run 4 | |
|---|---|---|---|---|---|---|---|
| 29-Oct-02 12:18:00 | 84.7 | 31-Oct-02 13:32:00 | 85.5 | 31-Oct-02 15:50:00 | 85.3 | 31-Oct-02 17:10:00 | 85.9 |
| 29-Oct-02 12:23:00 | 84.6 | 31-Oct-02 13:37:00 | 85.7 | 31-Oct-02 15:55:00 | 85.4 | 31-Oct-02 17:15:00 | 85.7 |
| 29-Oct-02 12:28:00 | 84.4 | 31-Oct-02 13:42:00 | 85.6 | 31-Oct-02 16:00:00 | 85.4 | 31-Oct-02 17:20:00 | 85.8 |
| 29-Oct-02 12:33:00 | 84.0 | 31-Oct-02 13:47:00 | 85.5 | 31-Oct-02 16:05:00 | 85.4 | 31-Oct-02 17:25:00 | 85.9 |
| 29-Oct-02 12:38:00 | 83.8 | 31-Oct-02 13:52:00 | 85.5 | 31-Oct-02 16:10:00 | 85.4 | 31-Oct-02 17:30:00 | 85.8 |
| 29-Oct-02 12:43:00 | 83.6 | 31-Oct-02 13:57:00 | 85.4 | 31-Oct-02 16:15:00 | 85.4 | 31-Oct-02 17:35:00 | 85.4 |
| 29-Oct-02 12:48:00 | 83.8 | 31-Oct-02 14:02:00 | 85.3 | 31-Oct-02 16:20:00 | 85.2 | 31-Oct-02 17:40:00 | 85.8 |
| 29-Oct-02 12:53:00 | 83.9 | 31-Oct-02 14:07:00 | 85.1 | 31-Oct-02 16:25:00 | 85.5 | 31-Oct-02 17:45:00 | 85.8 |
| 29-Oct-02 12:58:00 | 83.8 | 31-Oct-02 14:12:00 | 85.4 | 31-Oct-02 16:30:00 | 85.2 | 31-Oct-02 17:50:00 | 85.7 |
| 29-Oct-02 13:03:00 | 83.6 | 31-Oct-02 14:17:00 | 85.6 | 31-Oct-02 16:35:00 | 85.4 | 31-Oct-02 17:55:00 | 85.4 |
| 29-Oct-02 13:08:00 | 83.4 | 31-Oct-02 14:22:00 | 85.9 | 31-Oct-02 16:40:00 | 85.6 | 31-Oct-02 18:00:00 | 85.9 |
| 29-Oct-02 13:13:00 | 83.4 | 31-Oct-02 14:27:00 | 85.4 | 31-Oct-02 16:45:00 | 85.8 | 31-Oct-02 18:05:00 | 85.9 |
| 29-Oct-02 13:18:00 | 83.4 | 31-Oct-02 14:32:00 | 85.5 | 31-Oct-02 16:50:00 | 85.6 | 31-Oct-02 18:10:00 | 85.9 |
| | | 31-Oct-02 14:37:00 | 85.7 | | | | |

Attachment

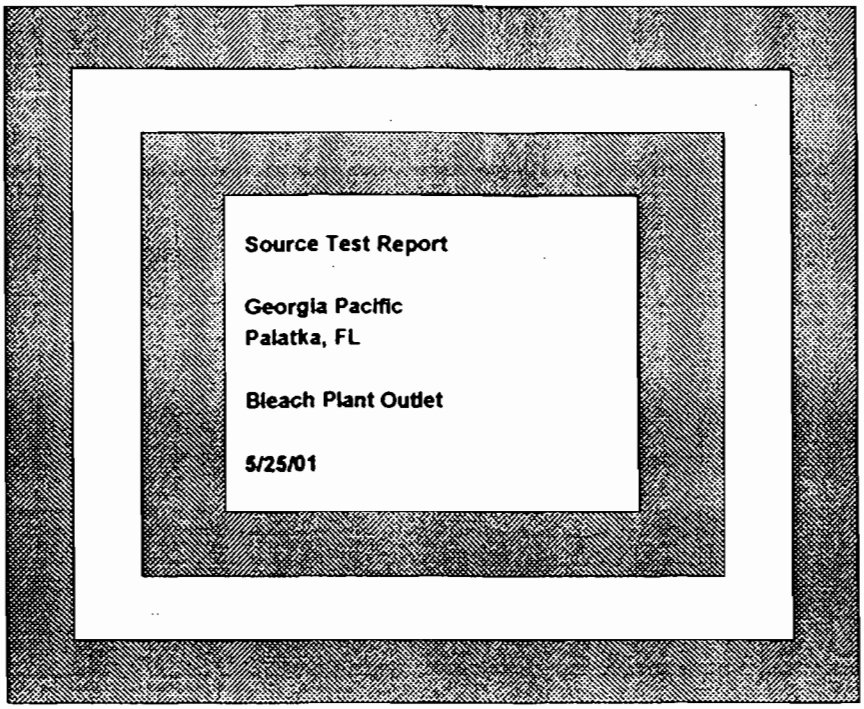



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David Salter
**David Salter**

## USE OF THIS REPORT AND INFORMATION INCLUDED

This Report and the information contained is the property of the individual or organization named on the face hereof and may be freely distributed in its present form.

## REPORT CERTIFICATION

Technical Services, Inc. (TSI) has used its professional experience and best professional efforts in performing this compliance test. I have reviewed the results of these tests and to the best of my knowledge and belief they are true and correct.

**REPORT NO.** 0104A07

Harvey C. Gray, Jr.

HARVEY C. GRAY, JR.
DATE:

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# I. Introduction

Compliance testing for Chlorinated Haps emissions and Carbon Monoxide emissions from the Bleach Plant Scrubber, located at the Georgia Pacific Paper facility in Palatka, FL., was performed on May 25th, 2001. Three (3) test runs, each lasting one (1) hour, were completed on this source for both tests.

Testing and analytical procedures were in accordance with EPA's Methods ten (10), twenty-six (26A), and Florida DEP requirements.

We wish to express our appreciation to Mr. Joe Taylor and the operating staff at Georgia Pacific for their valuable assistance in the successful completion of this project.

# II. Summary and Discussion of Results

Results of the compliance tests are summarized in the following tables. Complete emissions data, along with supportive field and analytical data, are included in Appendices A, B, C, and G.

The Bleach Plant Scrubber was within compliance during the tests. The average emissions for Chlorinated Haps were 0.0089 lbs/hr, with an allowable emissions of 0.36 lbs/hr. The average emissions for Carbon Monoxide were 44.72 lbs/hr, with an allowable emissions of 46.0 lbs/hr.

T S I

## Volumetric Flow and Emission Output - Table I

**FACILITY:** Georgia Pacific
**LOCATION:** Palatka, FL

**SOURCE:** Bleach Plant Outlet

| Date | Run Number | Chlorinated Haps Emissions GR/SCF | LB/HR | ppm, vol. | Vol. Flow Rate ACFM | SCFMD | Adjusted Volume SCFD | Percent H20 | Percent Isokinetic |
|---|---|---|---|---|---|---|---|---|---|
| 5/25/01 | 1 | 0.00008 | 0.0098 | 0.13 | 15440.0 | 14275.0 | 35.391 | 4.6 | 96.4 |
| 5/25/01 | 2 | 0.00007 | 0.0083 | 0.11 | 15256.0 | 14178.0 | 36.388 | 5.1 | 99.8 |
| 5/25/01 | 3 | 0.00007 | 0.0084 | 0.11 | 15409.0 | 14413.0 | 36.716 | 5.4 | 99.0 |
| **Mean** | | 0.00007 | 0.0089 | 0.12 | 15368.3 | 14288.7 | 36.165 | 5.0 | 98.4 |

**Mean determined as arithmetic average of the results for each of the three runs.**

**REMARKS:** MACT requires <10 ppm chlorinated HAPs

## GEORGIA PACIFIC - PALATKA, FLORIDA BLEACH PLANT - SUMMARY OF CARBON MONOXIDE RESULTS - MAY 25 - 26, 2001

| | START TIME | END TIME | STACK FLOW scfm-d | CARBON MONOXIDE, ppm | CARBON MONOXIDE, lbs/hr |
|---|---|---|---|---|---|
| RUN 1 | 21:50 | 22:49 | 14183 | 670.4 | 41.5 |
| RUN 2 | 23:02 | 0:01 | 14406 | 766.3 | 48.2 |
| RUN 3A | 0:12 | 2:13 | 14331 | 712.0 | 44.5 |
| **TEST AVERAGE** | | | **14307** | **716.2** | **44.7** |

*NOTE - DURING TEST RUN NUMBER THREE THE Eop MIXER TRIPPED. THE BLEACH PLANT PRODUCTION DECREASED AND THE TEST WAS SUSPENDED. ONCE NORMAL PRODUCTION RESUMED THE TEST RESTARTED.*

## III. Process Description And Operation

## III. Process Description and Operation

The bleaching process is an elemental chlorine-free (ECF) process. The CLO2 is produced on site.

The bleaching process consists of the staged introduction of CLO2 to the pulp slurry followed by washing of the bleached pulp. The off gases from all stages of the process are collected and passed through a wet scrubber utilizing an alkaline scrubbing solution.

## IV. Sampling Point Location

T S I

# Table III
## Air Report - Sampling Point Locations

**Facility** Georgia Pacific
**Location** Palatka, FL
**Source Name** Bleach Plant Outlet

**Stack Interior Diameter = 42.00 inches**

| Sample Point Number | Inches Inside Stack Wall |
|---|---|
| 1 | 1.85 |
| 2 | 6.13 |
| 3 | 12.43 |
| 4 | 29.57 |
| 5 | 35.87 |
| 6 | 40.15 |

**Port Length** 7 inches

### Distances From Nearest Disturbance

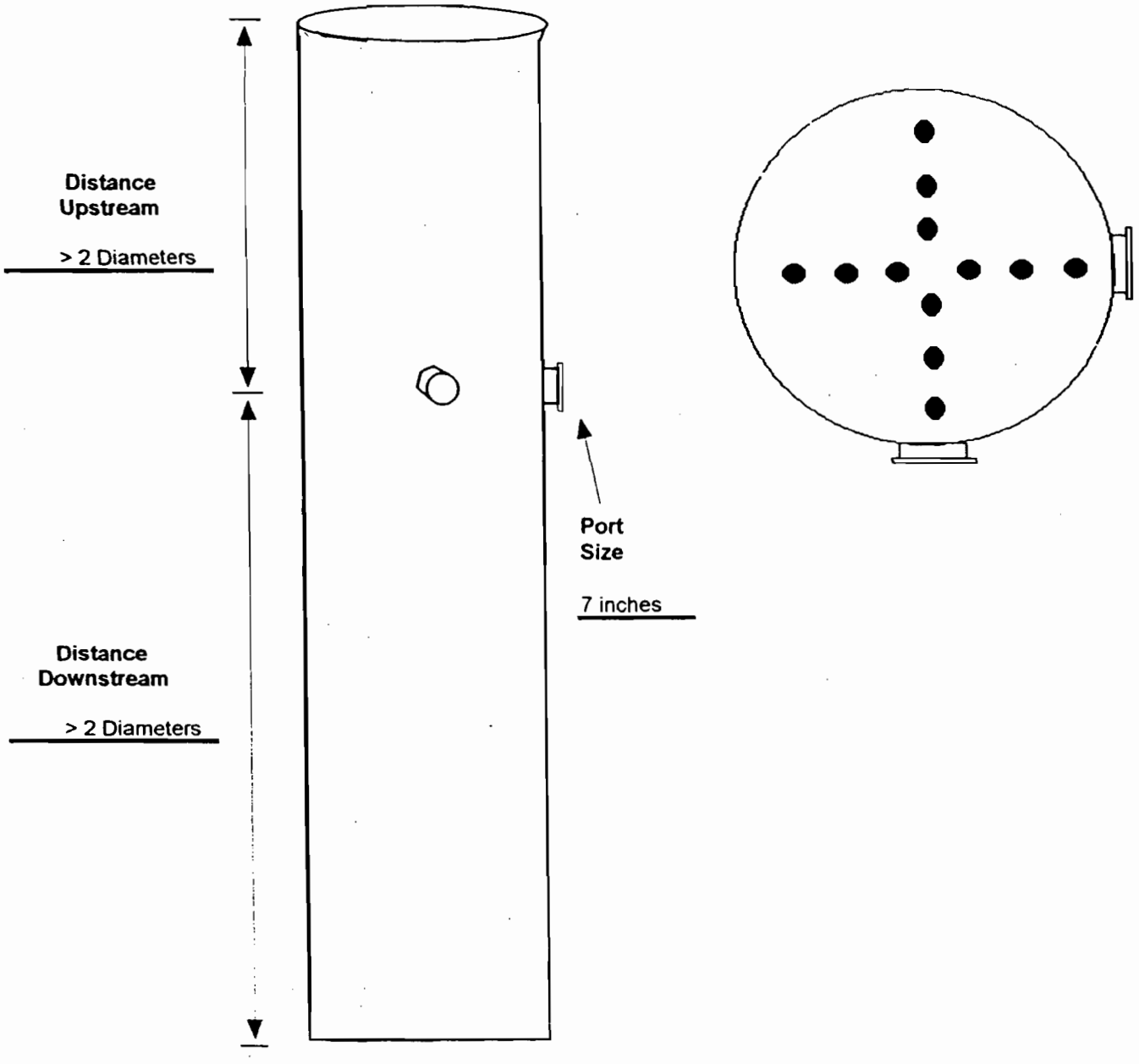
| Source | Stack Distance |
|---|---|
| Downstream | > 8 diameters |
| Upstream | > 2 Diameters |

**The above mentioned Downstream and Upstream distances are approximate distances.**

T S I

# Air Report - Sampling Port Location Diagram

| | | | |
|---|---|---|---|
| Facility | Georgia Pacific | Date | |
| Location | Palatka, FL | | |
| Source | Bleach Plant Outlet | | |



# V. Field And Analytical Procedures

# METHOD 10

## DETERMINATION OF CARBON MONOXIDE EMISSIONS FROM STATIONARY SOURCES

### 1. Principle and Applicability

1.1 Principle. An integrated or continuous gas sample is extracted from a sampling point and analyzed for carbon monoxide (CO) content using a Luft-type nondispersive infrared analyzer (NDIR) or equivalent.

1.2 Applicability. This method is applicable for the determination of carbon monoxide emissions from stationary sources only when specified by the test procedures contained in this text or otherwise specified by the Director. The test procedure will indicate whether a continuous or an integrated sample is to be used.

### 2. Range and Sensitivity

2.1 Range. 0 to 1,000 ppm.

2.2 Sensitivity. Minimum detectable concentration is 20 ppm for a 0 to 1,000 ppm span.

### 3. Interferences

Any substance having a strong absorption of infrared energy will interfere to some extent. For example, discrimination ratios for water ($H_2O$) and carbon dioxide ($CO_2$) are 3.5 percent $H_2O$ per 7 ppm CO and 10 percent $CO_2$ per 10 ppm CO, respectively, for devices measuring in the 1,500 to 3,000 ppm range. For devices measuring in the 0 to 100 ppm range, interference ratios can be as high as 3.5 percent H2O per 25 ppm CO and 10 percent CO2 per 50 ppm CO. The use of silica gel and ascarite traps will alleviate the major interference problems. The measured gas volume must be corrected if these traps are used.

### 4. Precision and Accuracy

4.1 Precision. The precision of most NDIR analyzers is approximately ± 2 percent of span.

4.2 Accuracy. The accuracy of most NDIR analyzers is approximately ± 5 percent of span after calibration.

### 5. Apparatus

5.1 Continuous sample (Figure 10-1).

5.1.1 Probe. Stainless steel or sheathed Pyrex glass, equipped with a filter to remove particulate matter.

5.1.2 Air-cooler condenser or equivalent. To remove any excess moisture.

5.2 Integrated sample (Figure 10.2).

5.2.1 Probe. Stainless steel or sheathed Pyrex glass, equipped with a filter to remove particulate matter.

5.2.2 Air-cooler condenser or equivalent. To remove any excess moisture.

5.2.3 Valve. Needle valve, or equivalent, to adjust flow rate.

5.2.4 Pump. Leak-free diaphragm type, or equivalent, to transport gas.

5.2.5 Rate meter. Rotameter, or equivalent, to measure a flow range from 0 to 1.0 liter per min. (0.035 cfm).

5.2.6 Flexible bag. Tedlar, or equivalent, with a capacity of 60 to 90 liters (2 to 3 $ft^3$). Leak-test the bag in the laboratory before using by evacuating bag with a pump followed by a dry gas meter. When evacuation is complete, there should be no flow through the meter.

5.2.7 Pitot tube. Type S, or equivalent, attached to the probe so that the sampling rate can be regulated proportional to the stack gas velocity when velocity is varying with the time or a sample traverse is conducted.

5.3 Analysis (Figure 10-3).

5.3.1 Carbon monoxide analyzer. Nondispersive infrared spectrometer, or equivalent. This instrument should be demonstrated, preferably by the manufacturer, to meet or exceed manufacturer's specifications and those described in this method.

5.3.2 Drying tube. To contain approximately 200 g of silica gel.

5.3.3 Calibration gas. Refer to Section 6.1.

5.3.4 Filter. As recommended by NDIR manufacturer.

5.3.5 $CO_2$ removal tube. To contain approximately 500 g of ascarite.

5.3.6 Ice water bath. For ascarite and silica gel tubes.

5.3.7 Valve. Needle valve, or equivalent, to adust flow rate.

5.3.8 Rate meter. Rotameter or equivalent to measure gas flow rate of 0 to 1.0 liter per minute (0.035 cfm) through NDIR.

5.3.9 Recorder (optional). To provide permanent record of NDIR readings.

## 6. Reagents

6.1 Calibration gases. Known concentration of CO in nitrogen ($N_2$) for instrument span, prepurified grade of $N_2$ for zero, and two additional concentrations corresponding approximately to 60 percent and 30 percent span. The span concentration shall not exceed 1.5 times the applicable source performance standard. The calibration gases shall be certified by the manufacturer to be within ± 2 percent of the specified concentration.

6.2 Silica gel. Indicating type, 6 to 16 mesh, dried at 175°C (347°F) for 2 hours.

6.3 Ascarite. Commercially available.

## 7. Procedure

7.1 Sampling

7.1.1 Continuous sampling. Set up the equipment as shown in Figure 10-1 making sure all connections are leak free. Place the probe in the stack at a sampling point and purge the sampling line. Connect the analyzer and begin drawing sample into the analyzer. Allow 5 minutes for the system to stabilize, then record the analyzer reading as required by the test procedure. (See Sections 7.2 and 8). $CO_2$ content of the gas may be determined by using the Method 3 integrated sample procedure, or by weighing the ascarite $CO_2$ removal tube and computing $CO_2$ concentration from the gas volume sampled and the weight gain of the tube.

7.1.2 Integrated sampling. Evacuate the flexible bag. Set up the equipment as shown in Figure 10-2 with the bag

disconnected. Place the probe in the stack and purge the sampling line. Connect the bag, making sure that all connections are leak free. Sample at a rate proportional to the stack velocity. $CO_2$ content of the gas may be determined by using the Method 3 integrated sample procedures, or by weighing the ascarite $CO_2$ removal tube and computing $CO_2$ concentration from the gas volume sampled and the weight gain of the tube.

7.2 CO Analysis. Assemble the apparatus as shown in Figure 10-3, calibrate the instrument, and perform other required operations as described in Section 8. Purge analyzer with $N_2$ prior to introduction of each sample. Direct the sample stream through the instrument for the test period, recording the readings. Check the zero and span again after the test to assure that any drift or malfunction is detected. Record the sample data on Table 10-1.

## 8. Calibration

Assemble the apparatus according to Figure 10-3. Generally an instrument requires a warm-up period before stability is obtained. Follow the manufacturer's instructions for specific procedure. Allow a minimum time of 1 hour for warm-up. During this time check the sample conditioning apparatus, i.e., filter, condenser, drying tube, and $CO_2$ removal tube, to ensure that each component is in good operating condition. Zero and calibrate the instrument according to the manufacturer's procedures using, respectively, nitrogen and the calibration gases.

TABLE 10-1. FIELD DATA

Location..... Comments:

Test.....

Date.....

Operator.....

| Clock Time | Rotameter setting, liters per minute (cubic feet per minute) |
|---|---|

## 9. Calculation

Calculate the concentration of carbon monoxide in the stack using Equation 10-1.

$$C_{CO_{stack}} = C_{CO_{NDIR}} (1-F_{CO_2})$$

where:

$C_{CO_{stack}}$ = concentration of CO in stack, ppm by volume (dry basis).

$C_{CO_{DNIR}}$ = concentration of CO measured by NDIR analyzer, ppm by volume (dry basis).

$F_{CO_2}$ = volume fraction of $CO_2$ in sample, i.e., percent $CO_2$ from Orsat analysis divided by 100.

## 10. Alternative Procedure

10.1 Interference Trap. The sample condition system described in Method 10A, Sections 2.1.2 and 4.2 may be used as an alternate to the silica gel and ascarite traps.

## 11. Bibliography

1. McElroy, Frank, The Intertech NDIR-CO Analyzer, Presented at 11th Methods Conference on Air Pollution, University of California, Berkeley, Calif., April 1, 1970.

2. Jacobs, M.B., et al., Continuous Determination of Carbon Monoxide and Hydrocarbons in Air by a Modified Infrared Analyzer, J. Air Pollution Control Association, 9(2):110-114, August 1959.

3. MSA LIRA Infrared Gas and Liquid Analyzer Instruction Book, Mine Safety Appliances Co., Technical Products Division, Pittsburgh, Pa.

4. Models 215A, 315A, and 415A Infrared Analyzers, Beckman Instruments Inc., Beckman Instructions 1635-B, Fullerton, Calif., October 1967.

5. Continuous CO Monitoring System, Model A5611, Intertech Corp., Princeton, N.J.

6. UNOR Infrared Gas Analayzers, Bendix Corp., Ronceverte, West Virginia.

ADDENDA

A. Performance Specifications for NDIR Carbon Monoxide Analyzers.

| | |
|---|---|
| Range (minimum) | 0-1000 ppm. |
| Output (minimum) | 0-10mV. |
| Minimum detectable sensitivity | 20 ppm. |
| Rise time, 90 percent (maximum) | 30 seconds. |
| Fall time, 90 percent (maximum) | 30 seconds. |
| Zero drift (maximum) | 10% in 8 hours. |
| Span drift (maximum) | 10% in 8 hours. |
| Precision (minimum) | ±2% of full scale. |
| Noise (maximum) | ±1% of full scale. |
| Linearity (maximum deviation) | 2% of full scale. |
| Interference rejection ration | $CO_2$--1000 to 1, $H_2O$--500 to 1. |

B. Definitions of Performance Specifications.

Range -- The minimum and maximum measurement limits.

Output -- Electrical signal which is proportional to the measurement; intended for connection to readout or data processing devices. Usually expressed as millivolts or milliamps full scale at a given impedance.

Full scale -- The maximum measuring limit for a given range.

Minimum detectable sensitivity -- The smallest amount of input concentration that can be detected as the concentration approaches zero.

Accuracy -- The degree of agreement between a measured value and the true value; usually expressed as ± percent of full scale.

Time to 90 percent response -- The time interval from a step change in the input concentration at the instrument inlet to a reading of 90 percent of the ultimate recorded concentration.

Rise Time (90 percent) -- The interval between initial response time and time to 90 percent response after a step increase in the inlet concentration.

Fall Time (90 percent) -- The interval between initial response time and time to 90 percent response after a step decrease in the inlet concentration.

Zero Drift -- The change in instrument output over a stated time period, usually 24 hours, of unadjusted continuous operation when the input concentration is zero; usually expressed as percent full scale.

Span Drift -- The change in instrument output over a stated time period, usually 24 hours of unadjusted continuous operation when the input concentration is a stated upscale value; usually expressed as percent full scale.

Precision -- The degree of agreement between repeated measurements of the same concentration, expressed as the average deviation of the single results from the mean.

Noise -- Spontaneous deviations from a mean output not caused by input concentration changes.

Linearity -- The maximum deviation between an actual instrument reading and the reading predicted by a straight line drawn between upper and lower calibration points.

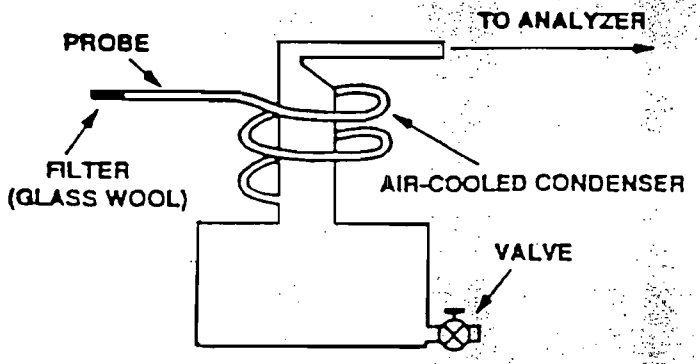



Figure 10-1. Continuous Sampling Train

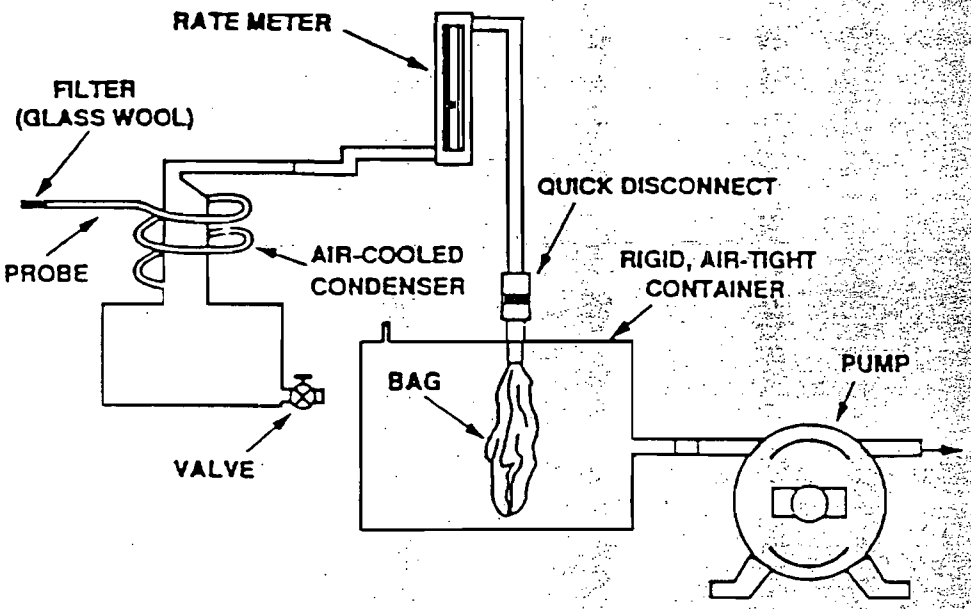



Figure 10-2. Integrated Gas--Sampling Train

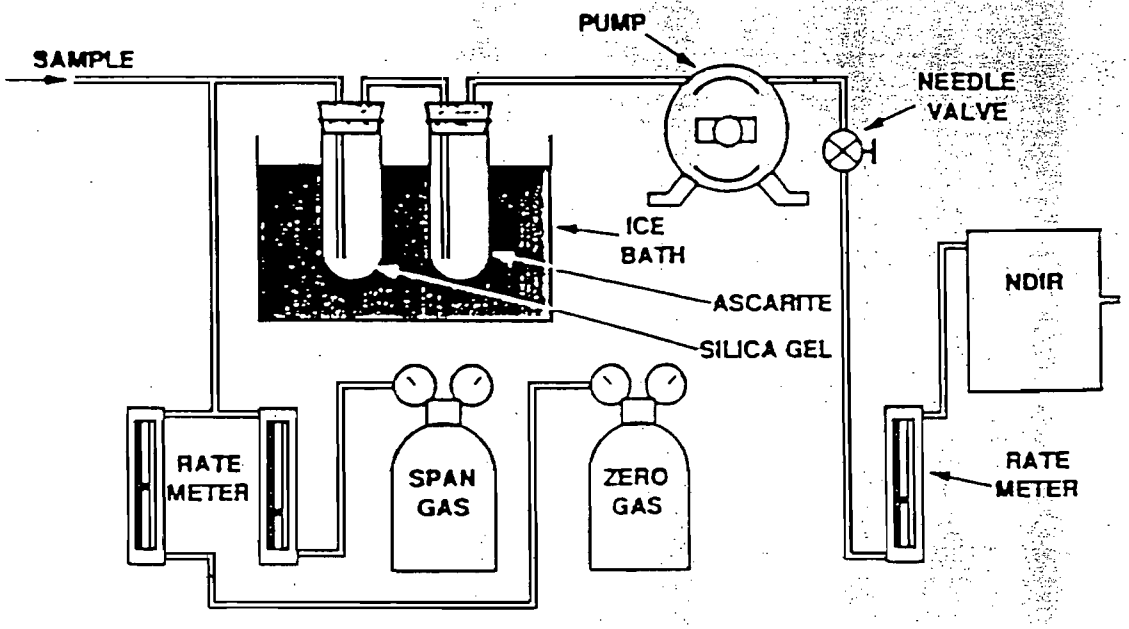



Figure 10-3. Analytical Equipment

# METHOD 26A

## DETERMINATION OF HYDROGEN HALIDE AND HALOGEN EMISSIONS FROM STATIONARY SOURCES - ISOKINETIC METHOD

### 1. Applicability, Principle, Interferences, Precision, Bias, and Stability

1.1 Applicability. This method is applicable for determining emissions of hydrogen halides (HX) [hydrogen chloride (HCL), hydrogen bromide (HBr), and hydrogen flouride (HF)] and halogens ($X_2$) [chlorine ($Cl_2$) and bromine ($Br_2$)] from stationary sources. This method collects the emission sample isokinetically and is therefore particulary suited for sampling at sources, such as those controlled by wet scrubbers, emitting acid-particulate matter (e.g., hydrogen halides dissolved in water droplets). [**NOTE**: Mention of trade names or specific products does not constitute endorsement by the Enviromental Protection Agency.]

1.2 Principle. Gaseous and particulate pollutants are withdrawn isokinetically from the source and collected in an optional cyclone, on a filter, and in absorbing solutions. The cyclone collects any liquid droplets and is not necessary if the source emissions do not contain them; however, it is preferable to include the cyclone in the sampling train to protect the filter from any moisture present. The filter collects other particulate matter including halide salts. Acidic and alkaline absorbing solutions collect the gaseous hydrogen halides and halogens, respectively. Following sampling of emissions containing liquid droplets, any halides/halogens dissolved in the liquid in the cyclone and on the filter are vaporized to gas and corrected in the impingers by pulling conditioned ambient air throught the sampling train. The hydrogen halides are solubilized in the acidic solution and form chloride ($Cl^-$), bromide ($Br^-$), and fluoride ($F^-$) ions. The halogens have a very low solubility in the acidic solution and pass through to the alkaline solution where they are hydrolyzed to form a proton ($H^+$), the halide ion, and the hypohalous acid (HClO or HBrO). Sodium thiosulfate is added to the alkaline solution to assure reaction with the hypohalous acid to form a second halide ion such that 2 halide ions are formed for each molecule of halogen gas. The halide ions in the separate solutions are measured by ion chromatography (IC). If desired, the particulate matter recovered from the filter and the probe is analyzed following the procedures in Method 5. [**NOTE**: If the tester intendes to use this sampling arrangement to sample concurrently for particulate

matter, the alternative Teflon$^R$ probe liner, cyclone, and filter holder should not be used. The Teflon$^R$ filter support must be used. The tester must also meet the probe and filter temperature requriements of both sampling trains.]

1.3 Interferences. Volatile materials, such as chlorine dioxide ($ClO_2$) and ammonium chloride ($NH_4Cl$), which produce halide ions upon dissolution during sampling are potential interferents. Interferents for the halide measurements are the halogen gases which disproportionate to a hydrogen halide and an hypohalous acid upon dissolution in water. The use of acidic rather than neutral or basic solutions for collection of the hydrogen halides greatly reduces the dissolution of any halogens passing through this solution. The simultaneous presence of both HBr and $Cl_2$ may cause a positive bias in the HCl result with a corresponding negative bias in the $Cl_2$ result as well as affecting the $HBr/Br_2$ split. High concentrations of nitrogen oxides ($NO_x$) may produce sufficient nitrate ($NO_3$) to interfere with measurements of very low Br levels.

1.4 Precision and Bias. The method has a possible measurable negative bias below 20 ppm HCl perhaps due to reaction with small amounts of moisture in the probe and filter. Similiar bias for the other hydrogen halides is possible.

1.5 Sample Stability. The collected $Cl^-$ samples can be stored for up to 4 weeks for analysis for HCl and $Cl_2$.

1.6 Detection Limit. The in-stack detection limit for HCl is approximately 0.02 ug per liter of stack gas; the analytical detection limit for HCl is 0.1 ug/ml. Detection limits for the other analyses should be similiar.

## 2. Apparatus

2.1 Sampling. The sampling train is shown in Figure 26A-1; the apparatus is similiar to the Method 5 train where noted as follows:

2.1.1 Probe Nozzle. Borosilicate or quartz glass; constructed and calibrated according to Method 5, Sections 2.1.1 and 5.1, and coupled to the probe liner using a Teflon$^R$ union; a stainless steel nut is recommended for this union. When the stack temperature exceeds 210$^o$C (410$^o$F), a one-piece glass nozzle/liner assembly must be used.

2.1.2 Probe Liner. Same as Method 5, Section 2.1.2, except metal liners shall not used. Water-cooling of the stainless steel sheath is recommended at temperatures exceeding 500$^o$C. Teflon$^R$ may be used in limited applications where the minimum

stack temperature exceeds 120°C (250°F) but never exceeds the temperature where Teflon$^R$ is estimated to become unstable (approximately 210°C).

2.1.3 Pitot Tube, Differential Pressure Gauge, Filter Heating System, Metering System, Barometer, Gas Density Determination Equipment. Same as Method 5, Sections 2.1.3, 2.1.4, 2.1.6, 2.1.8, 2.1.9, and 2.1.10.

2.1.4 Cyclone (Optional). Glass or Teflon$^R$. Use of the cyclone is required only when the sample gas stream is saturated with moisture; however, the cyclone is recommended to protect the filter from any moisture droplets present.

2.1.5 Filter Holder. Borosilicate or quartz glass, or Teflon$^R$ filter holder, with a Teflon$^R$ filter support and a sealing gasket. The sealing gasket shall be constructed of Teflon$^R$ or equivalent materials. The holder design shall provide a positive seal against leakage at any point along the filter circumference. The holder shall be attached immediately to the outlet of the cyclone.

2.1.6 Impinger Train. The following system shall be used to determine the stack gas moisture content and to collect the hydrogen halides and halogens: five or six impingers connected in a series with leak-free ground glass fittings or any similar leak-free noncontaminating fittings. The first impinger shown in Figure 26A-1 (knockout or condensate impinger) is optional and is recommended as a water knockout trap for use under high moisture conditions. If used, this impinger should be constructed as described below for the alkaline impingers, but with a shortened stem, and should contain 50 ml of 0.1 N $H_2SO_4$. The following two impingers (acid impingers which each contain 100 ml of 0.1 $H_2SO_4$) shall be of the Greenburg-Smith design with the standard tip (Method 5, Section 2.1.7). The next two impingers (alkaline impingers which each contain 100 ml of 0.1 N NaOH) and the last impinger (containing silica gel) shall be of the modified Greenburg-Smith design (Method 5, Section 2.1.7). The condensate, acid, and alkaline impingers shall contain known quantities of the appropriate absorbing reagents. The last impinger shall contain a known weight of silica gel or equivalent desiccant. Teflon$^R$ impingers are an acceptable alternative.

2.1.7 Ambient Air Conditioning Tube (Optional). Tube tightly packed with approximately 150 g of fresh 8 to 20 mesh sodium hydroxide-coated silica, or equivalent, (AscariteII$^R$ has been found suitable) to dry and remove acid gases from the ambient air used to remove moisture from the filter and cyclone, when the cyclone is used. The inlet and outlet ends of the tube should be packed with at least 1-cm thickness of glass wool or

filter material suitable to prevent escape of fines. Fit one end with flexible tubing, etc. to allow connection to probe nozzle following the test run.

2.2 Sample Recovery. The following items are needed:

2.2.1 Probe-Liner and Probe-Nozzle Brushes, Wash Bottles, Glass Sample Storage Containers, Petri Dishes, Graduated Cylinder or Balance, and Rubber Policeman. Same as Method 5, Sections 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, and 2.2.7.

2.2.2 Plastic Storage Containers. Screw-cap polypropylene containers to store silica gel. High-density polyethylene bottles with Teflon screw cap liners to store impinger reagents, 1-liter.

2.2.3 Funnels. Glass or high-density polyethylene, to aid in sample recovery.

2.3 Analysis. For analysis, the following equipment is needed:

2.3.1 Volumetric Flasks. Class A, various sizes.

2.3.2 Volumetric Pipettes. Class A, assortment, to dilute samples to calibration range of the ion chromatograph (IC).

2.3.3 Ion Chromatograph. Suppressed or nonsuppressed, with a conductivity detector and electronic integrator operating in the peak area mode. Other detectors, a strip chart recorder, and peak heights may be used.

## 3. Reagents

Unless otherwise indicated, all reagents must conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society (ACS reagent grade). When such specifications are not available, the best available grade shall be used.

3.1 Sampling.

3.1.1 Water. Deionized, distilled water that conforms to American Society of Testing and Materials (ASTM) Specification D 1193-77, Type 3.

3.1.2 Acidic Absorbing Solution, 0.1 N Sulfuric Acid ($H_2SO_4$). To prepare 1 L, slowly add 2.80 ml of concentrated $H_2SO_4$ to about 900 ml of water while stirring, and adjust the

final volume to 1 L using additional water. Shake well to mix the solution.

3.1.3 Alkaline Absorbing Solution, 0.1 N Sodium Hydroxide (NaOH). To prepare 1 L, dissolve 4.00 g of solid NaOH in about 900 ml of water and adjust the final volume to 1 L using additional water. Shake well to mix the solution.

3.1.4 Filter. Teflon mat (e.g., Pallflex$^{R}$ TX40H145) filter. When the stack gas temperature exceeds 210$^{o}$C (410$^{o}$F) a quartz fiber filter may be used.

3.1.5 Silica Gel, Crushed Ice, and Stopcock Grease. Same as Method 5, Sections 3.1.2, 3.1.4, and 3.1.5, respectively.

3.1.6 Sodium Thiosulfate, ($Na_2S_2O_3 3 \cdot 5\ H_2O$).

3.2 Sample Recovery.

3.2.1 Water. Same as Section 3.1.1.

3.2.2 Acetone. Same as Method 5, Section 3.2.

3.3 Sample Analysis.

3.3.1 Water. Same as Section 3.1.1.

3.3.2 Reagent Blanks. A separate blank solution of each absorbing reagent should be prepared for analysis with the field samples. Dilute 200 ml of each absorbing solution (250 ml of the acidic absorbing solution, if a condensate impinger is used) to the same final volume as the field samples using the blank sample of rinse water. If a particulate determination is conducted, collect a blank sample of acetone.

3.3.3 Halide Salt Stock Standard Solutions. Prepare concentrated stock solutions from reagent grade sodium chloride (NaCl), sodium bromide (NaBr), and sodium fluoride (NaF). Each must be dried at 110$^{o}$C for 2 or more hours and then cooled to room temperature in a desiccator immediately before weighing. Accurately weigh 1.6 to 1.7 g of the dried NaCl to within 0.1 mg, dissolve in water, and dilute to 1 liter. Calculate the exact Cl concentration using Equation 26A-1.

$$uCl^{-}/ml = g \text{ of NaCl} \times 10^{3} \times 35.453/58.44 \qquad \text{(Equation 26A-1)}$$

In a similar manner, accurately weigh and solubilize 1.2 to 1.3 g of dried NaBr and 2.2 to 2.3 g of NaF to make 1 liter solutions.

Use Equations 26A-2 and 26A-3 to calculate the $Br^-$ and $F^-$ concentrations.

$ugBr^-/ml = g \text{ of } NaBr \times 10^3 \times 79.904/102.90$ (Equation 26A-2)

$ugF^-/ml = g \text{ of } NaF \times 10^3 \times 18.998/41.99$ (Equation 26A-3)

Alternately, solutions containing a nominal certified concentration of 1000 mg/L NaCl are commercially available as convenient stock solutions from which standards can be made by appropriate volumetric dilution. Refrigerate the stock standard solutions and store no longer than 1 month.

3.3.4 Chromatographic Eluent. Same as Method 26, Section 3.2.4.

**4. Procedure**

Because of the complexity of this method, testers and analysts should be trained and experienced with the procedures to ensure reliable results.

4.1 Sampling.

4.1.1 Pretest Preparation. Follow the general procedure given in Method 5, Section 4.1.1, except the filter need only be desiccated and weighed if a particulate determination will be conducted.

4.1.2 Preliminary Determinations. Same as Method 5, Section 4.1.2.

4.1.3 Preparation of Sampling Train. Follow the general procedure given in Method 5, Section 4.1.3, except for the following variations:

And 50 ml of 0.1 N $H_2SO_4$ to the condensate impinger, if used. Place 100 ml of 0.1 N $H_2SO_4$ in each of the next two impingers. Finally, transfer approximately 200-300 g of preweighed silica gel from its container to the last impinger. Set up the train as in Figure 26A-1. When used, the optional cyclone is inserted between the probe liner and filter holder and located in the heated filter box.

4.1.4 Leak-Check Procedures. Follow the leak-check procedures given in Method 5, Sections 4.4.1 (Pretest Leak-Check), 4.1.4.2 (Leak-Checks During the Sample Run), and 4.1.4.3 (Post-Test Leak-Check).

4.1.5 Train Operation. Follow the general procedure given in Method 5, Section 4.1.5. Maintain a temperature around the filter and (cyclone, if used) of greater than 120°C (248°F). For each run, record the data required on a data sheet such as the one shown in Method 5, Figure 5-2. If the condensate impinger becomes too full, it may be emptied, recharged with 50 ml of 0.1 N $H_2SO_4$, and replaced during the sample run. The condensate emptied must be saved and included in the measurement of the volume of moisture collected and included in the sample for analysis. The additional 50 ml of absorbing reagent must also be considered in calculating the moisture. After the impinger is reinstalled in the train, conduct a leak-check as described in Method 5, Section 4.1.4.2.

4.1.6 Post-Test Moisture Removal (Optional). When the optional cyclone is included in the sampling train or when moisture is visible on the filter at the end of a sample run even in the absence of a cyclone, perform the following procedure. Upon completion of the test run, connect the ambient air conditioning tube at the probe inlet and operate the train with the filter heating system at least 120°C (248°F) at a low flow rate (e.g., $\Delta H$ = 1 in. $H_2O$) to vaporize any liquid and hydrogen halides in the cyclone or on the filter and pull them through the train into the impingers. After 30 minutes, turn off the flow, remove the conditioning tube, and examine the cyclone and filter for any visible moisture. If moisture is visible, repeat this step for 15 minutes and observe again. Keep repeating until the cyclone is dry. [NOTE: It is critical that this is repeated until the cyclone is completely dry.]

4.2 Sample Recovery. Allow the probe to cool. When the probe can be handled safely, wipe off all the external surfaces of the tip of the probe nozzle and place a cap loosely over the tip. Do not cap the probe tip tightly while the sampling train is cooling down because this will create a vacuum in the filter holder, drawing water from the impingers into the holder. Before moving the sampling train to the cleanup site, remove the probe, wipe off any silicone grease, and cap the open outlet of the impinger train, being careful not to lose any condensate that might be present. Wipe off any silicone grease and cap the filter or cyclone inlet. Remove the umbilical cord from the last impinger and cap the impinger. If a flexible line is used between the first impinger and the filter holder, disconnect it at the filter holder and let any condensed water drain into the first impinger. Wipe off any silicone grease and cap the filter holder outlet and the impinger inlet. Ground glass stoppers, plastic caps, serum caps, Teflon tape, Parafilm, or aluminum foil may be used to close these openings. Transfer the probe and filter/impinger assembly to the cleanup area. This area should be clean and protectd from the weather to minimize sample

contamination or loss. Inspect the train prior to and during disassembly and note any abnormal conditions. Treat samples as follows:

4.2.1 Container No. 1 (Optional; Filter Catch for Particulate Determination). Same as Method 5, Section 4.2, Container No. 1.

4.2.2 Container No. 2 (Optional; Front-Half Rinse for Particulate Determination). Same as Method 5, Section 4.2, Container No. 2.

4.2.3 Container No. 3 (Knockout and Acid Impinger Catch for Moisture and Hydrogen Halide Determination). Disconnect the impingers. Measure the liquid in the acid and knockout impingers to ± 1 ml by using a graduated cylinder or by weighing it to ± 0.5 g by using a balance. Record the volume or weight of liquid present. This information is required to calculate the moisture content of the effluent gas. Quantitatively transfer this liquid to a leak-free sample storage container. Rinse these impingers and connecting glassware including the back portion of the filter holder (and flexible tubing, if used) with water and add these rinses to the storage container. Seal the container, shake to mix, and label. The fluid level should be marked so that if any sample is lost during transport, a correction proportional to the lost volume can be applied. Retain rinse water and acidic absorbing solution blanks and analyze with the samples.

4.2.4 Container No. 4 (Alkaline Impinger Catch for Halogen and Moisture Determination). Measure and record the liquid in the alkaline impingers as described in Section 4.2.3. Quantitatively transfer this liquid to a leak-free sample storage container. Rinse these two impingers and connecting glassware with water and add these rinses to the container. Add 25 mg of sodium thiosulfate per ppm halogen-dscm of stack gas sample. [NOTE: This amount of sodium thiosulfate includes a safety factor of approximately 5 to assure complete reaction with the hypohalous acid to form a second $Cl^-$ ion in the alkaline solution.] Seal the container, shake to mix, and label; mark the fluid level. Retain alkaline absorbing solution blank and analyze with the samples.

4.2.5 Container No. 5 (Silica Gel for Moisture Determination). Same as Method 5, Section 4.2, Container No. 3.

4.2.6 Container Nos. 6 through 9 (Reagent Blanks). Save portions of the absorbing reagents (0.1 N $H_2SO_4$ and 0.1 N NaOH) equivalent to the amount used in the sampling train; dilute to the approximate volume of the corresponding samples using rinse water directly from the wash bottle being used. Add the same

ratio of sodium thiosulfate solution used in container No. 4 to the 0.1 N NaOH absorbing reagent blank. Also, save a portion of the rinse water alone and a portion of the acetone equivalent to the amount used to rinse the front half of the sampling train. Place each in a separate, prelableled sample container.

4.2.7 Prior to shipment, recheck all sample containers to ensure that the caps are well-secured. Seal the lids of all containers around the circumference with Teflon tape. Ship all liquid samples upright and all particulate filters with the particulate catch facing upward.

4.3 Sample Preparation and Analysis. Note the liquid levels in the sample containers and confirm on the analysis sheet whether or not leakage occurred during transport. If a noticeable leakage has occurred, either void the sample or use methods, subject to the approval of the Administrator, to correct the final results.

4.3.1 Container Nos. 1 and 2 and Acetone Blank (Optional; Particulate Determination). Same as Method 5, Section 4.3.

4.3.2. Container No. 5. Same as Method 5, Section 4.3 for Silica gel.

4.3.3 Container Nos. 3 and 4 and Absorbing Solution and Water Blanks. Quantitatively transfer each sample to a volumetric flask or graduated cyclinder and dilute with water to a final volume within 50 ml of the largest sample.

4.3.3.1 The IC conditions will depend upon analytical column type and whether suppressed or nonsuppressed IC is used. Prior to calibration and sample analysis, establish a stable baseline. Next, inject a sample of water, and determine if any $Cl^-$, $Br^-$, or $F^-$ appears in the chromatogram. If any of these ions are present, repeat the load/injection procedure until they are no longer present. Analysis of the acid and alkaline absorbing solution samples requires separate standard calibration curves; prepare each according to Section 5.2. Ensure adequate baseline separation of the analyses.

4.3.3.2 Between injections of the appropriate series of calibration standards, inject in duplicate the reagent blanks and the field samples. Measure the areas or heights of the $Cl^-$, $Br^-$, and $F^-$ peaks. Use the average response to determine the concentrations of the field samples and reagent blanks using the linear calibration curve. If the values from duplicate injections are not within 5 percent of their mean, the duplicate injection shall be repaeated and all four values used to determine the average response. Dilute any sample and the blank

with equal volumes of water if the concentration exceeds that of the highest standard.

4.4 Audit Sample Analysis. Audit samples must be analyzed subject to availability.

## 5. Calibration

Maintain a laboratory log of all calibrations.

5.1 Probe Nozzle, Pitot Tube, Dry Gas Metering System, Probe Heater, Temperature Gauges, Leak-Check of Metering System, and Barometer. Same as Method 5, Sections 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, and 5.7, respectively.

5.2 Ion Chromatograph. To prepare the calibration standards, dilute given amounts (1.0 ml or greater) of the stock standard solutions to convenient volumes, using 0.1 N $H_2SO_4$ or 0.1 N NaOH, as appropriate. Prepare at least four calibration standards for each absorbing reagent containing the three stock solutions such that they are within the linear range of the field samples. Using one to the standards in each series, ensure adequate baseline separation for the peaks of interest. Inject the appropriate series of calibration standards, starting with the lowest concentration standard first both before and after injection of the quality control check sample, reagent blanks, and field samples. This allows compensation for any instrument drift occurring during sample analysis. Determine the peak areas, or height, of the standards and plot individual values versus halide ion concentrations in ug/ml. Draw a smooth curve through the points. Use linear regression to calculate a formula describing the resulting linear curve.

## 6. Quality Control

Same as Method 5, Section 4.4.

## 7. Quality Assurance

7.1 Applicability. When the method is used to demonstrate compliance with a regulation, a set of two audit samples shall be analyzed.

7.2 Audit Procedure. The currently available audit samples are chloride solutions. Concurrently analyze the two audit samples and a set of compliance samples in the same manner to evaluate the technique of the analyst and the standards preparation. The same analyst, analytical reagents, and analytical system shall be used both for compliance samples and the Environmental Protection Agency (EPA) audit samples.

7.3 Audit Sample Availability. Audit samples will be supplied only to enforcement agencies for compliance tests. Audit samples may be obtained by writing the Source Test Audit Coordinator (MD-77B), Quality Assurance Division, Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Laboratory, Research Triangle Park, NC 27711 or by calling the Source Test Audit Coordinator (STAC) at (919) 541-7834. The request for the audit samples should be made at least 30 days prior to the scheduled compliance sample analysis.

7.4 Audit Results. Calculate the concentrations in mg/dscm using the specified sample volume in the audit instructions. Include the results of both audit samples, their identification numbers, and the analyst's name with the results of the compliance determination samples in appropriate reports to the EPA regional office or the appropriate enforcement agency. **(NOTE:** Acceptability of results may be obtained immediately by reporting the audit results in mg/dscm and compliance results in total ug HCl/sample to the responsible enforcement agency.) The concentrations of the audit samples obtained by the analyst shall be agree within 10 percent of the actual concentrations. If the 10 percent specification is not met, reanalyze the compliance samples and audit samples, and include intitial and reanalysis values in the test report. Failure to meet the 10 percent specification may require retests until the audit problems are resolved.

## 8. Calculations

Retain at least one extra decimal figure beyond those contained in the available data in intermediate calculations, and round off only the final answer appropriately.

8.1 Nomenclature. Same as Method 5, Section 6.1. In Addition:

$B_x$ = Mass concentration of applicable absorbing solution blank, ug halide ion ($Cl^-$, $Br^-$, $F^-$)/ml, not exceed 1 ug/ml which is 10 times the published analytical detection limit of 0.1 ug/ml. (It is also approximately 5 percent of the mass concentration anticipated to result from a one hour sample at 10 ppmv HCl.)

C = Concentration of hydrogen halide (HX) or halogen ($X_2$), dry basis, mg/dscm.

$m_{HX}$ = Mass of HCl, HBr, or HF in sample , ug.

$m_{X2}$ = Mass of $Cl_2$ or $Br_2$ in sample, ug.

$S_x$ = Analysis of sample, ug halide ion ($Cl^-$, $Br^-$, $F^-$)/ml.

$V_s$ = Volume of filtered and diluted sample, ml.

8.2 Average Dry Gas Meter Temperature and Average Orifice Pressure Drop. See data sheet (Figure 5-2 of Method 5).

8.3 Dry Gas Volume. Calculate $V_{m(std)}$ and adjust for leakage, if necessary, using the equation in Section 6.3 of Method 5.

8.4 Volume of Water Vapor and Moisture Content. Calculate the volume of water vapor $V_{w(std)}$ and moisture content $B_{ws}$ from the data obtained in this method (Figure 5-2 of Method 5); use Equations 5-2 and 5-3 of Method 5.

8.5 Isokinetic Variation and Acceptable Results. Use Method 5, Sections 6.11 and 6.12.

8.6 Actone Blank Concentration, Acetone Wash Blank Residue Weight, Particulate Weight, and Particulate Concentration. For particulate determination.

8.7 Total ug HCl, HBr, or HF Per Sample.

$$m_{HX} = K\ V_s\ (S_{X^-} - B_{X^-}) \qquad \text{(Equation 26A-4)}$$

where:

$K_{HCl}$ = 1.028 (ug HCl/ug-mole)/(ug $Cl^-$/ug-mole).

$K_{HBr}$ = 1.013 (ug HBr/ug-mole)/(ug $Br^-$/ug-mole).

$K_{HF}$ = 1.053 (ug HF/ug-mole)/(ug $F^-$/ug$^-$mole).

8.8 Total ug $Cl_2$ or $Br_2$ Per Sample.

$$m_{X2} = V_s\ (S_{X^-} - B_{X^-}) \qquad \text{(Equation 26A-5)}$$

8.9 Concentration of Hydrogen Halide or Halogen in Flue Gas.

$$C = K\ m_{HX,X2} / V_{m(std)} \qquad \text{(Equation 26A-6)}$$

where:

$K = 10^{-3}$ mg/ug

8.10 Stack Gas Velocity and Volumetric Flow Rate. Calculate the average stack gas velocity and volumetric flow

rate, if needed, in using data obtained in this method and the equations in Sections 5.2 and 5.3 of Method 2.

## 9. Bibliography

1. Steinsberger, S.C. and J.H. Margeson. Laboratory and Field Evaluation of a Methodology for Determination of Hydrogen Chloride Emissions from Municipal and Hzardous Waste Incinerators. U.S. Environmenta Protection Agency, Office of Research and Development. Publication No. 600/3-89/064. April 1989. Available from National Technical Information Service, Springfield, VA 22161 as PB89220586/AS.

2. State of California Air Resources Board. Method 421 - Determination of Hydrochloric Acid Emissions from Stationary Sources. March 18, 1987.

3. Cheney, J.L. and C.R. Fortune. Improvements in the Methodology for Measuring Hydrochloric Acid in Combustion Source Emissions. J. Environ.Sci Health. A19(3): 337-350. 1984.

4. Stern, D.A., B.M. Myatt, J.F. Lachowski, and K.T. McGregor. Speciation of Halogen and Hydrogen Halide Compounds in Gaseous Emissions. In: Incineration and Treatment of Hazardous Waste: Proceedings of the 9th Annual Research Symposium, Cincinnati, Ohio, May 2-4, 1983. Publication No. 600/9-84-015. July 1984. Available from National Technical Information Service, Springfield, VA 22161 as PB84-234525.

5. Holm, R.D. and S.A. Barksdale. Analysis of Anions in Combustion Products. In: Ion Chromatographic Analysis of Environmental Pollutants, E. Sawicki, J.D. Mulik, and E. Wittgenstein (eds). Ann Arbor, Michigan, Ann Arbor Science Publishers. 1978. pp. 99-110.

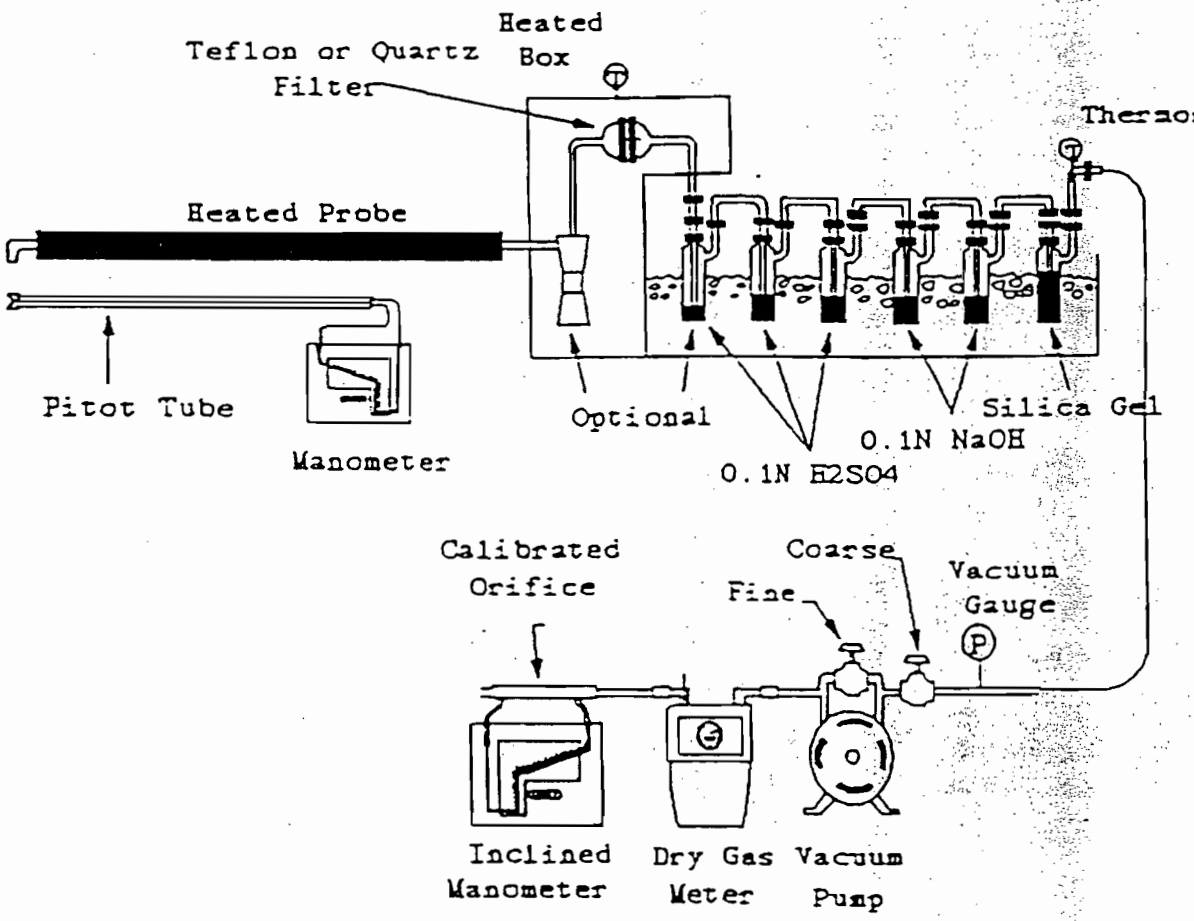



Figure 26A-1. Sampling train.

# APPENDIX A

# COMPLETE EMISSION DATA

## Source Sampling Nomenclature Sheet

**PB** - Barometric pressure, inches Hg.
**PS** - Stack pressure, inches Hg.
**AS** - Effective area of positive stack gas flow, sq. ft.
**As** - stack area, sq. ft.
**NPTS** - Number of traverse point where the pitot velocity head was greater than zero
**TS** - Stack temperature, degrees fahrenheit
**TM** - Meter temperature, degrees fahrenheit
**ASQH** - Average square root of velocity head, inches H2O
**DH** - Average meter orifice pressure differential, inches H2O
**AN** - Sampling nozzle area, square feet
**CP** - S-type pitot tube correction factor
**VM** - Recorded meter volume sample, cubic feet (meter conditions)
**VC** - Condensate and silica gel increase in impingers, milliliters
**PO** - Pressure at the dry test meter orifice, $PB + \frac{H}{13.6}$
**t** - Test time in minutes
**STP** - Standard conditions, dry, 68 degrees fahrenheit (Tstd), 29.92 inches Hg (Pstd)
**Y** - Average ratio of accuracy of wet test meter to dry gas meter, with a tolerance of plus or minus 0.02

---

**VWV** - Conversion of condensate in milliliters to water vapor in cubic feet (STP)
**VSTPD** - Volume sampled, cubic feet (STP)
**VT** - Total water vapor and dry gas volume sampled, cubic feet (STP)
**W** - Moisture fraction of stack gas
**FDA** - Dry gas fraction
**MD** - Molecular weight of stack gas, lbs/lb-mole (dry conditions)
**MS** - Molecular weight of stack gas, lbs/lb-mole (stack conditions)
**GS** - Specific gravity of stack gas, referred to air
**EA** - Excess air
**U** - Stack gas velocity, feet per minute
**QS** - Stack gas flow rate, cubic feet per minute (stack conditions)
**QD** - Stack gas flow rate, cubic feet per minute (dry conditions)
**QSTPD** - Stack gas flow rate, cubic feet per minute (STP)
**PISO** - Percent isokinetic volume sampled (method described in Federal Register)
**ESTP** - Particulate concentration at standard and dry conditions, grains/scf
**E12** - ESTP corrected to 12 % CO2, grains/scf
**E50** - ESTP corrected to 50 % excess air, grains/scf
**EM** - Mass emissions rate, lbs/hr
**Eh** - Mass emissions rate, lbs mmBTUs
**E** - ESTP corrected to % Excess Air.

## Equations For Calculating Particulate Emissions

$$VWV = (0.04707) \times (VC)$$

$$VSTPD = (17.65) \times (VM) \times \left(\frac{PB + DH}{13.6}\right) + (TM) \times (Y)$$

$$VT = (VWV) \times (VSTPD)$$

$$W = (VWV) + (VT)$$

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

$$MD = (0.44 \times \%\,CO2) + (0.32 \times \%\,O2) + (0.28 \times \%\,N2) + (0.28 \times \%\,CO)$$

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

$$CS = (MS) + (28.99)$$

$$EA = \left[(100) \times \left(\%\,O2 - \frac{\%\,CO}{2}\right)\right] \Big/ \left[(0.266 \times \%\,N2) - \left(O2 - \frac{\%\,CO}{2}\right)\right]$$

$$U = (174) \times (CP) \times (ASQH) \times \sqrt{(TS \times 29.92) + (CS \times PS)}$$

$$QS = (U) \times (AS)$$

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

$$QSTPD = (528) \times (QD) \times (PS) + (TS \times 29.9)$$

$$PISO = \frac{(100) \times Ts \times VSTPD \times Pstd}{Tstd \times U \times (t) \times An \times Ps \times (FDA)}$$

$$ESTP = \frac{(\text{SAMPLE WT. in mg.}) \times (0.01543)}{VSTPD}$$

$$E12 = \frac{(ESTP) \times (12)}{(CO2\,\%)}$$

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

$$EM = \frac{(ESTP) \times (QSTPD) \times (60\ \text{min})}{7000}$$

$$Eh = \frac{(ESTP)}{7000} \times \text{FUEL FACTOR} \times \frac{20.9}{(20.9 - \%\,O2)}$$

$$E_{EA} = \frac{(ESTP) \times (100 + EA)}{\text{Desired EA}}$$

**Facility:** Georgia Pacific **Test Date:** 5/25/01

**Source:** Bleach Plant Outlet **Run Number:** 1

Example Calculations:
Page 1

1. Stack Pressure, (PS)
   PS = PB + (PG/ 13.6)

Example. PB = 30.09 Therefore PS= 30.10 in. Hg.
PG = 0.07

2. Meter Pressure, (PM)
   PM = (PB) + (*H / 13.6)

Example. *H = 1.508 Therefore PM= 30.20 in. Hg.

3. Volume Water Vapor, (VWV).
   VWV = (0.04707) x (VC)

Example. VC = 37 Therefore VWV= 1.718 SCF

4. Meter Volume, corrected to Standard Conditions, (VSTD)

$$VSTPD = \frac{(17.65) \times (VM) \times (PM) \times (Y)}{TM}$$

Example. VM = 35.618 Therefore VSTPD = 35.391 SCF
PM = 30.20
TM = 553.1
Y = 1.031

5. Total Volume Of Sample, (VT).

   VT = VWV + VSTPD

Example. VWV = 1.718 Therefore VT = 37.109 SCF
VSTPD = 35.391

PB = Barometric Pressure, inches of Hg.
PG = Static Pressure of stack, inches of H2O.
*H = Average meter orifice pressure differential inches of H2O.
VC = Volume condensate liquid volume + gain in silica gel wt., grams.
PM = See eq. 2.
TM = Temperature, meter, degrees Rankine.
Y = Meter Correction Factor
VWV = See eq. 3.
VSTPD = See eq. 4.

**Facility:** Georgia Pacific **Test Date:** 5/25/01

**Source:** Bleach Plant Outlet **Run Number:** 1

Example Calculations:
Page 2

6. Fraction Water Vapor in Gas Stream, (W)

W = (VWV / VT)

Example. VWV = 1.718 Therefore W = 0.046
VT = 37.109

7. Fraction Dry Air, (FDA).

FDA = 1.0 - W

Example. W = 0.046 Therefore FDA = 0.954

8. Molecular Weight of Stack Gas, Dry, (MD).

MD = (0.44 x %CO2) + (0.32 x %O2) + (0.28 x %N2) + (0.28 x %CO)

Example. CO2 = 0 Therefore MD = 28.84
O2 = 20.9
N2 = 79.1
CO = 0

9. Molecular Weight of Stack Gas, Stack Conditions, (MS).

MS = (MD x FDA) + (18 x W)

Example. MD = 28.84 Therefore MS = 28.34
FDA = 0.954
W = 0.046

10. Specific Gravity of Gas, Relative to Air, (GS)

GS = MS / 28.99

Example. MS = 28.34 Therefore GS = 0.978

VWV = See eq. 3
VT = See eq. 5
W = See eq. 6
MD = See eq. 8
MS = See eq. 9

**Facility:** Georgia Pacific **Test Date:** 5/25/01

**Source:** Bleach Plant Outlet **Run Number:** 1

Example Calculations:
Page 3

11. Velocity of Stack Gas, as feet per minute, (U).

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

| | | | | |
|---|---|---|---|---|
| Example. CP = | 0.84 | Therefore U = | 1604.8 | FPM |
| H = | 0.4652 | | | |
| TS = | 548 | | | |
| PS = | 30.10 | | | |
| GS = | 0.978 | | | |

12. Stack Gas Flow Rate, Stack Conditions, cubic feet per minute, (QS).

$QS = U \times AS$

| | | | | |
|---|---|---|---|---|
| Example. U = | 1604.8 | Therefore QS = | 15440 | ACFM |
| AS = | 9.621 | | | |

13. Stack Gas Flow Rate, Dry (QD)

$QD = QS \times FDA$

| | | | | |
|---|---|---|---|---|
| Example. QS = | 15440 | Therefore QD = | 14730 | CFMD |
| FDA = | 0.954 | | | |

14. Stack Gas Flow Rate, Standard Temperature and Pressure, Dry, (QSTPD)

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

| | | | | |
|---|---|---|---|---|
| Example QD = | 14730 | Therefore QSTPD = | 14275 | SCFMD |
| PS = | 30.09 | | | |
| TS = | 548 | | | |

CP = Pitot Coefficient
H = Average of square roots of velocity heads, in H2O.
TS = Temperature of stack, deg. R.
PS = See eq. 1
GS = See eq. 10

**Facility:** Georgia Pacific **Test Date:** 5/25/01

**Source:** Bleach Plant Outlet **Run Number:** 1

Example Calculations:
Page 4

15. Percent Isokinetic Volume Sampled, (PISO)

$$PISO = \frac{(100) \times Ts \times VSTPD \times Pstd}{Tstd \times U \times \Theta \times An \times Ps \times FDA}$$

| | | | |
|---|---|---|---|
| Example. AN = | 0.000413 | Therefore PISO = | 96.4 |
| Θ = | 60 | Pstd = | 29.92 |
| VSTPD = | 35.391 | Tstd = | 528 |
| Ts = | 548 | Ps = | 30.095147 |
| U = | 1604.8 | FDA = | 0.954 |

16. Particulate Concentration, grains per Standard Cubic Foot, (ESTP).

ESTP = (.01543 x Mg.) / VSTPD

Example. Mg. = 0 Therefore ESTP = 0 Grs/ SCF.
VSTPD = 35.391

17. Mass Emission Rate, Lbs / Hr, (EM).

$$EM = \frac{ESTP \times QSTPD \times 60\ Min/\ Hr}{7000}$$

Example.
QSTPD = 14275 Therefore EM = 0 Lbs/ Hr

VSTPD = See eq. 4
AN = Area Nozzle, Sq Ft
Mg. = Weight of particulate catch in milligrams.

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| | | | |
|---|---|---|---|
| **Facility** | Georgia Pacific | | |
| **Location** | Palatka, FL | | |
| **Stack** | Bleach Plant Outlet | | |
| **Run Date** | 5/25/01 | **Impinger Condensate , Ml** | 32 |
| **Run Number** | 1 | **Silica Gel Condensate, Gm** | 4.5 |
| **Start Time** | 1850 | **Volume Metered** | 35.618 |
| **Finish Time** | 1952 | **Meter Temp (Deg R)** | 553.1 |
| **Weather** | Clear | **Orsat CO2 %** | 0.0 |
| **Total Time (min.)** | 60.00 | **Orsat O2 %** | 20.9 |
| **Barometric Pressure** | 30.09 | **Orsat CO %** | 0.0 |
| **Stack Diameter (in.)** | 42.000 | **Orsat N %** | 79.1 |
| **Stack Area sq. ft.** | 9.621 | **Condensate Volume, Ml** | 36.5 |
| **Nozzle Area sq. ft.** | 0.0004125 | **Delta H (Inches H2O)** | 1.5080 |
| **Number of Points** | 12 | **Stack Pressure** | 30.095 |
| **Avg of SQRT of V.H.** | 0.4652 | **Stack Temp (Deg R)** | 548.0 |
| **Meter Correction (Y)** | 1.031 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

==========

| | |
|---|---|
| **Volume Water Vapor, SCF** | **1.718** |
| **Gas Volume Sampled, STPD** | **35.391** |
| **Total Volume, STP** | **37.109** |
| **Moisture in stack gas, volume fraction** | **0.046** |
| **Dry Stack Gas, volume fraction** | **0.954** |
| **Molecular Weight of Stack Gas (Dry Basis)** | **28.84** |
| **Molecular Weight of Stack Gas (Stack conditions)** | **28.34** |
| **Specific gravity of Stack Gas Relative to Air** | **0.978** |
| **Excess Air (%)** | **14864.9** |
| **Average Stack Velocity, FPM** | **1604.8** |
| **Actual Stack Gas Flow Rate, ACFM** | **15440** |
| **Actual Stack Gas Flow Rate, (Dry) ACFMD** | **14730** |
| **Stack Gas Flow Rate, SCFMD** | **14275** |
| **Percent Isokinetic** | **96.4** |

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**Facility:** Georgia Pacific
**Stack:** Bleach Plant Outlet
**Run Date:** 5/25/01
**Run No:** 1

| Field Data Points | | | | |
|---|---|---|---|---|
| Trav. Pt. | Vel. Head | Meter Orif. | Stack 'F | Meter 'F |
| 1 | 0.23 | 1.60 | 92 | 91 |
| 2 | 0.23 | 1.60 | 91 | 92 |
| 3 | 0.22 | 1.53 | 89 | 93 |
| 4 | 0.22 | 1.53 | 90 | 93 |
| 5 | 0.22 | 1.53 | 90 | 93 |
| 6 | 0.2 | 1.39 | 90 | 93 |
| 7 | 0.22 | 1.53 | 86 | 93 |
| 8 | 0.23 | 1.60 | 85 | 93 |
| 9 | 0.22 | 1.53 | 85 | 93 |
| 10 | 0.22 | 1.53 | 85 | 94 |
| 11 | 0.21 | 1.46 | 88 | 95 |
| 12 | 0.18 | 1.25 | 85 | 94 |
| 13 | 0 | | 0 | 0 |
| 14 | 0 | | 0 | 0 |
| 15 | 0 | | 0 | 0 |
| 16 | 0 | | 0 | 0 |
| 17 | 0 | | 0 | 0 |
| 18 | 0 | | 0 | 0 |
| 19 | 0 | | 0 | 0 |
| 20 | 0 | | 0 | 0 |
| 21 | 0 | | 0 | 0 |
| 22 | 0 | | 0 | 0 |
| 23 | 0 | | 0 | 0 |
| 24 | 0 | | 0 | 0 |
| 25 | 0 | | 0 | 0 |
| 26 | 0 | | 0 | 0 |
| 27 | 0 | | 0 | 0 |
| 28 | 0 | | 0 | 0 |
| 29 | 0 | | 0 | 0 |
| 30 | 0 | | 0 | 0 |

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| | | | |
|---|---|---|---|
| **Facility** | | | |
| **Location** | Palatka, FL | | |
| **Stack** | Bleach Plant Outlet | | |
| **Run Date** | 5/25/01 | **Impinger Condensate, Ml** | 36.0 |
| **Run Number** | 2 | **Silica Gel Condensate, Gm** | 5.2 |
| **Start Time** | 2130 | **Volume Metered** | 36.140 |
| **Finish Time** | 2234 | **Meter Temp (Deg R)** | 545.8 |
| **Weather** | Scattered Clouds | **Orsat CO2 %** | 0.0 |
| **Total Time (min.)** | 60.00 | **Orsat O2 %** | 20.9 |
| **Barometric Pressure** | 30.09 | **Orsat CO %** | 0.0 |
| **Stack Diameter (in.)** | 42.000 | **Orsat N %** | 79.1 |
| **Stack Area sq. ft.** | 9.621 | **Condensate Volume, Ml** | 41.2 |
| **Nozzle Area sq. ft.** | 0.0004125 | **Delta H (Inches H2O)** | 1.4850 |
| **Number of Points** | 12 | **Stack Pressure** | 30.094 |
| **Avg of SQRT of V.H.** | 0.4616 | **Stack Temp (Deg R)** | 542.3 |
| **Meter Correction (Y)** | 1.031 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

==========

| | |
|---|---|
| **Volume Water Vapor, SCF** | **1.939** |
| **Gas Volume Sampled, STPD** | **36.388** |
| **Total Volume, STP** | **38.327** |
| **Moisture in stack gas, volume fraction** | **0.051** |
| **Dry Stack Gas, volume fraction** | **0.949** |
| **Molecular Weight of Stack Gas (Dry Basis)** | **28.84** |
| **Molecular Weight of Stack Gas (Stack conditions)** | **28.29** |
| **Specific gravity of Stack Gas Relative to Air** | **0.976** |
| **Excess Air (%)** | **14864.9** |
| **Average Stack Velocity, FPM** | **1585.7** |
| **Actual Stack Gas Flow Rate, ACFM** | **15256** |
| **Actual Stack Gas Flow Rate, (Dry) ACFMD** | **14478** |
| **Stack Gas Flow Rate, SCFMD** | **14178** |
| **Percent Isokinetic** | **99.8** |

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**Facility:** Georgia Pacific
**Stack:** Bleach Plant Outlet
**Run Date:** 5/25/01
**Run No:** 2

| Field Data Points | | | | |
|---|---|---|---|---|
| Trav. Pt. | Vel. Head | Meter Orif. | Stack ' F | Meter ' F |
| 1 | 0.23 | 1.60 | 81 | 85 |
| 2 | 0.23 | 1.60 | 82 | 85 |
| 3 | 0.22 | 1.53 | 82 | 85 |
| 4 | 0.22 | 1.53 | 82 | 84 |
| 5 | 0.21 | 1.46 | 83 | 88 |
| 6 | 0.2 | 1.39 | 82 | 87 |
| 7 | 0.23 | 1.60 | 82 | 85 |
| 8 | 0.22 | 1.53 | 83 | 86 |
| 9 | 0.21 | 1.46 | 82 | 86 |
| 10 | 0.21 | 1.46 | 83 | 86 |
| 11 | 0.2 | 1.39 | 83 | 86 |
| 12 | 0.18 | 1.25 | 83 | 86 |
| 13 | 0 | | 0 | 0 |
| 14 | 0 | | 0 | 0 |
| 15 | 0 | | 0 | 0 |
| 16 | 0 | | 0 | 0 |
| 17 | 0 | | 0 | 0 |
| 18 | 0 | | 0 | 0 |
| 19 | 0 | | 0 | 0 |
| 20 | 0 | | 0 | 0 |
| 21 | 0 | | 0 | 0 |
| 22 | 0 | | 0 | 0 |
| 23 | 0 | | 0 | 0 |
| 24 | 0 | | 0 | 0 |
| 25 | 0 | | 0 | 0 |
| 26 | 0 | | 0 | 0 |
| 27 | 0 | | 0 | 0 |
| 28 | 0 | | 0 | 0 |
| 29 | 0 | | 0 | 0 |
| 30 | 0 | | 0 | 0 |

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| | | | |
|---|---|---|---|
| **Facility** | Georgia Pacific | | |
| **Location** | Palatka, FL | | |
| **Stack** | Bleach Plant Outlet | | |
| **Run Date** | 5/25/01 | **Impinger Condensate, Ml** | 40.0 |
| **Run Number** | 3 | **Silica Gel Condensate, Gm** | 4.9 |
| **Start Time** | 2300 | **Volume Metered** | 36.222 |
| **Finish Time** | 2402 | **Meter Temp (Deg R)** | 542.2 |
| **Weather** | Partly Cloudy | **Orsat CO2 %** | 0.0 |
| **Total Time (min.)** | 60 | **Orsat O2 %** | 20.9 |
| **Barometric Pressure** | 30.09 | **Orsat CO %** | 0.0 |
| **Stack Diameter (in.)** | 42.000 | **Orsat N %** | 79.1 |
| **Stack Area sq. ft.** | 9.621 | **Condensate Volume, Ml** | 44.9 |
| **Nozzle Area sq. ft.** | 0.0004125 | **Delta H (inches H2O)** | 1.5250 |
| **Number of Points** | 12 | **Stack Pressure** | 30.094 |
| **Avg of SQRT of V.H.** | 0.4680 | **Stack Temp (Deg R)** | 537.1 |
| **Meter Correction (Y)** | 1.031 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

==========

| | |
|---|---|
| **Volume Water Vapor, SCF** | **2.113** |
| **Gas Volume Sampled, STPD** | **36.716** |
| **Total Volume, STP** | **38.829** |
| **Moisture in stack gas, volume fraction** | **0.054** |
| **Dry Stack Gas, volume fraction** | **0.946** |
| **Molecular Weight of Stack Gas (Dry Basis)** | **28.84** |
| **Molecular Weight of Stack Gas (Stack conditions)** | **28.25** |
| **Specific gravity of Stack Gas Relative to Air** | **0.974** |
| **Excess Air (%)** | **14864.9** |
| **Average Stack Velocity, FPM** | **1601.6** |
| **Actual Stack Gas Flow Rate, ACFM** | **15409** |
| **Actual Stack Gas Flow Rate, (Dry) ACFMD** | **14577** |
| **Stack Gas Flow Rate, SCFMD** | **14413** |
| **Percent Isokinetic** | **99.0** |

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**Facility:** Georgia Pacific
**Stack:** Bleach Plant Outlet
**Run Date:** 5/25/01
**Run No:** 3

| Field Data Points | | | | |
|---|---|---|---|---|
| Trav. Pt. | Vel. Head | Meter Orif. | Stack 'F | Meter 'F |
| 1 | 0.23 | 1.60 | 80 | 82 |
| 2 | 0.22 | 1.53 | 81 | 83 |
| 3 | 0.22 | 1.53 | 80 | 83 |
| 4 | 0.22 | 1.53 | 78 | 82 |
| 5 | 0.2 | 1.39 | 78 | 82 |
| 6 | 0.2 | 1.39 | 78 | 82 |
| 7 | 0.23 | 1.60 | 76 | 82 |
| 8 | 0.23 | 1.60 | 76 | 82 |
| 9 | 0.24 | 1.67 | 75 | 82 |
| 10 | 0.22 | 1.53 | 75 | 82 |
| 11 | 0.22 | 1.53 | 74 | 82 |
| 12 | 0.2 | 1.39 | 74 | 82 |
| 13 | 0 | | 0 | 0 |
| 14 | 0 | | 0 | 0 |
| 15 | 0 | | 0 | 0 |
| 16 | 0 | | 0 | 0 |
| 17 | 0 | | 0 | 0 |
| 18 | 0 | | 0 | 0 |
| 19 | 0 | | 0 | 0 |
| 20 | 0 | | 0 | 0 |
| 21 | 0 | | 0 | 0 |
| 22 | 0 | | 0 | 0 |
| 23 | 0 | | 0 | 0 |
| 24 | 0 | | 0 | 0 |
| 25 | 0 | | 0 | 0 |
| 26 | 0 | | 0 | 0 |
| 27 | 0 | | 0 | 0 |
| 28 | 0 | | 0 | 0 |
| 29 | 0 | | 0 | 0 |
| 30 | 0 | | 0 | 0 |

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## Volumetric Air-Flow Rates

| | | | |
|---|---|---|---|
| **Plant** | GEORGIA PACIFIC | | |
| **Location** | PALATKA, FL | | |
| **Stack** | BLEACH PLANT | | |
| **Run Date** | 5/26/01 | | |
| **Run Number** | 3 | **Volume Metered** | 0 |
| **Start Time** | 0 | **Meter Temp (Deg R)** | ERR |
| **Finish Time** | 0 | **Orsat CO2 %** | 0 |
| **Barometric Pressure** | 30.09 | **Orsat O2 %** | 21 |
| **Stack Diameter (in.)** | 42 | **Orsat CO %** | 0 |
| **Stack Area sq. ft.** | 9.621 | **Orsat N %** | 79 |
| **Number of Points** | 0 | **Condensate Volume** | 0 |
| **Avg of SQRT of V.H.** | 0.4641 | **Delta H (inches H2O)** | ERR |
| **Meter Correction (Y)** | 0 | **Stack Pressure** | 30.09 |
| **Pitot Correction Factor** | 0.84 | **Stack Temp (Deg R)** | 534.8 |

==========

| | |
|---|---|
| Moisture in stack gas, volume fraction | **0.053** |
| Dry Stack Gas, volume fraction | **0.947** |
| Molecular Weight of Stack Gas (Dry Basis) | **28.84** |
| Molecular Weight of Stack Gas (Stack conditions) | **28.270** |
| Specific gravity of Stack Gas Relative to Air | **0.975** |
| Excess Air (%) | |
| Average Stack Velocity, FPM | **1584.2** |
| Actual Stack Gas Flow Rate, ACFM | **15242** |
| Actual Stack Gas Flow Rate, (Dry) ACFMD | **14434** |
| Stack Gas Flow Rate (Standard conditions), SCFMD | **14331** |
| Stack Gas Flow Rate (Standard conditions), SCFMW | **15133** |

# APPENDIX B

# FIELD DATA SHEETS

TECHNICAL SERVICES, INC.
JACKSONVILLE, FL
(904)353-5761

**SOURCE SAMPLING FIELD DATA SHEET**

FACILITY: Georgia Pacific Palatka, GA RUN No. 1
SOURCE: Bleach Plant outlet DATE: ~~3~~ 5-25-01
WEATHER: Clear
TYPE TEST: M26A
TESTERS: DA / BAA
12 PTS. @ 5 MIN/PT 60 MIN F.D.A. = 0.92
Y meter = 1.031 Filter No. = _____
COMMENTS: Dave / GP Palatka

BAROMETRIC PRESS 30.09
METER BOX ID 11
METER DELTA Ha 2.32
PROBE ID 5cs
PITOT CORR. FACTOR 0.84
NOZZLE DIA. 0.275 in.
PROBE TEMP ~250
STACK ID (IN): ~~46~~ 42
PORT LENGTH 7"

**PRE-TEST.**
Ts = 558
Tm = 555

ORSAT:
CO2 0
O2 20.5
CO 0

| | | | | | |
|---|---|---|---|---|---|
| TIME | START | 1450 | START VOLUME | 212.658 | |
| TIME | END | 1952 | END VOLUME | 248.276 | |
| | | | Factors: | 6.959 | |

Eq = 0.36 lb/hr
Chlorinated hpps

LEAK CHECK: PRE.TEST 0.016 CFM@15". POST: 0.006 @ 2 " Hg.
PITOT LEAK CHECK = OK AT 3"
VOL. WATER COLLECTED = 32 ML
WEIGHT MOIS. SILICA GEL = 4.5 GR
STAT.PRESS= +0.07

SCFMD = 17124

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS DROP | STACK GAS TEMP. | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGER TEMP. | VACUUM INCHES Hg. |
|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 5 | 15.4 | 0.23 | 1.6 | 92 | 91 | 249 | 62 | 2 |
| 2 | 10 | 18.2 | 0.23 | 1.6 | 91 | 92 | 252 | 60 | 2 |
| 3 | 15 | 22.0 | 0.24 | 1.5 | 89 | 93 | 252 | 59 | 2 |
| 4 | 20 | 25.2 | 0.22 | 1.5 | 90 | 93 | 253 | 60 | 2 |
| 5 | 25 | 28.9 | 0.22 | 1.5 | 90 | 93 | 252 | 60 | 2 |
| 6 | 30 | 31.1 | 0.20 | 1.4 | 90 | 93 | 251 | 61 | 2 |
| | | | | | | | | | |
| 2-1 | 35 | 34.6 | 0.22 | 1.5 | 86 | 93 | 250 | 62 | 2 |
| 2 | 40 | 36.8 | 0.23 | 1.6 | 85 | 93 | 250 | 62 | 2 |
| 3 | 45 | 39.7 | 0.22 | 1.5 | 88 | 93 | 251 | 62 | 2 |
| 4 | 50 | 42.2 | 0.22 | 1.5 | 86 | 94 | 250 | 63 | 2 |
| 5 | 55 | 45.0 | 0.21 | 1.5 | 88 | 95 | 251 | 63 | 2 |
| 6 | 60 | | 0.18 | 1.3 | 88 | 94 | 252 | 63 | 2 |

[redacted] TECHNICAL [redacted] SERVICE [redacted] INC.
JACKSONVILLE, FL
(904)353-5761

FACILITY: Georgia Pacific Palatka, RUN No. 2
SOURCE: Bleach Plant outlet DATE 5-27-04
WEATHER: Scattered Clouds PRE-TEST. ORSAT
TYPE TEST: M26A Ts = CO2 0
TESTERS: LH/BM Tm = O2 20.5
12 PTS. @ 5 MIN/PT 60 MIN F.D.A. = CO 0
Y meter = 1.031 Filter No. = Computer
Directory and file name

BAROMETRIC PRESS 30.05
METER BOX ID 11
METER DELTA Ha 2.32
PROBE ID 509
PITOT CORR FACTOR 0.84
NOZZLE DIA 0.275 in
PROBE TEMP 250
STACK ID (IN) 46.42
PORT LENGTH 7"

TIME START 2130 START VOLUME [redacted] 248.351
TIME END 2234 END VOLUME 254.491
Factors: 6.959

LEAK CHECK
PRE TEST 0.010 CFM@15" POST 0.002 "Hg.
PITOT LEAK CHECK = OK AT 3"
VOL. WATER COLLECTED = 36 ML
WEIGHT MOIS. SILICA GEL = 5.2 GR
STAT PRESS= +0.05

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGER TEMP. | VACUUM INCHES Hg | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 5 | 52.4 | 0.23 | 1.6 | 81 | 85 | 244 | 64 | 3 | Stopped 2.8 L |
| 2 | 10 | 55.8 | 0.23 | 1.6 | 82 | 85 | 244 | 60 | 3 | |
| 3 | 15 | 58.2 | 0.22 | 1.5 | 83 | 85 | 254 | 60 | 3 | |
| 4 | 20 | 60.5 | 0.22 | 1.5 | 82 | 83 | 251 | 61 | 3 | |
| 5 | 25 | 63.4 | 0.21 | 1.5 | 83 | 85 | 250 | 61 | 3 | |
| 6 | 30 | 66.1 | 0.22 | 1.4 | 82 | 87 | 252 | 61 | 3 | |
| | | | | | | | | | | |
| 2-1 | 35 | 68.9 | 0.23 | 1.4 | 82 | 85 | 242 | 61 | 3 | |
| 2 | 40 | 71.2 | 0.22 | 1.5 | 83 | 86 | 245 | 60 | 3 | |
| 3 | 45 | 74.2 | 0.21 | 1.5 | 82 | 86 | 250 | 61 | 3 | |
| 4 | 50 | 77.8 | 0.21 | 1.5 | 83 | 86 | 249 | 61 | 3 | |
| 5 | 55 | 79.9 | 0.20 | 1.4 | 83 | 86 | 242 | 61 | 3 | |
| 6 | 60 | | 0.18 | 1.3 | 83 | 86 | 230 | 62 | 3 | |

[redacted] TECHNICAL SERVICES, INC. [redacted]
JACKSONVILLE, FL
(904)353-5761

## [redacted] SOURCE SAMPLING FIELD DATA SHEET

FACILITY: Georgia Pacific Palatka, FL RUN No 3
SOURCE: Bleach Plant Outlet DATE 5-25-01
WEATHER: Partly Cloudy
TYPE TEST: M26A
TESTERS: DA/BM
12 PTS. @ 5 MIN/PT 60 MIN F.D.A. =

BAROMETRIC PRESS 30.09
METER BOX ID 11
METER DELTA Ha 2.32
PROBE ID 549
PITOT CORR FACTOR 0.84
NOZZLE DIA 0.225 in
PROBE TEMP ~250
STACK ID (IN) 46 42
PORT LENGTH 7"

PRE-TEST.
Ts =
Tm =
Y meter = 1.032 Filter No. =

ORSAT
CO2 0
O2 20.8
CO 0

Computer
Directory and file name

TIME START 2300 START VOLUME 285.513
TIME END 2402 END VOLUME 320.215
Factors: 6.959

LEAK CHECK:
PRE TEST 0.00 CFM@15" POST: 0.001@3 "Hg.
PITOT LEAK CHECK = OK AT 3"
VOL. WATER COLLECTED = 40 ML
WEIGHT MOIS. SILICA GEL = 4.9 GR
STAT PRESS= -0.06

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS DROP | STACK GAS TEMP. | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGER TEMP. | VACUUM INCHES Hg | COMMENTS: |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 5 | 88.7 | 0.23 | 1.6 | 80 | 82 | 249 | 62 | 3 | |
| 2 | 10 | 90.8 | 0.22 | 1.5 | 81 | 83 | 255 | 60 | 3 | |
| 3 | 15 | 94.1 | 0.22 | 1.5 | 82 | 83 | 256 | 55 | 3 | |
| 4 | 20 | 98.2 | 0.22 | 1.4 | 78 | 82 | 252 | 66 | 3 | |
| 5 | 25 | 00.3 | 0.20 | 1.4 | 78 | 82 | 247 | 59 | 3 | |
| 6 | 30 | 03.1 | 0.20 | 1.4 | 78 | 82 | 245 | 59 | 3 | |
| | | | | | | | | | | |
| 2-1 | 35 | 05.6 | 0.23 | 1.6 | 76 | 82 | 242 | 60 | 3 | |
| 2 | 40 | 7.9 | 0.23 | 1.6 | 76 | 82 | 240 | 60 | 3 | |
| 3 | 45 | 10.5 | 0.24 | 1.7 | 75 | 82 | 241 | 60 | 3 | |
| 4 | 50 | 13.1 | 0.22 | 1.4 | 75 | 82 | 242 | 61 | 3 | |
| 5 | 55 | 17.2 | 0.22 | 1.4 | 74 | 82 | 245 | 60 | 3 | |
| 6 | 60 | | 0.22 | 1.4 | 74 | 82 | 236 | 61 | 3 | |

**Velocity Traverse**

Technical Services, Inc.
Jacksonville, FL (904)353-5761

Plant: Georgia Pacific Date: 5-25-01

Source: _____ Barometric Pressure: 30.05

Stack Diameter: 46

Run No. (4)

Start: 0030 Stop: 0035

Static Press.(in.H2O) +0.05

| Traverse Point No. | Velocity Head | Stack Temp. (Ts) Deg. F |
|---|---|---|
| 1-1 | 0.24 | 74 |
| 2 | 0.24 | 75 |
| 3 | 0.23 | 75 |
| 4 | 0.22 | 75 |
| 5 | 0.20 | 76 |
| 6 | 0.19 | 75 |
| | | |
| 2-1 | 0.23 | 74 |
| 2 | 0.23 | 75 |
| 3 | 0.22 | 75 |
| 4 | 0.22 | 75 |
| 5 | 0.19 | 75 |
| 6 | 0.18 | 74 |

Run No. _____

Start: Stop.

Static Press.(in.H2O) _____

| Traverse Point No. | Velocity Head | Stack Temp. (Ts) Deg. F |
|---|---|---|
| | | |

Run No. _____

Start: Stop:

Static Press.(in.H2O) _____

| Traverse Point No. | Velocity Head | Stack Temp. (Ts) Deg. F |
|---|---|---|
| | | |

# APPENDIX C

# LABORATORY ANALYSIS

Best Available Copy

# TECHNICAL SERVICES, INC.

## ENVIRONMENTAL CONSULTANTS

For Georgia Pacific (Palatka)
P O Box 919
Palatka, FL 32178-0919
Contact: Joe Taylor

*Report Date 30-May-01*
Date Received 05/26/2001 @ 10:20
Purchase Order #:

## CERTIFICATE OF ANALYSIS

| LAB | MATRIX | SAMPLE DATE | SAMPLE TIME | SAMPLED BY |
|---|---|---|---|---|
| SAMPLE DESCRIPTION | | | | |
| 01050850 | IMPINGER | 05/25/2001 | NA | TSI- D.S. , G.H. |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 1/ COMPOSITE | | | | |
| 01050851 | IMPINGER | 05/25/2001 | NA | TSI- D.S. , G.H. |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 2/ COMPOSITE | | | | |
| 01050852 | IMPINGER | 05/25/2001 | NA | TSI- D.S. , G.H. |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 3/ COMPOSITE | | | | |
| 01050853 | IMPINGER | 05/25/2001 | NA | TSI- D.S. , G.H. |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 1/ COMPOSITE | | | | |
| 01050854 | IMPINGER | 05/25/2001 | NA | TSI- D.S. , G.H. |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 2/ COMPOSITE | | | | |
| 01050855 | IMPINGER | 05/25/2001 | NA | TSI- D.S. , G.H. |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 3/ COMPOSITE | | | | |

Respectfully submitted,
Technical Services, Inc.

Walter Mock

Georgia Pacific (Palatka)

| Lab No. | Parameter | Result | | Code | Method | Detection Limit |
|---|---|---|---|---|---|---|
| 01050850 | Default | Not analyzed | | | | |
| 01050851 | Default | Not analyzed | | | | |
| 01050852 | Default | Not analyzed | | | | |
| 01050853 | Chloride | 0.971 | ug/ml Cl- | | Method 26A | 0.02 |
| 01050853 | Sample Volume | 196 | mls | | | 1 |
| | | 190.3 µg | | | | |
| 01050854 | Chloride | 0.808 | ug/ml Cl- | | Method 26A | 0.02 |
| 01050854 | Sample Volume | 200 | mls | | | 1 |
| | | 161.6 µg | | | | |
| 01050855 | Chloride | 0.838 | ug/ml Cl- | | Method 26A | 0.02 |
| 01050855 | Sample Volume | 194 | mls | | | 1 |
| | | 162.6 µg | | | | |

R-1

R-2

R-3

Georgia Pacific (Palatka)

| Lab No. | Parameter | Date of Analysis | Analysis Time | Analyst | Prep Date |
|---|---|---|---|---|---|
| 01050850 | Default | | | none | |
| 01050851 | Default | | | none | |
| 01050852 | Default | | | none | |
| 01050853 | Chloride | 05/26/2001 | | WEM | |
| 01050853 | Sample Volume | 05/26/2001 | | WEM | |
| 01050854 | Chloride | 05/26/2001 | | WEM | |
| 01050854 | Sample Volume | 05/26/2001 | | WEM | |
| 01050855 | Chloride | 05/26/2001 | | WEM | |
| 01050855 | Sample Volume | 05/26/2001 | | WEM | |

# APPENDIX D

# SCRUBBER DATA AND PROCESS CERTIFICATION

# BLEACH PLANT PRODUCTION DATA

| DATE | TIME | ADTUP | FAN LOAD, % |
|---|---|---|---|
| 05/25/01 | 1850-1952 | 55 | 85.1 |
| | 2133-2300 | 50 | 85.6 |
| | 2300-2330 | 55 | 85.9 |
| | 2330-0042 | 50 | 85.8 |
| | 0145-0230 | 50 | 85.2 |

ADTUP is air-dried tons of unbleached pulp across the bleach plant.
Fan load is the % of full load (amperage) of the fan used as the surrogate flow measure.
The scrubber recirculation flow ranged from 1500 gpm to 1740 gpm during the testing.
The scrubber pH was 9.5 during the testing.

DATA CERTIFICATION BY OWNER OR HIS AUTHORIZED AGENT

I, Myra Carpenter (print name),

certify that to my knowledge all data

submitted in this compliance test report

for the ECF Bleach Plant unit

on May 25, 2001 (date)

are true and correct.

Myra Carpenter (signature and title)

# APPENDIX E

# CHAIN OF CUSTODY

0105085C -
0105085

**Technical Services, Inc.**
**2901 Danese St., Jacksonville, FL 32206**
**(904) 353-5761 / fax (904) 358-2908**

# CHAIN of CUSTODY RECORD

CLIENT NAME & ADDRESS (REPORT TO BE SENT TO:) c/o Air Dept
Georgia Pacific
Palatka, FL

REMARKS
Bleach Plant inlet & Outlet
Method 26A

PROJ. NO.

PROJECT NAME/ ADDRESS:

SAMPLERS: (SIGNATURE)
L. Stark G Hawkins

| Sample Location ID | DATE | TIME | COMP | GRAB | TOTAL NO. of Containers | BOTTLE MAKEUP | PARAMETERS |
|---|---|---|---|---|---|---|---|
| Outlet R-1 | 5-25-01 | N/A | ✓ | | 1 | 0.1N $H_2SO_4$ | M 26A |
| 2 | ↓ | ↓ | ↓ | | 1 | | |
| 3 | | | | | 1 | | |
| R-1 | | | | | 1 | 0.1N NaOH | |
| 2 | | | | | 1 | | |
| 3 | | | | | 1 | | |

| | | | |
|---|---|---|---|
| RELINQUISHED BY: L. Stark | DATE/TIME 5/26/01 1100 | RECEIVED BY | DATE/TIME |
| RELINQUISHED BY | DATE/TIME | RECEIVED BY | DATE/TIME |
| RELINQUISHED BY | DATE/TIME | RECEIVED BY | DATE/TIME |
| | | RECEIVED FOR LABORATORY BY | DATE/TIME 5/26/01 1620 |

# APPENDIX F

# CALIBRATION DATA

T S I

# Annual Dry Gas Meter Calibration Data By TSI Reference Meter

REFERENCE METER R-275 TSI Reference Dry Meter Calibration Date: 8/09/00

Yi of reference meter: 1.012

Date 1/4/01 Calibrated by R Garza

Barometric Pressure 30.12 Meter Box 11

| Orifice Manometer Setting (DH) In. H2O | Reference Dry Gas Meter Cu.ft. | Gas Volume: Reference Meter (Vw) Std.Cu. Ft. | Gas Volume: Dry Gas Meter (VD) Cu. Ft. | Temperature: Reference Meter (Tw) Deg ^F | Temperature: Dry Gas Meter Temperature (Td) Deg ^F | | Time (t), min | Delta H In. H2O | Yi |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 10.015 | 10.099 | 9.715 | 73.2 | X | 66.40 | 29.34 | 2.39 | 1.025 |
| 1 | 10.002 | 10.082 | 9.761 | 73.4 | X | 70.90 | 20.46 | 2.31 | 1.026 |
| 1.5 | 10.005 | 10.044 | 9.642 | 75.6 | X | 73.30 | 17.00 | 2.42 | 1.033 |
| 2 | 10.013 | 10.075 | 9.691 | 74.4 | X | 74.50 | 14.50 | 2.32 | 1.035 |
| 3 | 10.012 | 10.057 | 9.645 | 75.3 | X | 75.40 | 11.39 | 2.16 | 1.035 |
| | | | | | Average Delta H and Y | | | 2.32 | 1.031 |
| | | | | | Yi Allowance = | | 1.011 | To | 1.051 |
| | | | | | DH Allowance = | | 2.12 | To | 2.52 |

* If there is only one thermometer on the dry gas meter, record the temperature under Td

Vw = Gas volume passing through the Reference test meter, (cu. ft.)

Vd = Gas volume passing through the dry gas meter, (cu. ft.)

Tw = Temperature of the gas in the Reference test meter, Deg F

Td = Temperature of the gas in the dry gas meter, Deg F

DH = Pressure differential across orifice, in H2O = pretest DH + or - 0.20

Yi = Ratio of accuracy of the Reference test meter to dry gas meter for each run

Y = Average ratio of the Reference test meter to dry gas meter for all three test runs; tolerance = pretest Y + or - 0.02Y

Pb = Barometric pressure, in. Hg.

t = Time of calibration run, min.

Quality Assurance Handbook M5-2.4A

Quality Assurance Handbook M5-2.4A

T S I

## Post-Test Dry Gas Meter Calibration Data Form (English Units)

**Test numbers** All **Date** 5/31/01 **Meter Box No.** 11 **Facility** GP

**Barometric Pressure, Pb** 30.05 **Reference Meter** R-275 **Pretest Y Value** 1.024

| Orifice Manometer Setting (DH) In. H2O | Gas Volume: Reference Meter (Vw) Cu. Ft. | Gas Volume: Dry Gas Meter (VD) Cu. Ft. | Temperature: Reference Meter (Tw) Deg ^F | Temperature: Dry Gas Meter | | Temperature: Dry Gas Meter: Average (Td) Deg ^F | Time (), min | Vacuum Setting In. Hg. | Yi |
|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 10.003 | 9.831 | 75 | X | X | 75 | 16.87 | < 2 | 1.014 |
| 1.5 | 10.001 | 9.823 | 75 | X | X | 76 | 16.56 | <2 | 1.016 |
| 1.5 | 10.000 | 9.820 | 80 | X | X | 81 | 16.92 | <2 | 1.016 |
| | | | | | | | | Yi = | 1.016 |

* If there is only one thermometer on the dry gas meter, record the temperature under Td

$$Yi = \frac{Vw * Pb * (Td + 460)}{Vd\,(Pb + (Delta\ H/13.6)) \times (Tw + 460)}$$

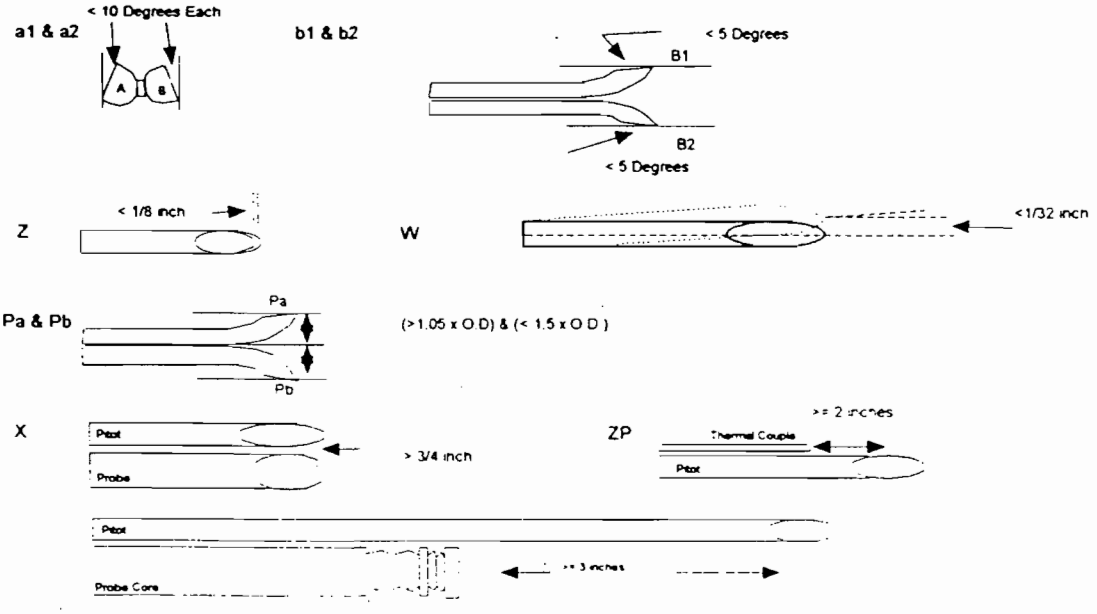
Vw = Gas volume passing through the reference test meter, (cu. ft.)
Vd = Gas volume passing through the dry gas meter, (cu. ft.)
Tw = Temperature of the gas in the reference test meter, Deg F
(Td)i = Temperature of the inlet gas of the dry gas meter, Deg F
(Td) = Temperature of the outlet gas of the dry gas meter, Deg F
Td = Average temperature of the gas in the dry gas meter, obtained by the average of (Td)i & (Td)o, Deg F
DH = Pressure differential across orifice, in H2O
Yi = Ratio of accuracy of the reference test meter to dry gas meter for each run
Y = Average ratio of the reference test meter to dry gas meter for all three test runs;
tolerance = pretest Y + or - 0.02Y
Pb = Barometric pressure, in. Hg.
= Time of calibration run, min.

## ANNUAL PITOT TUBE CALIBRATION WORKSHEET
## MARCH 22, 2001

| Pitot Tube I.D. # | Coefficient | Pa Inches | Pb Inches | Dt Inches | Zs Inches | Ws Inches | a1 Degrees | a2 Degrees | b1 Degrees | b2 Degrees | X Inches | Zp Inches | Y Inches |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WC1 | 0.84 | 0.555 | 0.533 | 0.373 | 0.07 | < 0.313 | 0 | 2 | 2 | 3 | 0.74 | 2.0 | 4.0 |
| 3A | 0.84 | 0.554 | 0.556 | 0.374 | 0.061 | < 0.313 | 1 | 3 | 2 | 2 | 1.4 | 2.0 | 4.0 |
| 3AG | 0.84 | 0.550 | 0.551 | 0.375 | 0.003 | < 0.313 | 2 | 3 | 3 | 2 | 1.5 | 2.0 | 4.0 |
| 4A | 0.84 | 0.540 | 0.538 | 0.375 | 0.049 | < 0.313 | 1 | 3 | 2 | 2 | 1.4 | 2.0 | 4.0 |
| 4AG | 0.84 | 0.557 | 0.554 | 0.373 | 0.03 | < 0.313 | 1 | 1 | 3 | 0 | 1.5 | 2.0 | 4.0 |
| 6A | 0.84 | 0.512 | 0.539 | 0.375 | 0.063 | < 0.313 | 0 | 2 | 2 | 1 | 1.5 | 2.0 | 4.0 |
| 6B | 0.84 | 0.405 | 0.415 | 0.375 | 0.06 | < 0.313 | 0 | 3 | 2 | 1 | 1.2 | 2.0 | 4.0 |
| 5CG | 0.84 | 0.540 | 0.551 | 0.375 | 0.066 | < 0.313 | 2 | 3 | 2 | 2 | 1.12 | 2.0 | 4.0 |
| 7A | 0.84 | 0.550 | 0.542 | 0.374 | 0.056 | < 0.313 | 1 | 2 | 1 | 2 | 1.31 | 2.0 | 4.0 |
| 7B | 0.84 | 0.549 | 0.542 | 0.375 | 0.06 | < 0.313 | 3 | 1 | 1 | 1 | 1.38 | 2.0 | 4.0 |
| 7C | 0.84 | 0.555 | 0.550 | 0.375 | 0.051 | < 0.313 | 1 | 2 | 2 | 2 | 1.41 | 2.0 | 4.0 |
| 7AG | 0.84 | 0.540 | 0.535 | 0.371 | 0.037 | < 0.313 | 3 | 3 | 1 | 1 | 1.3 | 2.0 | 4.0 |
| 7BG | 0.84 | 0.550 | 0.551 | 0.375 | 0.034 | < 0.313 | 2 | 2 | 3 | 3 | 1.1 | 2.0 | 4.0 |
| 7CG | 0.84 | 0.556 | 0.554 | 0.375 | 0.032 | < 0.313 | 1 | 3 | 1 | 1 | 1.35 | 2.0 | 4.0 |
| 8A | 0.84 | 0.531 | 0.545 | 0.375 | 0.031 | < 0.313 | 2 | 2 | 0 | 2 | 1.2 | 2.0 | 4.0 |
| 9A | 0.84 | 0.520 | 0.512 | 0.374 | 0.056 | < 0.313 | 2 | 2 | 1 | 1 | 1.51 | 2.0 | 4.0 |
| 10A | 0.84 | 0.554 | 0.544 | 0.374 | 0.078 | < 0.313 | 2 | 2 | 0 | 1 | 1.28 | 2.0 | 4.0 |
| 10B | 0.84 | 0.550 | 0.552 | 0.375 | 0.05 | < 0.313 | 1 | 1 | 3 | 2 | 1.25 | 2.0 | 4.0 |
| 12A | 0.84 | 0.407 | 0.411 | 0.374 | 0.059 | < 0.313 | 3 | 3 | 2 | 2 | 1.35 | 2.0 | 4.0 |

Calibrations performed by George Hawkins

**Pa** Distance between where pitots adjoin to tip of pitot (Must be between 1.05 & 1.50 times O.D. of tubing)
**Pb** Distance between where pitots adjoin to tip of pitot (Must be between 1.05 & 1.50 times O.D. of tubing)
**Dt** Diameter of pitot tube (0.375 inches on all pitots)
**Zs** Distance between the tip of the impact and static line along the length of the pitot (Must be < 1/8 inch ( 0.1250))
**Ws** Spacing between Pitot tubes where welded together (Must be < 1/32 inch (0.0313))
**a1** Angle across opening of Pitot tube from side to side or perpendicular to length of probe (Must be < 10 Deg)
**a2** Angle across opening of Pitot tube from side to side or perpendicular to length of probe (Must be < 10 Deg)
**b1** Angle across opening of Pitot tube from side to side or perpendicular to length of probe (Must be < 5 Deg)
**b2** Angle across opening of Pitot tube from side to side or perpendicular to length of probe (Must be < 5 Deg)
**X** Distance between side of nozzle and side of pitot tube (Must be > 3/4 inch)
**Zp** Distance from center of pitot opening back to tip of thermal couple (Must be >= 3/4 inch ( 0.75))
**Y** Distance from center of pitot opening back to probe (Must be >= 3 inches)



T S I

# Air Report - Method Five Equipment Calibrations

## NOZZLE CALIBRATION

| | | | |
|---|---|---|---|
| Facility | Georgia Pacific | Date | 5/25/01 |
| Location | Palatka, FL | | |
| Source Name | Bleach Plant Outlet | Analyst | WA |

### Calibration Data

All Technical Services, Inc. pitot tubes have been modified to comply with specifications as presented in the Thursday, August 18, 1977 Federal Register (Vol. 42, No. 160). A pitot tube correction factor of 0.84 has been assigned.

Our thermometers, pyrometers and thermocouples are calibrated against a standard mercury thermometer in a hot oven in our laboratory. (Data on following page.)

Our field barometer is checked before every test against that of our laboratory mercury barometer.

All probe nozzles are calibrated each test run to assure isokinetic sampling.

Nozzle Diameter in Inches: 0.275

| | | | | Mean |
|---|---|---|---|---|
| Run 1 | 0.275 | 0.275 | 0.275 | 0.275 |

## Air Report - Method Five Equipment Calibrations

### THERMOCOUPLE CALIBRATIONS

Facility: Georgia Pacific  Date: 5/31/01

Location: Palatka, FL  Analyst: [signature]

Source Name: Bleach Plant Outlet Inlet

**Calibration Data**

Ambient Temperature: 75  Reference: Mercury in glass: X

Thermocouple Number: 5cg  Other:

Barometric Pressure: 29.97

| Reference Point Number | Source(a) (specify) | Reference Thermometer Temperature | Thermocouple Temperature | Temperature Difference(b) |
|---|---|---|---|---|
| 1 | Ice Bath | 34 | 33 | 0.20 |
| 2 | Inter-mediate | 75 | 73 | 0.37 |
| 3 | Boiling Water | 212 | 212 | 0.00 |
| 4 | Hot Oil | 347 | 345 | 0.25 |

≡ Type of calibration system used

= $\frac{(\text{REF. TEMP. } +460)-(\text{THERMOCOUPLE TEMP. } +460)}{\text{ref. temp } + 460} \times 100 <= 1.5\%$

## GEORGIA PACIFIC

## PALATKA, FLORIDA

## SUMMARY OF CO CALIBRATIONS - BLEACH PLANT

**5/25/01 - 5/26/01**

| INSTRUMENT RANGE, PPM | 1200 | | | |
|---|---|---|---|---|
| **CALIBRATION GAS PPM** | **INITIAL CALIBRATION** | **END RUN 1** | **END RUN 2** | **END RUN 3** |
| 0.0 | 12.0 | 12.0 | 11.3 | 10.8 |
| 1015.0 | 1016.4 | 1020.0 | 1032.5 | 1031.6 |
| 594.7 | 575.1 | N/A | N/A | N/A |
| 301.9 | 293.5 | N/A | N/A | N/A |
| **CALIBRATION ERROR** | | **((INSTRUMENT RESPONSE-CALIBRATION GAS VALUE)/INSTRUMENT RANGE)X100** | | |
| 0.0 | 1.0 | 1.0 | 0.9 | 0.9 |
| 1015.0 | 0.1 | 0.4 | 1.5 | 1.4 |
| 594.7 | -1.6 | N/A | N/A | N/A |
| 301.9 | -0.7 | N/A | N/A | N/A |
| **CALIBRATION DRIFT** | | **((FINAL CALIBRATION - INITIAL CALIBRATION)/INSTRUMENT RANGE)X100** | | |
| 0.0 | N/A | 0.0 | -0.1 | -0.1 |
| 1015.0 | N/A | 0.3 | 1.3 | 1.3 |
| 594.7 | N/A | N/A | N/A | N/A |

| **ZERO BIAS CHECKS** | | **(SAMPLE SYSTEM-DIRECT)/RANGEX100** | |
|---|---|---|---|
| SAMPLE ZERO | DIRECT ZERO | **BIAS** | |
| N/A | N/A | #VALUE! INITIAL | |
| N/A | N/A | #VALUE! FINAL | ALL CAL |
| **CALIBRATION BIAS CHECKS** | | | GASES INJECTED |
| CALIBRATION GAS, PPM | N/A | | TO PROBE TIP ONLY |
| SAMPLE | DIRECT | **BIAS** | |
| N/A | N/A | #VALUE! INITIAL | |
| N/A | N/A | #VALUE! FINAL | |

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PRAXAIR

**Praxair Distribution, Inc.**
145 Shimersville Road
Bethlehem, PA 18015
Tel. (610) 691-2474
Fax (610) 758-8384

# *CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS*

**CUSTOMER** PRAXAIR SOUTHEAST **P.O NUMBER** 333045-00

## *REFERENCE STANDARD*

| COMPONENT | NIST SRM NO. | CYLINDER NO. | CONCENTRATION |
|---|---|---|---|
| CARBON MONOXIDE 503.2PPM GMIS VS | 1680B | CLM-009396 | 490.4 PPM |

## *ANALYZER READINGS*

***R=REFERENCE STANDARD*** ***Z=ZERO GAS*** ***C=GAS CANDIDATE***

**COMPONENT** CARBON MONOXIDE 503.2PPM GMIS **ANALYZER MAKE-MODEL-S/N** Siemens Ultramat SE S/N B8-900

**ANALYTICAL PRINCIPLE** NON-DISPERSIVE INFRARED **LAST CALIBRATION DATE** 12/31/00

**FIRST ANALYSIS DATE** 12/27/00 **SECOND ANALYSIS DATE** 01/03/01

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Z 0 | R 503 | C 301 | CONC. 301.3 | Z 0 | R 504 | C 302 | CONC. 301.5 | | |
| R 502 | Z 0 | C 302 | CONC. 302.3 | R 504 | Z 0 | C 302 | CONC. 301.5 | | |
| Z 0 | C 302 | R 503 | CONC. 302.3 | Z 0 | C 303 | R 504 | CONC. 302.5 | | |
| U/M ppm | | MEAN TEST ASSAY 302.0 | | U/M ppm | | MEAN TEST ASSAY 301.9 | | | |

VALUES NOT VALID BELOW 150 PSIG

UNCERTAINTIY OF CARBON MONOXIDE: ±1.9PPM

THIS CYLINDER NO. CC114912 **CERTIFIED CONCENTRATION**

HAS BEEN CERTIFIED ACCORDING TO SECTION 2.0 CARBON MONOXIDE 301.9PPM

OF TRACEABILITY PROTOCOL NO. EPA-600/R97/121 AIR BALANCE

PROCEDURE G1

CERTIFIED ACCURACY ± 1 % NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE 01/03/01

EXPIRATION DATE 01/03/04 TERM

*ANALYZED BY* *CERTIFIED BY*

JOHN FRIBISH KEVIN BRADY

Best Available Copy

PRAXAIR

**Praxair Distribution, Inc.**
145 Shimersville Road
Bethlehem, PA 18015
Tel. (610) 691-2474
Fax (610) 758-8384

# *CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS*

**CUSTOMER** PRAXAIR SOUTHEAST **P.O NUMBER** 333045-00

## *REFERENCE STANDARD*

| COMPONENT | NIST SRM NO. | CYLINDER NO. | CONCENTRATION |
|---|---|---|---|
| CARBON MONOXIDE 503.2PPM GMIS VS | 1680B | CLM-009396 | 490.4 PPM |

## *ANALYZER READINGS*

***R=REFERENCE STANDARD*** ***Z=ZERO GAS*** ***C=GAS CANDIDATE***

**1. COMPONENT** CARBON MONOXIDE 503.2PPM GMIS **ANALYZER MAKE-MODEL-S/N** Siemens Ultramat SE S/N B8-900

**ANALYTICAL PRINCIPLE** NON-DISPERSIVE INFRARED **LAST CALIBRATION DATE** 12/31/00

**FIRST ANALYSIS DATE** 12/27/00 **SECOND ANALYSIS DATE** 01/03/01

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Z 0 | R 503 | C 595 | CONC. 595.6 | | Z 0 | R 504 | C 595 | CONC. 594.1 | |
| R 502 | Z 0 | C 595 | CONC. 595.6 | | R 504 | Z 0 | C 595 | CONC. 594.1 | |
| Z 0 | C 594 | R 503 | CONC. 594.6 | | Z 0 | C 595 | R 504 | CONC. 594.1 | |
| U/M ppm | | MEAN TEST ASSAY 595.3 | | | U/M ppm | | | MEAN TEST ASSAY 594.1 | |

VALUES NOT VALID BELOW 150 PSIG

UNCERTAINTIY OF CARBON MONOXIDE: ±4.2PPM

THIS CYLINDER NO. SA12251

HAS BEEN CERTIFIED ACCORDING TO SECTION 2.2

OF TRACEABILITY PROTOCOL NO. EPA-600/R97/121

PROCEDURE G1

CERTIFIED ACCURACY ± 1 % NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE 01/03/01

EXPIRATION DATE 01/03/04 TERM

**CERTIFIED CONCENTRATION**

| | |
|---|---|
| CARBON MONOXIDE | 594.7PPM |
| AIR | BALANCE |

*ANALYZED BY* JOHN PRIBISH *CERTIFIED BY*

**SPECTRA GASES**
277 Coit St. • Irvington, NJ 07111 USA Tel.: (973) 372-2060 • (800) 932-0624 • Fax: (973) 372-8551
Shipped From: 80 Industrial Drive • Alpha, N.J. 08865

## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE
**PROCEDURE # : G2**

**CUSTOMER:** Ambient Air Service
**SGI ORDER # :** 134478
**ITEM# :** 1
**P.O.# :** 07079802

**CYLINDER # :** CC88617
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 350

**CERTIFICATION DATE:** 7/8/98
**EXPIRATION DATE:** 7/8/2001

**CERTIFICATION HISTORY**

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 2/24/98<br>7/8/98 | 1014 ppm<br>1017 ppm | 1015 ppm | +/- 1% |
| | | | | |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**REFERENCE STANDARDS**

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | NTRM-81681 | CC55775 | 994 ppm |
| | | | |
| | | | |
| | | | |

**INSTRUMENTATION**

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 6/29/98 |
| | | | | |
| | | | | |
| | | | | |

**THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

ANALYST: _____ DATE: 7/8/98
FRED PIKULA

# APPENDIX G

# CARBON MONOXIDE EMISSIONS

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1015 ppm cal | CORRECTED PPM | FLOW, scfm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 18:46 | 1030.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:46 | 1026.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:46 | 1022.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:46 | 1026.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:47 | 1030.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:47 | 1024.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:47 | 1022.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:47 | 1016.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:48 | 923.8 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:48 | 456.9 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:48 | 144.2 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:48 | 24.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:49 | 14.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:49 | 24.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:49 | 56.1 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:49 | 44.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:50 | 18.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:50 | 12.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:50 | 12.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:50 | 10.0 | 0 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:51 | 10.0 | 0 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:51 | 10.0 | 0 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:51 | 12.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:51 | 16.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:52 | 60.1 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:52 | 154.3 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:52 | 214.4 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:52 | 270.5 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:53 | 288.5 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:53 | 292.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:53 | 294.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:53 | 294.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:54 | 292.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:54 | 292.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:54 | 294.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:54 | 294.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:55 | 292.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:55 | 286.5 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:55 | 298.5 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:55 | 440.8 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:56 | 545.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:56 | 575.1 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:56 | 579.1 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:56 | 581.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:57 | 583.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:57 | 583.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:57 | 581.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:57 | 581.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:58 | 581.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:58 | 581.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:58 | 643.2 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:58 | 939.8 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:59 | 1070.1 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:59 | 1118.2 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 21:37 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:37 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:38 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:38 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:38 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:38 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:39 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1015 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 21:39 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:39 | 14.0 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:39 | 212.4 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:40 | 649.2 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:40 | 959.9 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:40 | 1010.0 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:40 | 1014.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:41 | 1018.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:41 | 1016.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:41 | 1012.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:41 | 1018.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:42 | 1020.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:42 | 1014.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:42 | 1018.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:42 | 1018.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:43 | 1014.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:43 | 1020.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:43 | 1016.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:43 | 1014.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:44 | 1018.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:44 | 1008.0 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:44 | 933.8 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:44 | 729.4 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:45 | 611.2 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:45 | 581.1 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:45 | 575.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:45 | 575.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:46 | 577.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:46 | 575.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:46 | 577.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:46 | 573.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:47 | 573.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:47 | 561.1 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:47 | 601.1 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:47 | 675.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:48 | 701.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:48 | 713.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:48 | 721.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:48 | 723.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:49 | 717.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:49 | 717.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:49 | 719.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:49 | 719.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:50 | 715.4 | run 1 | 11.982 | 1018.2 | 709.5 | 14183 | 43.9 |
| 5/25/01 21:50 | 713.4 | run 1 | 11.982 | 1018.2 | 707.5 | 14183 | 43.8 |
| 5/25/01 21:50 | 711.4 | run 1 | 11.982 | 1018.2 | 705.5 | 14183 | 43.7 |
| 5/25/01 21:50 | 709.4 | run 1 | 11.982 | 1018.2 | 703.5 | 14183 | 43.5 |
| 5/25/01 21:51 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 21:51 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 21:51 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 21:51 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 21:52 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 21:52 | 679.3 | run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 21:52 | 683.3 | run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 21:52 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 21:53 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 21:53 | 691.3 | run 1 | 11.982 | 1018.2 | 685.3 | 14183 | 42.4 |
| 5/25/01 21:53 | 691.3 | run 1 | 11.982 | 1018.2 | 685.3 | 14183 | 42.4 |
| 5/25/01 21:53 | 685.3 | run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 21:54 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 21:54 | 683.3 | run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, acfm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 21:54 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 21:54 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.3 | 14183 | 41.0 |
| 5/25/01 21:55 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.3 | 14183 | 41.0 |
| 5/25/01 21:55 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 21:55 | 673.3 | Run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 21:55 | 665.3 | Run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |
| 5/25/01 21:56 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.3 | 14183 | 41.0 |
| 5/25/01 21:56 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 21:56 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 21:56 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 21:57 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 21:57 | 673.3 | Run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 21:57 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 21:57 | 663.3 | Run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 21:58 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 21:58 | 663.3 | Run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 21:58 | 655.3 | Run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 21:58 | 655.3 | Run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 21:59 | 661.3 | Run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 21:59 | 649.2 | Run 1 | 11.982 | 1018.2 | 642.8 | 14183 | 39.8 |
| 5/25/01 21:59 | 633.2 | Run 1 | 11.982 | 1018.2 | 626.7 | 14183 | 38.8 |
| 5/25/01 21:59 | 639.2 | Run 1 | 11.982 | 1018.2 | 632.7 | 14183 | 39.1 |
| 5/25/01 22:00 | 647.2 | Run 1 | 11.982 | 1018.2 | 640.8 | 14183 | 39.6 |
| 5/25/01 22:00 | 641.2 | Run 1 | 11.982 | 1018.2 | 634.7 | 14183 | 39.3 |
| 5/25/01 22:00 | 639.2 | Run 1 | 11.982 | 1018.2 | 632.7 | 14183 | 39.1 |
| 5/25/01 22:00 | 651.2 | Run 1 | 11.982 | 1018.2 | 644.9 | 14183 | 39.9 |
| 5/25/01 22:01 | 655.3 | Run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:01 | 657.3 | Run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:01 | 665.3 | Run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |
| 5/25/01 22:01 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:02 | 685.3 | Run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:02 | 693.3 | Run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:02 | 693.3 | Run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:02 | 691.3 | Run 1 | 11.982 | 1018.2 | 685.3 | 14183 | 42.4 |
| 5/25/01 22:03 | 693.3 | Run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:03 | 697.3 | Run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:03 | 697.3 | Run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:03 | 705.4 | Run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:04 | 705.4 | Run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:04 | 695.3 | Run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:04 | 685.3 | Run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:04 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:05 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:05 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:05 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:05 | 663.3 | Run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:06 | 659.3 | Run 1 | 11.982 | 1018.2 | 652.9 | 14183 | 40.4 |
| 5/25/01 22:06 | 657.3 | Run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:06 | 651.2 | Run 1 | 11.982 | 1018.2 | 644.9 | 14183 | 39.9 |
| 5/25/01 22:06 | 643.2 | Run 1 | 11.982 | 1018.2 | 636.8 | 14183 | 39.4 |
| 5/25/01 22:07 | 647.2 | Run 1 | 11.982 | 1018.2 | 640.8 | 14183 | 39.6 |
| 5/25/01 22:07 | 655.3 | Run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:07 | 653.2 | Run 1 | 11.982 | 1018.2 | 646.9 | 14183 | 40.0 |
| 5/25/01 22:07 | 651.2 | Run 1 | 11.982 | 1018.2 | 644.9 | 14183 | 39.9 |
| 5/25/01 22:08 | 655.3 | Run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:08 | 657.3 | Run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:08 | 653.2 | Run 1 | 11.982 | 1018.2 | 646.9 | 14183 | 40.0 |
| 5/25/01 22:08 | 655.3 | Run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:09 | 663.3 | Run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:09 | 665.3 | Run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 41.0 |
| 5/25/01 22:09 | 665.3 | Run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, acfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 22:09 | 663.3 | Run 1 | 11.982 | 1018.2 | 557.0 | 14183 | 40.6 |
| 5/25/01 22:10 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:10 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:10 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:10 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:11 | 683.3 | Run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:11 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:11 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:11 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:12 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:12 | 661.3 | Run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 22:12 | 665.3 | Run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |
| 5/25/01 22:12 | 665.3 | Run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |
| 5/25/01 22:13 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:13 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:13 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:13 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:14 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:14 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:14 | 673.3 | Run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:14 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:15 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:15 | 683.3 | Run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:15 | 683.3 | Run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:15 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:16 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:16 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:16 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:16 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:17 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:17 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:17 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:17 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:18 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:18 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:18 | 673.3 | Run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:18 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:19 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:19 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:19 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:19 | 685.3 | Run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:20 | 685.3 | Run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:20 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:20 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:20 | 673.3 | Run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:21 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:21 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:21 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:21 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:22 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:22 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:22 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:22 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:23 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:23 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:23 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:23 | 683.3 | Run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:24 | 689.3 | Run 1 | 11.982 | 1018.2 | 683.3 | 14183 | 42.3 |
| 5/25/01 22:24 | 693.3 | Run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:24 | 687.3 | Run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 22:24 | 689.3 | Run 1 | 11.982 | 1018.2 | 683.3 | 14183 | 42.3 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 22:25 | 687.3 | Run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 22:25 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:25 | 685.3 | Run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:25 | 683.3 | Run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:26 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:26 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:26 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:26 | 687.3 | Run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 22:27 | 693.3 | Run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:27 | 695.3 | Run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:27 | 695.3 | Run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:27 | 697.3 | Run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:28 | 699.3 | Run 1 | 11.982 | 1018.2 | 693.4 | 14183 | 42.9 |
| 5/25/01 22:28 | 697.3 | Run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:28 | 695.3 | Run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:28 | 695.3 | Run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:29 | 697.3 | Run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:29 | 697.3 | Run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:29 | 699.3 | Run 1 | 11.982 | 1018.2 | 693.4 | 14183 | 42.9 |
| 5/25/01 22:29 | 709.4 | Run 1 | 11.982 | 1018.2 | 703.5 | 14183 | 43.5 |
| 5/25/01 22:30 | 717.4 | Run 1 | 11.982 | 1018.2 | 711.6 | 14183 | 44.0 |
| 5/25/01 22:30 | 711.4 | Run 1 | 11.982 | 1018.2 | 705.5 | 14183 | 43.7 |
| 5/25/01 22:30 | 703.3 | Run 1 | 11.982 | 1018.2 | 697.4 | 14183 | 43.2 |
| 5/25/01 22:30 | 701.3 | Run 1 | 11.982 | 1018.2 | 695.4 | 14183 | 43.0 |
| 5/25/01 22:31 | 695.3 | Run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:31 | 693.3 | Run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:31 | 695.3 | Run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:31 | 697.3 | Run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:32 | 695.3 | Run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:32 | 693.3 | Run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:32 | 687.3 | Run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 22:32 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:33 | 673.3 | Run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:33 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:33 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:33 | 655.3 | Run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:34 | 647.2 | Run 1 | 11.982 | 1018.2 | 640.8 | 14183 | 39.6 |
| 5/25/01 22:34 | 647.2 | Run 1 | 11.982 | 1018.2 | 640.8 | 14183 | 39.6 |
| 5/25/01 22:34 | 641.2 | Run 1 | 11.982 | 1018.2 | 634.7 | 14183 | 39.3 |
| 5/25/01 22:34 | 639.2 | Run 1 | 11.982 | 1018.2 | 632.7 | 14183 | 39.1 |
| 5/25/01 22:35 | 639.2 | Run 1 | 11.982 | 1018.2 | 632.7 | 14183 | 39.1 |
| 5/25/01 22:35 | 639.2 | Run 1 | 11.982 | 1018.2 | 632.7 | 14183 | 39.1 |
| 5/25/01 22:35 | 641.2 | Run 1 | 11.982 | 1018.2 | 634.7 | 14183 | 39.3 |
| 5/25/01 22:35 | 641.2 | Run 1 | 11.982 | 1018.2 | 634.7 | 14183 | 39.3 |
| 5/25/01 22:36 | 647.2 | Run 1 | 11.982 | 1018.2 | 640.8 | 14183 | 39.6 |
| 5/25/01 22:36 | 655.3 | Run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:36 | 661.3 | Run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 22:36 | 665.3 | Run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |
| 5/25/01 22:37 | 657.3 | Run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:37 | 657.3 | Run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:37 | 663.3 | Run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:37 | 659.3 | Run 1 | 11.982 | 1018.2 | 652.9 | 14183 | 40.4 |
| 5/25/01 22:38 | 655.3 | Run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:38 | 663.3 | Run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:38 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:38 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:39 | 661.3 | Run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 22:39 | 655.3 | Run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:39 | 657.3 | Run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:39 | 661.3 | Run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 22:40 | 657.3 | Run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, acfm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 22:40 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:40 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:40 | 661.3 | run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 22:41 | 669.3 | run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:41 | 673.3 | run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:41 | 673.3 | run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:41 | 675.3 | run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:42 | 679.3 | run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:42 | 677.3 | run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:42 | 669.3 | run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:42 | 663.3 | run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:43 | 659.3 | run 1 | 11.982 | 1018.2 | 652.9 | 14183 | 40.4 |
| 5/25/01 22:43 | 659.3 | run 1 | 11.982 | 1018.2 | 652.9 | 14183 | 40.4 |
| 5/25/01 22:43 | 663.3 | run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:43 | 667.3 | run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:44 | 677.3 | run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:44 | 683.3 | run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:44 | 683.3 | run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:44 | 681.3 | run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:45 | 685.3 | run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:45 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:45 | 699.3 | run 1 | 11.982 | 1018.2 | 693.4 | 14183 | 42.9 |
| 5/25/01 22:45 | 691.3 | run 1 | 11.982 | 1018.2 | 685.3 | 14183 | 42.4 |
| 5/25/01 22:46 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 22:46 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:46 | 703.3 | run 1 | 11.982 | 1018.2 | 697.4 | 14183 | 43.2 |
| 5/25/01 22:46 | 701.3 | run 1 | 11.982 | 1018.2 | 695.4 | 14183 | 43.0 |
| 5/25/01 22:47 | 699.3 | run 1 | 11.982 | 1018.2 | 693.4 | 14183 | 42.9 |
| 5/25/01 22:47 | 701.3 | run 1 | 11.982 | 1018.2 | 695.4 | 14183 | 43.0 |
| 5/25/01 22:47 | 703.3 | run 1 | 11.982 | 1018.2 | 697.4 | 14183 | 43.2 |
| 5/25/01 22:47 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:48 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:48 | 701.3 | run 1 | 11.982 | 1018.2 | 695.4 | 14183 | 43.0 |
| 5/25/01 22:48 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:48 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:49 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:49 | 703.3 | run 1 | 11.982 | 1018.2 | 697.4 | 14183 | 43.2 |
| 5/25/01 22:49 | 699.3 | run 1 | 11.982 | 1018.2 | 693.4 | 14183 | 42.9 |
| 5/25/01 22:49 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:50 | 711.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:50 | 711.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:50 | 711.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:50 | 713.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:51 | 701.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:51 | 703.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:51 | 701.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:51 | 689.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:52 | 757.5 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:52 | 909.8 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:52 | 993.9 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:52 | 1014.0 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:53 | 1016.0 | 1015 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 22:53 | 1016.0 | 1015 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 22:53 | 1016.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:53 | 1016.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:54 | 1016.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:54 | 1014.0 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:54 | 1010.0 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:54 | 1012.0 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:55 | 995.9 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:55 | 863.7 | wait | 11.65 | 1026.2 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 22:55 | 679.3 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:55 | 593.1 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:56 | 581.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:56 | 581.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:56 | 579.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:56 | 577.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:57 | 577.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:57 | 577.1 | 594.7 ppm cal | 11.65 | 1025.2 | | | |
| 5/25/01 22:57 | 490.9 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:57 | 232.4 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:58 | 60.1 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:58 | 16.0 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:58 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:58 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:59 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:59 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:59 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:59 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 23:00 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 23:00 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 23:00 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 23:00 | 82.1 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 23:01 | 362.7 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 23:01 | 613.2 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 23:01 | 671.3 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 23:01 | 671.3 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 23:02 | 677.3 | run 2 | 11.65 | 1026.2 | 665.9 | 14405 | 41.9 |
| 5/25/01 23:02 | 677.3 | run 2 | 11.65 | 1026.2 | 665.9 | 14405 | 41.9 |
| 5/25/01 23:02 | 677.3 | run 2 | 11.65 | 1026.2 | 665.9 | 14405 | 41.9 |
| 5/25/01 23:02 | 681.3 | run 2 | 11.65 | 1026.2 | 669.9 | 14405 | 42.1 |
| 5/25/01 23:03 | 683.3 | run 2 | 11.65 | 1026.2 | 671.9 | 14405 | 42.2 |
| 5/25/01 23:03 | 683.3 | run 2 | 11.65 | 1026.2 | 671.9 | 14405 | 42.2 |
| 5/25/01 23:03 | 687.3 | run 2 | 11.65 | 1026.2 | 675.9 | 14405 | 42.5 |
| 5/25/01 23:03 | 693.3 | run 2 | 11.65 | 1026.2 | 682.0 | 14405 | 42.9 |
| 5/25/01 23:04 | 693.3 | run 2 | 11.65 | 1026.2 | 682.0 | 14405 | 42.9 |
| 5/25/01 23:04 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14405 | 43.5 |
| 5/25/01 23:04 | 709.4 | run 2 | 11.65 | 1026.2 | 698.0 | 14405 | 43.9 |
| 5/25/01 23:04 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14405 | 43.6 |
| 5/25/01 23:05 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14405 | 43.5 |
| 5/25/01 23:05 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14405 | 43.6 |
| 5/25/01 23:05 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14405 | 43.6 |
| 5/25/01 23:05 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14405 | 43.6 |
| 5/25/01 23:06 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14405 | 43.4 |
| 5/25/01 23:06 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14405 | 43.4 |
| 5/25/01 23:06 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14405 | 43.2 |
| 5/25/01 23:06 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14405 | 43.2 |
| 5/25/01 23:07 | 695.3 | run 2 | 11.65 | 1026.2 | 684.0 | 14405 | 43.0 |
| 5/25/01 23:07 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14405 | 43.2 |
| 5/25/01 23:07 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14405 | 43.5 |
| 5/25/01 23:07 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14405 | 43.5 |
| 5/25/01 23:08 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14405 | 43.6 |
| 5/25/01 23:08 | 711.4 | run 2 | 11.65 | 1026.2 | 700.0 | 14405 | 44.0 |
| 5/25/01 23:08 | 715.4 | run 2 | 11.65 | 1026.2 | 704.0 | 14405 | 44.2 |
| 5/25/01 23:08 | 711.4 | run 2 | 11.65 | 1026.2 | 700.0 | 14405 | 44.0 |
| 5/25/01 23:09 | 713.4 | run 2 | 11.65 | 1026.2 | 702.0 | 14405 | 44.1 |
| 5/25/01 23:09 | 719.4 | run 2 | 11.65 | 1026.2 | 708.0 | 14405 | 44.5 |
| 5/25/01 23:09 | 713.4 | run 2 | 11.65 | 1026.2 | 702.0 | 14405 | 44.1 |
| 5/25/01 23:09 | 713.4 | run 2 | 11.65 | 1026.2 | 702.0 | 14405 | 44.1 |
| 5/25/01 23:10 | 711.4 | run 2 | 11.65 | 1026.2 | 700.0 | 14405 | 44.0 |
| 5/25/01 23:10 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14405 | 43.6 |
| 5/25/01 23:10 | 709.4 | run 2 | 11.65 | 1026.2 | 698.0 | 14405 | 43.9 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 23:10 | 707.4 | run 2 | 11.65 | 1026.2 | 696.0 | 14406 | 43.7 |
| 5/25/01 23:11 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:11 | 707.4 | run 2 | 11.65 | 1026.2 | 696.0 | 14406 | 43.7 |
| 5/25/01 23:11 | 707.4 | run 2 | 11.65 | 1026.2 | 696.0 | 14406 | 43.7 |
| 5/25/01 23:11 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:12 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:12 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:12 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:12 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:13 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:13 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:13 | 697.3 | run 2 | 11.65 | 1026.2 | 686.0 | 14406 | 43.1 |
| 5/25/01 23:13 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:14 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:14 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:14 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:14 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:15 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:15 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:15 | 695.3 | run 2 | 11.65 | 1026.2 | 684.0 | 14406 | 43.0 |
| 5/25/01 23:15 | 695.3 | run 2 | 11.65 | 1026.2 | 684.0 | 14406 | 43.0 |
| 5/25/01 23:16 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:16 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:16 | 713.4 | run 2 | 11.65 | 1026.2 | 702.0 | 14406 | 44.1 |
| 5/25/01 23:16 | 723.4 | run 2 | 11.65 | 1026.2 | 712.0 | 14406 | 44.7 |
| 5/25/01 23:17 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:17 | 729.4 | run 2 | 11.65 | 1026.2 | 718.0 | 14406 | 45.1 |
| 5/25/01 23:17 | 731.4 | run 2 | 11.65 | 1026.2 | 720.1 | 14406 | 45.3 |
| 5/25/01 23:17 | 737.4 | run 2 | 11.65 | 1026.2 | 726.1 | 14406 | 45.6 |
| 5/25/01 23:18 | 737.4 | run 2 | 11.65 | 1026.2 | 726.1 | 14406 | 45.6 |
| 5/25/01 23:18 | 737.4 | run 2 | 11.65 | 1026.2 | 726.1 | 14406 | 45.6 |
| 5/25/01 23:18 | 733.4 | run 2 | 11.65 | 1026.2 | 722.1 | 14406 | 45.4 |
| 5/25/01 23:18 | 737.4 | run 2 | 11.65 | 1026.2 | 726.1 | 14406 | 45.6 |
| 5/25/01 23:19 | 733.4 | run 2 | 11.65 | 1026.2 | 722.1 | 14406 | 45.4 |
| 5/25/01 23:19 | 727.4 | run 2 | 11.65 | 1026.2 | 716.0 | 14406 | 45.0 |
| 5/25/01 23:19 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:19 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:20 | 731.4 | run 2 | 11.65 | 1026.2 | 720.1 | 14406 | 45.3 |
| 5/25/01 23:20 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:20 | 719.4 | run 2 | 11.65 | 1026.2 | 708.0 | 14406 | 44.5 |
| 5/25/01 23:20 | 721.4 | run 2 | 11.65 | 1026.2 | 710.0 | 14406 | 44.6 |
| 5/25/01 23:21 | 723.4 | run 2 | 11.65 | 1026.2 | 712.0 | 14406 | 44.7 |
| 5/25/01 23:21 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:21 | 727.4 | run 2 | 11.65 | 1026.2 | 716.0 | 14406 | 45.0 |
| 5/25/01 23:21 | 723.4 | run 2 | 11.65 | 1026.2 | 712.0 | 14406 | 44.7 |
| 5/25/01 23:22 | 721.4 | run 2 | 11.65 | 1026.2 | 710.0 | 14406 | 44.6 |
| 5/25/01 23:22 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:22 | 721.4 | run 2 | 11.65 | 1026.2 | 710.0 | 14406 | 44.6 |
| 5/25/01 23:22 | 717.4 | run 2 | 11.65 | 1026.2 | 706.0 | 14406 | 44.4 |
| 5/25/01 23:23 | 719.4 | run 2 | 11.65 | 1026.2 | 708.0 | 14406 | 44.5 |
| 5/25/01 23:23 | 723.4 | run 2 | 11.65 | 1026.2 | 712.0 | 14406 | 44.7 |
| 5/25/01 23:23 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:23 | 731.4 | run 2 | 11.65 | 1026.2 | 720.1 | 14406 | 45.3 |
| 5/25/01 23:24 | 727.4 | run 2 | 11.65 | 1026.2 | 716.0 | 14406 | 45.0 |
| 5/25/01 23:24 | 735.4 | run 2 | 11.65 | 1026.2 | 724.1 | 14406 | 45.5 |
| 5/25/01 23:24 | 759.5 | run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:24 | 767.5 | run 2 | 11.65 | 1026.2 | 756.1 | 14406 | 47.5 |
| 5/25/01 23:25 | 767.5 | run 2 | 11.65 | 1026.2 | 756.1 | 14406 | 47.5 |
| 5/25/01 23:25 | 761.5 | run 2 | 11.65 | 1026.2 | 750.1 | 14406 | 47.1 |
| 5/25/01 23:25 | 759.5 | run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:25 | 761.5 | run 2 | 11.65 | 1026.2 | 750.1 | 14406 | 47.1 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 23:26 | 763.5 | Run 2 | 11.65 | 1026.2 | 752.1 | 14406 | 47.3 |
| 5/25/01 23:26 | 763.5 | Run 2 | 11.65 | 1026.2 | 752.1 | 14406 | 47.3 |
| 5/25/01 23:26 | 759.5 | Run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:26 | 753.4 | Run 2 | 11.65 | 1026.2 | 742.1 | 14406 | 46.6 |
| 5/25/01 23:27 | 753.4 | Run 2 | 11.65 | 1026.2 | 742.1 | 14406 | 46.6 |
| 5/25/01 23:27 | 759.5 | Run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:27 | 763.5 | Run 2 | 11.65 | 1026.2 | 752.1 | 14406 | 47.3 |
| 5/25/01 23:27 | 759.5 | Run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:28 | 759.5 | Run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:28 | 761.5 | Run 2 | 11.65 | 1026.2 | 750.1 | 14406 | 47.1 |
| 5/25/01 23:28 | 761.5 | Run 2 | 11.65 | 1026.2 | 750.1 | 14406 | 47.1 |
| 5/25/01 23:28 | 763.5 | Run 2 | 11.65 | 1026.2 | 752.1 | 14406 | 47.3 |
| 5/25/01 23:29 | 767.5 | Run 2 | 11.65 | 1026.2 | 756.1 | 14406 | 47.5 |
| 5/25/01 23:29 | 777.5 | Run 2 | 11.65 | 1026.2 | 766.2 | 14406 | 48.2 |
| 5/25/01 23:29 | 783.5 | Run 2 | 11.65 | 1026.2 | 772.2 | 14406 | 48.5 |
| 5/25/01 23:29 | 775.5 | Run 2 | 11.65 | 1026.2 | 764.2 | 14406 | 48.0 |
| 5/25/01 23:30 | 767.5 | Run 2 | 11.65 | 1026.2 | 756.1 | 14406 | 47.5 |
| 5/25/01 23:30 | 767.5 | Run 2 | 11.65 | 1026.2 | 756.1 | 14406 | 47.5 |
| 5/25/01 23:30 | 769.5 | Run 2 | 11.65 | 1026.2 | 758.1 | 14406 | 47.6 |
| 5/25/01 23:30 | 775.5 | Run 2 | 11.65 | 1026.2 | 764.2 | 14406 | 48.0 |
| 5/25/01 23:31 | 793.5 | Run 2 | 11.65 | 1026.2 | 782.2 | 14406 | 49.2 |
| 5/25/01 23:31 | 801.5 | Run 2 | 11.65 | 1026.2 | 790.2 | 14406 | 49.7 |
| 5/25/01 23:31 | 797.5 | Run 2 | 11.65 | 1026.2 | 786.2 | 14406 | 49.4 |
| 5/25/01 23:31 | 793.5 | Run 2 | 11.65 | 1026.2 | 782.2 | 14406 | 49.2 |
| 5/25/01 23:32 | 787.5 | Run 2 | 11.65 | 1026.2 | 776.2 | 14406 | 48.8 |
| 5/25/01 23:32 | 785.5 | Run 2 | 11.65 | 1026.2 | 774.2 | 14406 | 48.7 |
| 5/25/01 23:32 | 783.5 | Run 2 | 11.65 | 1026.2 | 772.2 | 14406 | 48.5 |
| 5/25/01 23:32 | 779.5 | Run 2 | 11.65 | 1026.2 | 768.2 | 14406 | 48.3 |
| 5/25/01 23:33 | 781.5 | Run 2 | 11.65 | 1026.2 | 770.2 | 14406 | 48.4 |
| 5/25/01 23:33 | 785.5 | Run 2 | 11.65 | 1026.2 | 774.2 | 14406 | 48.7 |
| 5/25/01 23:33 | 781.5 | Run 2 | 11.65 | 1026.2 | 770.2 | 14406 | 48.4 |
| 5/25/01 23:33 | 781.5 | Run 2 | 11.65 | 1026.2 | 770.2 | 14406 | 48.4 |
| 5/25/01 23:34 | 787.5 | Run 2 | 11.65 | 1026.2 | 776.2 | 14406 | 48.8 |
| 5/25/01 23:34 | 791.5 | Run 2 | 11.65 | 1026.2 | 780.2 | 14406 | 49.0 |
| 5/25/01 23:34 | 795.5 | Run 2 | 11.65 | 1026.2 | 784.2 | 14406 | 49.3 |
| 5/25/01 23:34 | 799.5 | Run 2 | 11.65 | 1026.2 | 788.2 | 14406 | 49.5 |
| 5/25/01 23:35 | 803.5 | Run 2 | 11.65 | 1026.2 | 792.2 | 14406 | 49.8 |
| 5/25/01 23:35 | 803.5 | Run 2 | 11.65 | 1026.2 | 792.2 | 14406 | 49.8 |
| 5/25/01 23:35 | 809.6 | Run 2 | 11.65 | 1026.2 | 798.2 | 14406 | 50.2 |
| 5/25/01 23:35 | 811.6 | Run 2 | 11.65 | 1026.2 | 800.2 | 14406 | 50.3 |
| 5/25/01 23:36 | 795.5 | Run 2 | 11.65 | 1026.2 | 784.2 | 14406 | 49.3 |
| 5/25/01 23:36 | 789.5 | Run 2 | 11.65 | 1026.2 | 778.2 | 14406 | 48.9 |
| 5/25/01 23:36 | 811.6 | Run 2 | 11.65 | 1026.2 | 800.2 | 14406 | 50.3 |
| 5/25/01 23:36 | 831.6 | Run 2 | 11.65 | 1026.2 | 820.3 | 14406 | 51.6 |
| 5/25/01 23:37 | 847.6 | Run 2 | 11.65 | 1026.2 | 836.3 | 14406 | 52.6 |
| 5/25/01 23:37 | 851.6 | Run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |
| 5/25/01 23:37 | 847.6 | Run 2 | 11.65 | 1026.2 | 836.3 | 14406 | 52.6 |
| 5/25/01 23:37 | 847.6 | Run 2 | 11.65 | 1026.2 | 836.3 | 14406 | 52.6 |
| 5/25/01 23:38 | 853.6 | Run 2 | 11.65 | 1026.2 | 842.3 | 14406 | 52.9 |
| 5/25/01 23:38 | 871.7 | Run 2 | 11.65 | 1026.2 | 860.4 | 14406 | 54.1 |
| 5/25/01 23:38 | 883.7 | Run 2 | 11.65 | 1026.2 | 872.4 | 14406 | 54.8 |
| 5/25/01 23:38 | 879.7 | Run 2 | 11.65 | 1026.2 | 868.4 | 14406 | 54.6 |
| 5/25/01 23:39 | 869.7 | Run 2 | 11.65 | 1026.2 | 858.4 | 14406 | 53.9 |
| 5/25/01 23:39 | 869.7 | Run 2 | 11.65 | 1026.2 | 858.4 | 14406 | 53.9 |
| 5/25/01 23:39 | 875.7 | Run 2 | 11.65 | 1026.2 | 864.4 | 14406 | 54.3 |
| 5/25/01 23:39 | 869.7 | Run 2 | 11.65 | 1026.2 | 858.4 | 14406 | 53.9 |
| 5/25/01 23:40 | 859.7 | Run 2 | 11.65 | 1026.2 | 848.4 | 14406 | 53.3 |
| 5/25/01 23:40 | 859.7 | Run 2 | 11.65 | 1026.2 | 848.4 | 14406 | 53.3 |
| 5/25/01 23:40 | 855.6 | Run 2 | 11.65 | 1026.2 | 844.3 | 14406 | 53.1 |
| 5/25/01 23:40 | 855.6 | Run 2 | 11.65 | 1026.2 | 844.3 | 14406 | 53.1 |
| 5/25/01 23:41 | 851.5 | Run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm, dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 23:41 | 847.6 | run 2 | 11.65 | 1026.2 | 836.3 | 14406 | 52.5 |
| 5/25/01 23:41 | 851.6 | run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |
| 5/25/01 23:41 | 851.6 | run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |
| 5/25/01 23:42 | 849.6 | run 2 | 11.65 | 1026.2 | 838.3 | 14406 | 52.7 |
| 5/25/01 23:42 | 853.6 | run 2 | 11.65 | 1026.2 | 842.3 | 14406 | 52.9 |
| 5/25/01 23:42 | 859.7 | run 2 | 11.55 | 1026.2 | 848.4 | 14406 | 53.3 |
| 5/25/01 23:42 | 857.7 | run 2 | 11.65 | 1026.2 | 846.4 | 14406 | 53.2 |
| 5/25/01 23:43 | 851.6 | run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |
| 5/25/01 23:43 | 853.6 | run 2 | 11.55 | 1026.2 | 842.3 | 14406 | 52.9 |
| 5/25/01 23:43 | 853.6 | run 2 | 11.65 | 1026.2 | 842.3 | 14406 | 52.9 |
| 5/25/01 23:43 | 849.6 | run 2 | 11.65 | 1026.2 | 838.3 | 14406 | 52.7 |
| 5/25/01 23:44 | 851.6 | run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |
| 5/25/01 23:44 | 857.7 | run 2 | 11.65 | 1026.2 | 846.4 | 14406 | 53.2 |
| 5/25/01 23:44 | 869.7 | run 2 | 11.65 | 1026.2 | 858.4 | 14406 | 53.9 |
| 5/25/01 23:44 | 885.7 | run 2 | 11.55 | 1026.2 | 874.4 | 14406 | 55.0 |
| 5/25/01 23:45 | 895.7 | run 2 | 11.65 | 1026.2 | 884.4 | 14406 | 55.6 |
| 5/25/01 23:45 | 889.7 | run 2 | 11.65 | 1026.2 | 878.4 | 14406 | 55.2 |
| 5/25/01 23:45 | 885.7 | run 2 | 11.65 | 1026.2 | 874.4 | 14406 | 55.0 |
| 5/25/01 23:45 | 889.7 | run 2 | 11.65 | 1026.2 | 878.4 | 14406 | 55.2 |
| 5/25/01 23:46 | 879.7 | run 2 | 11.65 | 1026.2 | 868.4 | 14406 | 54.6 |
| 5/25/01 23:46 | 857.7 | run 2 | 11.65 | 1026.2 | 846.4 | 14406 | 53.2 |
| 5/25/01 23:46 | 839.6 | run 2 | 11.65 | 1026.2 | 828.3 | 14406 | 52.1 |
| 5/25/01 23:46 | 837.6 | run 2 | 11.65 | 1026.2 | 826.3 | 14406 | 51.9 |
| 5/25/01 23:47 | 835.6 | run 2 | 11.65 | 1026.2 | 824.3 | 14406 | 51.8 |
| 5/25/01 23:47 | 835.6 | run 2 | 11.65 | 1026.2 | 824.3 | 14406 | 51.8 |
| 5/25/01 23:47 | 831.6 | run 2 | 11.65 | 1026.2 | 820.3 | 14406 | 51.6 |
| 5/25/01 23:47 | 825.6 | run 2 | 11.65 | 1026.2 | 814.3 | 14406 | 51.2 |
| 5/25/01 23:48 | 825.6 | run 2 | 11.65 | 1026.2 | 814.3 | 14406 | 51.2 |
| 5/25/01 23:48 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:48 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:48 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:49 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:49 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:49 | 833.6 | run 2 | 11.65 | 1026.2 | 822.3 | 14406 | 51.7 |
| 5/25/01 23:49 | 839.6 | run 2 | 11.65 | 1026.2 | 828.3 | 14406 | 52.1 |
| 5/25/01 23:50 | 833.6 | run 2 | 11.65 | 1026.2 | 822.3 | 14406 | 51.7 |
| 5/25/01 23:50 | 823.6 | run 2 | 11.65 | 1026.2 | 812.3 | 14406 | 51.0 |
| 5/25/01 23:50 | 823.6 | run 2 | 11.65 | 1026.2 | 812.3 | 14406 | 51.0 |
| 5/25/01 23:50 | 827.6 | run 2 | 11.65 | 1026.2 | 816.3 | 14406 | 51.3 |
| 5/25/01 23:51 | 825.6 | run 2 | 11.65 | 1026.2 | 814.3 | 14406 | 51.2 |
| 5/25/01 23:51 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:51 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:51 | 827.6 | run 2 | 11.65 | 1026.2 | 816.3 | 14406 | 51.3 |
| 5/25/01 23:52 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:52 | 831.6 | run 2 | 11.65 | 1026.2 | 820.3 | 14406 | 51.6 |
| 5/25/01 23:52 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:52 | 823.6 | run 2 | 11.65 | 1026.2 | 812.3 | 14406 | 51.0 |
| 5/25/01 23:53 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/25/01 23:53 | 813.6 | run 2 | 11.65 | 1026.2 | 802.2 | 14406 | 50.4 |
| 5/25/01 23:53 | 813.6 | run 2 | 11.65 | 1026.2 | 802.2 | 14406 | 50.4 |
| 5/25/01 23:53 | 811.6 | run 2 | 11.65 | 1026.2 | 800.2 | 14406 | 50.3 |
| 5/25/01 23:54 | 809.6 | run 2 | 11.55 | 1026.2 | 798.2 | 14406 | 50.2 |
| 5/25/01 23:54 | 811.6 | run 2 | 11.55 | 1026.2 | 800.2 | 14406 | 50.3 |
| 5/25/01 23:54 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/25/01 23:54 | 817.6 | run 2 | 11.55 | 1026.2 | 806.3 | 14406 | 50.7 |
| 5/25/01 23:55 | 813.6 | run 2 | 11.55 | 1026.2 | 802.2 | 14406 | 50.4 |
| 5/25/01 23:55 | 809.6 | run 2 | 11.65 | 1026.2 | 798.2 | 14406 | 50.2 |
| 5/25/01 23:55 | 805.6 | run 2 | 11.55 | 1026.2 | 794.2 | 14406 | 49.9 |
| 5/25/01 23:55 | 803.5 | run 2 | 11.55 | 1026.2 | 792.2 | 14406 | 49.8 |
| 5/25/01 23:56 | 809.6 | run 2 | 11.65 | 1026.2 | 798.2 | 14406 | 50.2 |
| 5/25/01 23:56 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1015 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 23:56 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/25/01 23:56 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/25/01 23:57 | 821.6 | run 2 | 11.65 | 1026.2 | 810.3 | 14406 | 50.9 |
| 5/25/01 23:57 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:57 | 835.6 | run 2 | 11.65 | 1026.2 | 824.3 | 14406 | 51.8 |
| 5/25/01 23:57 | 837.6 | run 2 | 11.65 | 1026.2 | 826.3 | 14406 | 51.9 |
| 5/25/01 23:58 | 833.6 | run 2 | 11.65 | 1026.2 | 822.3 | 14406 | 51.7 |
| 5/25/01 23:58 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:58 | 827.6 | run 2 | 11.65 | 1026.2 | 816.3 | 14406 | 51.3 |
| 5/25/01 23:58 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:59 | 825.6 | run 2 | 11.65 | 1026.2 | 814.3 | 14406 | 51.2 |
| 5/25/01 23:59 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/25/01 23:59 | 805.6 | run 2 | 11.65 | 1026.2 | 794.2 | 14406 | 49.9 |
| 5/25/01 23:59 | 801.5 | run 2 | 11.65 | 1026.2 | 790.2 | 14406 | 49.7 |
| 5/26/01 0:00 | 799.5 | run 2 | 11.65 | 1026.2 | 788.2 | 14406 | 49.5 |
| 5/26/01 0:00 | 803.5 | run 2 | 11.65 | 1026.2 | 792.2 | 14406 | 49.8 |
| 5/26/01 0:00 | 803.5 | run 2 | 11.65 | 1026.2 | 792.2 | 14406 | 49.8 |
| 5/26/01 0:00 | 805.6 | run 2 | 11.65 | 1026.2 | 794.2 | 14406 | 49.9 |
| 5/26/01 0:01 | 805.6 | run 2 | 11.65 | 1026.2 | 794.2 | 14406 | 49.9 |
| 5/26/01 0:01 | 805.6 | run 2 | 11.65 | 1026.2 | 794.2 | 14406 | 49.9 |
| 5/26/01 0:01 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/26/01 0:01 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/26/01 0:02 | 823.6 | wait | 11.55 | 1026.2 | | | |
| 5/26/01 0:02 | 815.6 | wait | 11.55 | 1026.2 | | | |
| 5/26/01 0:02 | 789.5 | wait | 11.55 | 1026.2 | | | |
| 5/26/01 0:02 | 739.4 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:03 | 887.7 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:03 | 1597.1 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:03 | 1959.8 | wait | 11.55 | 1026.2 | | | |
| 5/26/01 0:03 | 1959.8 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:04 | 1362.7 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:04 | 478.9 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:04 | 66.1 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:04 | 18.0 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:05 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:05 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:05 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:05 | 10.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:06 | 10.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:06 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:06 | 16.0 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:06 | 128.2 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:07 | 595.1 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:07 | 909.8 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:07 | 1030.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:07 | 1038.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:08 | 1036.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:08 | 1026.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:08 | 936.8 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:08 | 765.5 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:09 | 635.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:09 | 607.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:09 | 603.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:09 | 601.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:10 | 601.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:10 | 595.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:10 | 657.3 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:10 | 725.4 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:11 | 805.6 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:11 | 835.6 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:11 | 845.6 | wait | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, actm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 0:11 | 847.6 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:12 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:12 | 841.6 | run 3a | 11.047 | 1032.0 | 825.7 | 14331 | 51.6 |
| 5/26/01 0:12 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:12 | 851.6 | run 3a | 11.047 | 1032.0 | 835.7 | 14331 | 52.2 |
| 5/26/01 0:13 | 857.7 | run 3a | 11.047 | 1032.0 | 841.6 | 14331 | 52.6 |
| 5/26/01 0:13 | 853.6 | run 3a | 11.047 | 1032.0 | 837.6 | 14331 | 52.4 |
| 5/26/01 0:13 | 847.6 | run 3a | 11.047 | 1032.0 | 831.7 | 14331 | 52.0 |
| 5/26/01 0:13 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:14 | 843.6 | run 3a | 11.047 | 1032.0 | 827.7 | 14331 | 51.7 |
| 5/26/01 0:14 | 843.6 | run 3a | 11.047 | 1032.0 | 827.7 | 14331 | 51.7 |
| 5/26/01 0:14 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:14 | 849.6 | run 3a | 11.047 | 1032.0 | 833.7 | 14331 | 52.1 |
| 5/26/01 0:15 | 851.6 | run 3a | 11.047 | 1032.0 | 835.7 | 14331 | 52.2 |
| 5/26/01 0:15 | 849.6 | run 3a | 11.047 | 1032.0 | 833.7 | 14331 | 52.1 |
| 5/26/01 0:15 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:15 | 847.6 | run 3a | 11.047 | 1032.0 | 831.7 | 14331 | 52.0 |
| 5/26/01 0:16 | 853.6 | run 3a | 11.047 | 1032.0 | 837.6 | 14331 | 52.4 |
| 5/26/01 0:16 | 855.6 | run 3a | 11.047 | 1032.0 | 839.6 | 14331 | 52.5 |
| 5/26/01 0:16 | 849.6 | run 3a | 11.047 | 1032.0 | 833.7 | 14331 | 52.1 |
| 5/26/01 0:16 | 853.6 | run 3a | 11.047 | 1032.0 | 837.6 | 14331 | 52.4 |
| 5/26/01 0:17 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:17 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:17 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:17 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:18 | 865.7 | run 3a | 11.047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:18 | 867.7 | run 3a | 11.047 | 1032.0 | 851.6 | 14331 | 53.2 |
| 5/26/01 0:18 | 875.7 | run 3a | 11.047 | 1032.0 | 859.6 | 14331 | 53.7 |
| 5/26/01 0:18 | 873.7 | run 3a | 11.047 | 1032.0 | 857.6 | 14331 | 53.6 |
| 5/26/01 0:19 | 861.7 | run 3a | 11.047 | 1032.0 | 845.6 | 14331 | 52.9 |
| 5/26/01 0:19 | 857.7 | run 3a | 11.047 | 1032.0 | 841.6 | 14331 | 52.6 |
| 5/26/01 0:19 | 861.7 | run 3a | 11.047 | 1032.0 | 845.6 | 14331 | 52.9 |
| 5/26/01 0:19 | 861.7 | run 3a | 11.047 | 1032.0 | 845.6 | 14331 | 52.9 |
| 5/26/01 0:20 | 863.7 | run 3a | 11.047 | 1032.0 | 847.6 | 14331 | 53.0 |
| 5/26/01 0:20 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:20 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:20 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:21 | 865.7 | run 3a | 11.047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:21 | 863.7 | run 3a | 11.047 | 1032.0 | 847.6 | 14331 | 53.0 |
| 5/26/01 0:21 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:21 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:22 | 879.7 | run 3a | 11.047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:22 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:22 | 883.7 | run 3a | 11.047 | 1032.0 | 867.5 | 14331 | 54.2 |
| 5/26/01 0:22 | 887.7 | run 3a | 11.047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:23 | 881.7 | run 3a | 11.047 | 1032.0 | 865.5 | 14331 | 54.1 |
| 5/26/01 0:23 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:23 | 879.7 | run 3a | 11.047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:23 | 881.7 | run 3a | 11.047 | 1032.0 | 865.5 | 14331 | 54.1 |
| 5/26/01 0:24 | 887.7 | run 3a | 11.047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:24 | 891.7 | run 3a | 11.047 | 1032.0 | 875.5 | 14331 | 54.7 |
| 5/26/01 0:24 | 891.7 | run 3a | 11.047 | 1032.0 | 875.5 | 14331 | 54.7 |
| 5/26/01 0:24 | 895.7 | run 3a | 11.047 | 1032.0 | 879.5 | 14331 | 55.0 |
| 5/26/01 0:25 | 917.8 | run 3a | 11.047 | 1032.0 | 901.4 | 14331 | 56.4 |
| 5/26/01 0:25 | 913.8 | run 3a | 11.047 | 1032.0 | 897.4 | 14331 | 56.1 |
| 5/26/01 0:25 | 901.7 | run 3a | 11.047 | 1032.0 | 885.5 | 14331 | 55.4 |
| 5/26/01 0:25 | 893.7 | run 3a | 11.047 | 1032.0 | 877.5 | 14331 | 54.9 |
| 5/26/01 0:26 | 899.7 | run 3a | 11.047 | 1032.0 | 883.5 | 14331 | 55.2 |
| 5/26/01 0:26 | 905.7 | run 3a | 11.047 | 1032.0 | 889.4 | 14331 | 55.6 |
| 5/26/01 0:26 | 899.7 | run 3a | 11.047 | 1032.0 | 883.5 | 14331 | 55.2 |
| 5/26/01 0:26 | 899.7 | run 3a | 11.047 | 1032.0 | 883.5 | 14331 | 55.2 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1015 ppm cal | CORRECTED PPM | FLOW, scfm, dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 0:27 | 893.7 | run 3a | 11:047 | 1032.0 | 877.5 | 14331 | 54.9 |
| 5/26/01 0:27 | 887.7 | run 3a | 11:047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:27 | 891.7 | run 3a | 11:047 | 1032.0 | 875.5 | 14331 | 54.7 |
| 5/26/01 0:27 | 895.7 | run 3a | 11:047 | 1032.0 | 879.5 | 14331 | 55.0 |
| 5/26/01 0:28 | 893.7 | run 3a | 11:047 | 1032.0 | 877.5 | 14331 | 54.9 |
| 5/26/01 0:28 | 889.7 | run 3a | 11:047 | 1032.0 | 873.5 | 14331 | 54.6 |
| 5/26/01 0:28 | 887.7 | run 3a | 11:047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:28 | 889.7 | run 3a | 11:047 | 1032.0 | 873.5 | 14331 | 54.6 |
| 5/26/01 0:29 | 889.7 | run 3a | 11:047 | 1032.0 | 873.5 | 14331 | 54.6 |
| 5/26/01 0:29 | 891.7 | run 3a | 11:047 | 1032.0 | 875.5 | 14331 | 54.7 |
| 5/26/01 0:29 | 887.7 | run 3a | 11:047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:29 | 881.7 | run 3a | 11:047 | 1032.0 | 865.5 | 14331 | 54.1 |
| 5/26/01 0:30 | 877.7 | run 3a | 11:047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:30 | 877.7 | run 3a | 11:047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:30 | 885.7 | run 3a | 11:047 | 1032.0 | 869.5 | 14331 | 54.4 |
| 5/26/01 0:30 | 891.7 | run 3a | 11:047 | 1032.0 | 875.5 | 14331 | 54.7 |
| 5/26/01 0:31 | 885.7 | run 3a | 11:047 | 1032.0 | 869.5 | 14331 | 54.4 |
| 5/26/01 0:31 | 887.7 | run 3a | 11:047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:31 | 887.7 | run 3a | 11:047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:31 | 877.7 | run 3a | 11:047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:32 | 883.7 | run 3a | 11:047 | 1032.0 | 867.5 | 14331 | 54.2 |
| 5/26/01 0:32 | 889.7 | run 3a | 11:047 | 1032.0 | 873.5 | 14331 | 54.6 |
| 5/26/01 0:32 | 883.7 | run 3a | 11:047 | 1032.0 | 867.5 | 14331 | 54.2 |
| 5/26/01 0:32 | 875.7 | run 3a | 11:047 | 1032.0 | 859.6 | 14331 | 53.7 |
| 5/26/01 0:33 | 871.7 | run 3a | 11:047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:33 | 869.7 | run 3a | 11:047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:33 | 867.7 | run 3a | 11:047 | 1032.0 | 851.6 | 14331 | 53.2 |
| 5/26/01 0:33 | 871.7 | run 3a | 11:047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:34 | 873.7 | run 3a | 11:047 | 1032.0 | 857.6 | 14331 | 53.6 |
| 5/26/01 0:34 | 879.7 | run 3a | 11:047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:34 | 883.7 | run 3a | 11:047 | 1032.0 | 867.5 | 14331 | 54.2 |
| 5/26/01 0:34 | 879.7 | run 3a | 11:047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:35 | 877.7 | run 3a | 11:047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:35 | 879.7 | run 3a | 11:047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:35 | 879.7 | run 3a | 11:047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:35 | 873.7 | run 3a | 11:047 | 1032.0 | 857.6 | 14331 | 53.6 |
| 5/26/01 0:36 | 867.7 | run 3a | 11:047 | 1032.0 | 851.6 | 14331 | 53.2 |
| 5/26/01 0:36 | 869.7 | run 3a | 11:047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:36 | 869.7 | run 3a | 11:047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:36 | 865.7 | run 3a | 11:047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:37 | 871.7 | run 3a | 11:047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:37 | 879.7 | run 3a | 11:047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:37 | 885.7 | run 3a | 11:047 | 1032.0 | 869.5 | 14331 | 54.4 |
| 5/26/01 0:37 | 885.7 | run 3a | 11:047 | 1032.0 | 869.5 | 14331 | 54.4 |
| 5/26/01 0:38 | 881.7 | run 3a | 11:047 | 1032.0 | 865.5 | 14331 | 54.1 |
| 5/26/01 0:38 | 877.7 | run 3a | 11:047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:38 | 879.7 | run 3a | 11:047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:38 | 875.7 | run 3a | 11:047 | 1032.0 | 859.6 | 14331 | 53.7 |
| 5/26/01 0:39 | 867.7 | run 3a | 11:047 | 1032.0 | 851.6 | 14331 | 53.2 |
| 5/26/01 0:39 | 865.7 | run 3a | 11:047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:39 | 867.7 | run 3a | 11:047 | 1032.0 | 851.6 | 14331 | 53.2 |
| 5/26/01 0:39 | 871.7 | run 3a | 11:047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:40 | 869.7 | run 3a | 11:047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:40 | 865.7 | run 3a | 11:047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:40 | 871.7 | run 3a | 11:047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:40 | 869.7 | run 3a | 11:047 | 1032.0 | 853.5 | 14331 | 53.4 |
| 5/26/01 0:41 | 861.7 | run 3a | 11:047 | 1032.0 | 845.6 | 14331 | 52.9 |
| 5/26/01 0:41 | 855.6 | run 3a | 11:047 | 1032.0 | 839.6 | 14331 | 52.5 |
| 5/26/01 0:41 | 855.6 | run 3a | 11:047 | 1032.0 | 839.6 | 14331 | 52.5 |
| 5/26/01 0:41 | 851.6 | run 3a | 11:047 | 1032.0 | 835.7 | 14331 | 52.2 |
| 5/26/01 0:42 | 857.7 | run 3a | 11:047 | 1032.0 | 841.6 | 14331 | 52.6 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1016 ppm cal | CORRECTED PPM | FLOW, acfm, dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 0:42 | 865.7 | run 3a | 11.047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:42 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:42 | 823.6 | run 3a | 11.047 | 1032.0 | 907.8 | 14331 | 50.5 |
| | | run 3a Average | | | 856.9 | | 53.5 |
| 5/26/01 0:43 | 813.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:43 | 823.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:43 | 831.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:43 | 823.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:44 | 817.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:44 | 815.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:44 | 813.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:44 | 807.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:45 | 811.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:45 | 825.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:45 | 833.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:45 | 829.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:46 | 825.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:46 | 823.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:46 | 813.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:46 | 799.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:47 | 793.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:47 | 791.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:47 | 789.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:47 | 781.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:48 | 777.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:48 | 781.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:48 | 783.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:48 | 777.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:49 | 781.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:49 | 787.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:49 | 783.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:49 | 777.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:50 | 781.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:50 | 785.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:50 | 785.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:50 | 785.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:51 | 785.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:51 | 791.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:51 | 803.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:51 | 813.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:52 | 817.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:52 | 819.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:52 | 827.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:52 | 833.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:53 | 829.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:53 | 819.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:53 | 807.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:53 | 791.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:54 | 773.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:54 | 759.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:54 | 741.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:54 | 723.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:55 | 711.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:55 | 709.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:55 | 701.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:55 | 685.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:56 | 683.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:56 | 689.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:56 | 693.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:56 | 693.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:57 | 689.3 | plant upset/delay | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 0 57 | 677 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 0 57 | 563 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 0 57 | 655 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 0 58 | 657 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 0 58 | 663 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 0 58 | 659 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 0 58 | 661 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 0 59 | 669 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 0 59 | 661 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 0 59 | 655 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 0 59 | 649 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 00 | 635 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 00 | 621 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 00 | 621 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 00 | 621 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 01 | 617 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 01 | 609 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 01 | 603 2 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 01 | 601 1 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 02 | 597 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 02 | 595 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 02 | 593 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 02 | 595 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 03 | 593 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 03 | 589 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 03 | 583 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 03 | 579 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 04 | 581 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 04 | 585 1 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 04 | 591.1 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 04 | 589 1 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 05 | 587 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 05 | 593 1 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 05 | 603 2 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 05 | 615.2 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 06 | 621.2 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 06 | 615.2 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 06 | 607 2 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 06 | 609.2 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 07 | 613 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 07 | 617 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 07 | 621 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 07 | 623.2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 08 | 627 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 08 | 631 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 08 | 627 2 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 08 | 619 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 09 | 613 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 09 | 613 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 09 | 615 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 09 | 617 2 | plant upset/delay | 11 047 | 1032.0 | | | |
| 5/26/01 1 10 | 613 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 10 | 609 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 10 | 609 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 10 | 617 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 11 | 621 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 11 | 633 2 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 11 | 559 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 11 | 679 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 12 | 677 3 | plant upset/delay | 11 047 | 1032 0 | | | |
| 5/26/01 1 12 | 677 3 | plant upset/delay | 11 047 | 1032 0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1016 ppm cal | CORRECTED PPM | FLOW, actm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 1:12 | 685.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:12 | 697.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:13 | 697.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:13 | 693.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:13 | 687.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:13 | 683.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:14 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:14 | 681.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:14 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:14 | 675.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:15 | 683.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:15 | 685.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:15 | 685.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:15 | 685.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:16 | 681.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:16 | 677.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:16 | 673.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:16 | 675.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:17 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:17 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:17 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:17 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:18 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:18 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:18 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:18 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:19 | 667.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:19 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:19 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:19 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:20 | 673.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:20 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:20 | 673.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:20 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:21 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:21 | 675.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:21 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:21 | 673.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:22 | 677.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:22 | 681.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:22 | 683.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:22 | 697.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:23 | 707.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:23 | 711.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:23 | 705.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:23 | 705.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:24 | 709.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:24 | 711.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:24 | 709.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:24 | 707.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:25 | 705.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:25 | 701.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:25 | 597.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:25 | 583.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:26 | 571.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:26 | 575.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:26 | 579.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:26 | 569.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:27 | 565.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:27 | 563.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:27 | 561.3 | plant upset/delay | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, a.c.f.m. dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 1:27 | 667.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:28 | 667.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:28 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:28 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:28 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:29 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:29 | 653.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:29 | 655.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:29 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:30 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:30 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:30 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:30 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:31 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:31 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:31 | 653.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:31 | 653.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:32 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:32 | 667.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:32 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:32 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:33 | 657.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:33 | 657.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:33 | 655.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:33 | 653.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:34 | 645.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:34 | 639.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:34 | 643.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:34 | 635.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:35 | 627.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:35 | 629.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:35 | 633.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:35 | 629.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:36 | 627.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:36 | 623.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:36 | 623.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:36 | 627.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:37 | 623.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:37 | 613.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:37 | 615.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:37 | 617.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:38 | 615.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:38 | 609.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:38 | 611.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:38 | 621.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:39 | 625.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:39 | 625.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:39 | 621.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:39 | 617.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:40 | 617.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:40 | 615.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:40 | 613.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:40 | 605.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:41 | 601.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:41 | 605.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:41 | 603.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:41 | 599.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:42 | 607.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:42 | 611.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:42 | 607.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:42 | 609.2 | plant upset/delay | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 1:43 | 609.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:43 | 605.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:43 | 601.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:43 | 601.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:44 | 597.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:44 | 595.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:44 | 595.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:44 | 595.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:45 | 595.1 | run 3b | 11.047 | 1032.0 | 580.7 | 14331 | 36.3 |
| 5/26/01 1:45 | 599.1 | run 3b | 11.047 | 1032.0 | 584.6 | 14331 | 36.6 |
| 5/26/01 1:45 | 603.2 | run 3b | 11.047 | 1032.0 | 588.6 | 14331 | 36.8 |
| 5/26/01 1:45 | 605.2 | run 3b | 11.047 | 1032.0 | 590.6 | 14331 | 36.9 |
| 5/26/01 1:46 | 611.2 | run 3b | 11.047 | 1032.0 | 596.6 | 14331 | 37.3 |
| 5/26/01 1:46 | 609.2 | run 3b | 11.047 | 1032.0 | 594.6 | 14331 | 37.2 |
| 5/26/01 1:46 | 595.1 | run 3b | 11.047 | 1032.0 | 580.7 | 14331 | 36.3 |
| 5/26/01 1:46 | 579.1 | run 3b | 11.047 | 1032.0 | 564.7 | 14331 | 35.3 |
| 5/26/01 1:47 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 1:47 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:47 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:47 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:48 | 557.1 | run 3b | 11.047 | 1032.0 | 542.8 | 14331 | 33.9 |
| 5/26/01 1:48 | 551.0 | run 3b | 11.047 | 1032.0 | 536.8 | 14331 | 33.6 |
| 5/26/01 1:48 | 557.1 | run 3b | 11.047 | 1032.0 | 542.8 | 14331 | 33.9 |
| 5/26/01 1:48 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:49 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:49 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:49 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:49 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 1:50 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:50 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:50 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:50 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:51 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:51 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:51 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:51 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 1:52 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 1:52 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 1:52 | 575.1 | run 3b | 11.047 | 1032.0 | 560.7 | 14331 | 35.1 |
| 5/26/01 1:52 | 573.1 | run 3b | 11.047 | 1032.0 | 558.7 | 14331 | 34.9 |
| 5/26/01 1:53 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 1:53 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 1:53 | 581.1 | run 3b | 11.047 | 1032.0 | 566.7 | 14331 | 35.4 |
| 5/26/01 1:53 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 1:54 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 1:54 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:54 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:54 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:55 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:55 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:55 | 559.1 | run 3b | 11.047 | 1032.0 | 544.8 | 14331 | 34.1 |
| 5/26/01 1:55 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:56 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:56 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:56 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:56 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:57 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:57 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:57 | 559.1 | run 3b | 11.047 | 1032.0 | 544.8 | 14331 | 34.1 |
| 5/26/01 1:57 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:58 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, acfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 1:58 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 1:58 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 1:58 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 1:59 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 1:59 | 579.1 | run 3b | 11.047 | 1032.0 | 564.7 | 14331 | 35.3 |
| 5/26/01 1:59 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 1:59 | 581.1 | run 3b | 11.047 | 1032.0 | 566.7 | 14331 | 35.4 |
| 5/26/01 2:00 | 587.1 | run 3b | 11.047 | 1032.0 | 572.7 | 14331 | 35.8 |
| 5/26/01 2:00 | 591.1 | run 3b | 11.047 | 1032.0 | 576.7 | 14331 | 36.1 |
| 5/26/01 2:00 | 593.1 | run 3b | 11.047 | 1032.0 | 578.7 | 14331 | 36.2 |
| 5/26/01 2:00 | 595.1 | run 3b | 11.047 | 1032.0 | 580.7 | 14331 | 36.3 |
| 5/26/01 2:01 | 591.1 | run 3b | 11.047 | 1032.0 | 576.7 | 14331 | 36.1 |
| 5/26/01 2:01 | 581.1 | run 3b | 11.047 | 1032.0 | 566.7 | 14331 | 35.4 |
| 5/26/01 2:01 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 2:01 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 2:02 | 575.1 | run 3b | 11.047 | 1032.0 | 560.7 | 14331 | 35.1 |
| 5/26/01 2:02 | 573.1 | run 3b | 11.047 | 1032.0 | 558.7 | 14331 | 34.9 |
| 5/26/01 2:02 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 2:02 | 575.1 | run 3b | 11.047 | 1032.0 | 560.7 | 14331 | 35.1 |
| 5/26/01 2:03 | 573.1 | run 3b | 11.047 | 1032.0 | 558.7 | 14331 | 34.9 |
| 5/26/01 2:03 | 573.1 | run 3b | 11.047 | 1032.0 | 558.7 | 14331 | 34.9 |
| 5/26/01 2:03 | 575.1 | run 3b | 11.047 | 1032.0 | 560.7 | 14331 | 35.1 |
| 5/26/01 2:03 | 573.1 | run 3b | 11.047 | 1032.0 | 558.7 | 14331 | 34.9 |
| 5/26/01 2:04 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:04 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:04 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:04 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:05 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:05 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:05 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:05 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:06 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:06 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:06 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 2:06 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:07 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 2:07 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 2:07 | 559.1 | run 3b | 11.047 | 1032.0 | 544.8 | 14331 | 34.1 |
| 5/26/01 2:07 | 559.1 | run 3b | 11.047 | 1032.0 | 544.8 | 14331 | 34.1 |
| 5/26/01 2:08 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 2:08 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:08 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:08 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:09 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 2:09 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:09 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:09 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:10 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 2:10 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 2:10 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:10 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 2:11 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 2:11 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 2:11 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 2:11 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:12 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:12 | 575.1 | run 3b | 11.047 | 1032.0 | 560.7 | 14331 | 35.1 |
| 5/26/01 2:12 | 583.1 | run 3b | 11.047 | 1032.0 | 568.7 | 14331 | 35.6 |
| 5/26/01 2:12 | 585.1 | run 3b | 11.047 | 1032.0 | 570.7 | 14331 | 35.7 |
| 5/26/01 2:13 | 581.1 | run 3b | 11.047 | 1032.0 | 566.7 | 14331 | 35.4 |
| 5/26/01 2:13 | 583.1 | run 3b | 11.047 | 1032.0 | 568.7 | 14331 | 35.6 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | ppm | COMMENTS | ZERO CAL | 1016 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 2:13 | 583.1 | run 3b | 11.047 | 1032.0 | 568.7 | 14331 | 35.6 |
| 5/26/01 2:13 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| | | run 3b Average | | | 557.1 | | 34.8 |
| 5/26/01 2:14 | 573.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:14 | 571.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:14 | 577.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:14 | 579.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:15 | 579.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:15 | 575.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:15 | 577.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:15 | 587.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:16 | 589.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:16 | 585.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:16 | 593.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:16 | 603.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:17 | 607.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:17 | 607.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:17 | 613.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:17 | 613.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:18 | 609.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:18 | 613.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:18 | 615.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:18 | 611.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:19 | 611.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:19 | 615.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:19 | 611.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:19 | 611.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:20 | 615.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:20 | 611.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:20 | 605.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:20 | 605.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:21 | 605.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:21 | 599.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:21 | 589.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:21 | 587.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:22 | 585.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:22 | 573.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:22 | 567.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:22 | 569.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:23 | 561.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:23 | 557.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:23 | 561.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:23 | 559.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:24 | 549.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:24 | 450.8 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:24 | 204.4 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:24 | 48.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:25 | 16.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:25 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:25 | 12.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:25 | 12.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:26 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:26 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:26 | 128.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:26 | 567.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:27 | 917.8 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:27 | 1026.0 | 1015 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:27 | 1032.0 | 1015 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:27 | 1032.0 | 1015 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:28 | 1036.0 | 1015 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:28 | 1032.0 | 1015 ppm cal | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1016 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 2:28 | 989.9 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:28 | 813.6 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:29 | 663.3 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:29 | 607.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:29 | 599.1 | 594.7 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:29 | 599.1 | 594.7 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:30 | 501.1 | 594.7 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:30 | 591.1 | 594.7 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:30 | 436.8 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:30 | 176.3 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:31 | 50.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:31 | 18.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:31 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:31 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:32 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:32 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:32 | 10.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:32 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:33 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:33 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:33 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:33 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:34 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:34 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:34 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:34 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:35 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:35 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:35 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:35 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:36 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:36 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:36 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:36 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:37 | -4.1 | end test | 11.047 | 1032.0 | | | |
| | | Grand Average | | | 716.2 | | 44.71764667 |
| | | TEST AVERAGE | | | 716.24 | 14307 | 44.72 |

# APPENDIX H

# PROJECT PARTICIPANTS

## Project Participants

| | |
|---|---|
| DAVID SALTER | FIELD TESTING<br>CALIBRATIONS<br>CALCULATIONS<br>REPORT PREPARATION |
| WALTER MOCK | LAB ANALYSIS |
| BEN MOORE | FIELD TESTING |
| JOE COOKSEY | CO TESTING |
| CRAIG COHEN | CO TESTING |
| GEORGE HAWKINS | FIELD TESTING |
| HARVEY C. GRAY | REPORT REVIEW |

# SOURCE TEST REPORT

Georgia-Pacific Corporation
Palatka, Florida

## Bleach Plant

October 29-31, 2002

Prepared By:

AAS Inc.
**Ambient Air Services, Inc.**
106 Ambient Airway • Starke, FL 32091 • (904) 964-8440 • Fax (904) 964-6675

Ambient Air Services, Inc. of Starke, Florida, has completed the testing as described in this report for Georgia-Pacific Corporation's Palatka, Florida Bleach Plant. To the best of our knowledge and abilities, we certify that all information, facts, and test data are true and correct. Information supplied to AASI for use in this report from Georgia-Pacific Corporation is perceived to be accurate and is used as such where necessary. This report was prepared and certified by:

**Report Number: 504-02-09**

Prepared By:

Randy L Weston
19 November 2002

Reviewed By:

David Sholtes
19 November 2002

## EXECUTIVE SUMMARY:

On 29 and 31 October, 2002 Ambient Air Services, Inc. performed the FDEP required permit stack test at Georgia-Pacific Corporation's Palatka, Florida Bleach Plant. During this test all required stack testing parameters were met. Table I summarizes the results of the test.

TABLE I

| Georgia-Pacific Corporation<br>Palatka, Florida<br>29 & 31 October, 2002 | | | | | |
|---|---|---|---|---|---|
| **PARAMETER** | **TEST RESULTS** | | | | |
| **29 October** | | | | | |
| | Permit Limits | R 1 | R 2 | R 3 | Avg |
| Carbon Monoxide (CO) | N/A | 979.0 ppm | 788.7 ppm | N/A | 883 9 ppm |
| | 46 lb/hr | 58.0 lb/hr | 44.5 lb/hr | N/A | 51.2 lb/hr |
| Chlorinated HAP (Cl2) | 10 ppm | 0.233 ppm | 0.160 ppm | 0 164 ppm | 0.186 ppm |
| | N/A | 0.016 lb/hr | 0.011 lb/hr | 0 012 lb/hr | 0.013 lb/hr |
| **31 October** | | | | | |
| | Permit Limits | R 1 | R 2 | R 3 | Avg |
| Carbon Monoxide (CO) | N/A | 1155.1 ppm | 1212.2 ppm | 583.1 ppm | 983.5 ppm |
| | 46 lb/hr | 72.4 lb/hr | 74 6 lb/hr | 36 5 lb/hr | 61.1 lb/hr |
| Chlorinated HAP (Cl2) | 10 ppm | 0.073 ppm | 0.020 ppm | 0 032 ppm | 0 042 ppm |
| | N/A | 0 005 lb/hr | 0 001 lb/hr | 0 002 lb/hr | 0 003 lb/hr |

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## 1.0 Introduction

Georgia-Pacific Corporation contracted with Ambient Air Services Inc. of Starke, Florida to perform the Chlorine and Carbon Monoxide compliance testing on the Bleach Plant located in Palatka, Florida.

This testing was conducted in order to satisfy testing requirements of Permit Number 1070005-010-AC for emission sources associated with the Palatka, Florida Bleach Plant. For the testing perspective the requirements of the permit associated with this facility was tested under one mobilization effort.

A summary of the testing performed is summarized in Table 2.

The testing was conducted on October 29 & 31, 2002. Florida DEP was notified of the test dates.

**Table 2**

**Georgia-Pacific Corporation**
**Palatka, Florida**
**29 & 31 October, 2002**
**Summary of Permit Requirements**
**Performance Emission Testing**

| Source Description | Approx. Stack Flow | Tests | EPA Method | No. of Runs | Min. hrs |
|---|---|---|---|---|---|
| Bleach Plant | 13,135 scfmd | Cl | 40CFR60 AppA, Meth 26a | 6 | 1 hour |
| | | CO | 40CFR60 AppA, Meth 10 | 5 | 1 hour |

## 2.0 Summary and Discussion of Results

### 2.1 Summary of Results

The following is the summary table for the test conducted with all results in Parts per Million and lbs/hr:

Table 3

# Georgia Pacific - Palatka, Florida

## Bleach Plant Carbon Monoxide Test

October 29, 2002

*Carbon Monoxide Emission Summary*

| RUN NUMBER | START TIME | END TIME | Total Minutes Tested | Flow, SCFM-D | Carbon Monoxide, parts per million | Carbon Monoxide, pounds per hour |
|---|---|---|---|---|---|---|
| 1 | 12:25 | 13:24 | 60 | 12676 | 979.0 | 58.0 |
| 2 | 14:33 | 15:32 | 60 | 12068 | 788.7 | 44.5 |
| Averages | | | 120 | 12372 | 883.9 | 51.2 |

Table 4

# Georgia Pacific - Palatka, Florida

## Bleach Plant Carbon Monoxide Test

October 31, 2002

*Carbon Monoxide Emission Summary*

| RUN NUMBER | START TIME | END TIME | Total Minutes Tested | Flow, SCFM-D | Carbon Monoxide, parts per million | Carbon Monoxide, pounds per hour |
|---|---|---|---|---|---|---|
| 1 | 13:30 | 14:29 | 60 | 13401 | 1155.1 | 72.4 |
| 2 | 15:47 | 16:46 | 60 | 13171 | 1212.2 | 74.6 |
| 3 | 17:10 | 18:09 | 60 | 13375 | 583.1 | 36.5 |
| Averages | | | **180** | **13316** | **983.5** | 61.1 |

Table 5

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AASI

**Chlorine Emissions Summary**
USEPA Method 26A (40 CFR Part 60 Appendix A)
**Georgia Pacific**
**Palatka, Fl.**

**October 29, 2002**
AASI USEPA Method 26A 12 Point Template - Rev 0/11-7-2002

| Run | | | Chlorine Emissions | | | Volumetric Flow Rates | | Stack | | Sample Volume | Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Number | Time (EDT) | GR/SCFD | PPM | LBS/HR | ACFM | SCFMD | Temp °F | Moisture % | SCFD | Isokinetic |
| 10/29/02 | 1 | 12:18<br>13:23 | 1.50E-04 | 0.233 | 0.016 | 16316 | 12775 | 144.3 | 10.7 | 34.421 | 104.7 |
| 10/29/02 | 2 | 14:33<br>15:38 | 1.03E-04 | 0.160 | 0.011 | 15336 | 12139 | 145.0 | 9.6 | 32.247 | 103.3 |
| 10/29/02 | 3 | 17:00<br>18:02 | 1.06E-04 | 0.164 | 0.012 | 16770 | 13454 | 142.2 | 8.8 | 35.523 | 105.5 |
| Average | | | 1.20E-04 | 0.186 | 0.013 | 16141 | 12789 | 143.8 | 9.7 | 34.397 | 104.5 |

Table 6

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## Chlorine Emissions Summary

USEPA Method 26A (40 CFR Part 60 Appendix A)

**Georgia Pacific**

**Palatka, Fl.**

**October 31, 2002**

AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

| Run | | | Chlorine Emissions | | | Volumetric Flow Rates | | Stack | | Sample Volume | Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Number | Time (EDT) | GR/SCFD | PPM | LBS/HR | ACFM | SCFMD | Temp °F | Moisture % | SCFD | Isokinetic |
| 10/31/02 | 1 | 13:32<br>14:43 | 4.73E-05 | 0.073 | 0.005 | 16387 | 13401 | 142.0 | 7.4 | 35.830 | 103.9 |
| 10/31/02 | 2 | 15:50<br>16:56 | 1.29E-05 | 0.020 | 0.001 | 16475 | 13134 | 143.1 | 9.0 | 35.928 | 106.3 |
| 10/31/02 | 3 | 17:10<br>18:16 | 2.06E-05 | 0.032 | 0.002 | 16123 | 12870 | 140.3 | 9.3 | 35.118 | 105.1 |
| Average | | | 2.69E-05 | 0.042 | 0.003 | 16328 | 13135 | 141.8 | 8.6 | 35.625 | 105.4 |

## 3.0 Process Description

### 3.1 Source Operating Parameters

The following conditions were met and the required information was collected during the compliance test.

1. The Bleach Plant had been stabilized for one hour prior to testing.

2. The production rate, species, Kappa, and ClO2 application rates were recorded during the test.

### 3.2 Process Description

The absorbance of visible light by wood pulp fibers is caused mainly by lignin, one of the main constituents of wood. Residual lignin remaining after chemical pulping processes is highly colored. It also darkens with age. Most of the lignin is removed during the pulping process. Bleaching is a process whereby chemicals are applied to the pulp to increase its brightness by continuing the delignification process.

Bleaching increases the usefulness of the paper by enhancing its capacity for accepting printed or written images. It is also a means of purifying pulp, increasing its stability, and enhancing some of its properties.

The chemicals used in the Georgia-Pacific Palatka Mill include oxidants (chlorine dioxide, oxygen and peroxide) and an alkali (sodium hydroxide). The bleaching sequence is first a chlorine dioxide stage ($D_0$), followed by a caustic extraction stage enhanced with oxygen and peroxide ($E_{op}$), and finally another chlorine dioxide stage ($D_1$). These chemicals are mixed with pulp suspensions at prescribed pH, temperature, and concentration conditions for a specified time period. Bleaching chemicals are applied sequentially with intermediate washing between stages, because it is not possible to achieve sufficient delignification by the action of any one chemical in a single stage. Reaction times for bleaching chemicals range from a few minutes to several hours, requiring large towers to provide adequate retention time.

## 4.0 Sampling Point Location

**Sample Site Diagram**

Facility: Georgia Pacific

Location: Palatka, Florida

Source: Bleach Plant

Drawing Date: 10/29/02

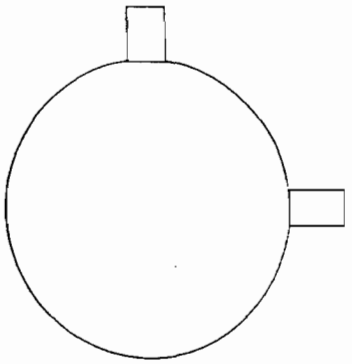
**NOT TO SCALE**

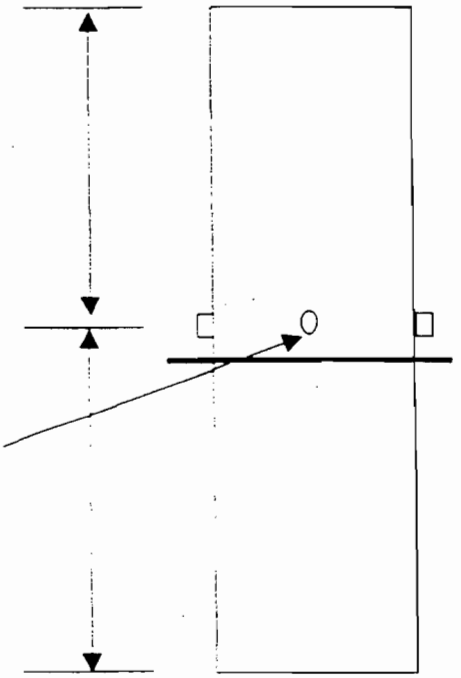
Stack Diameter: 42 Inches

Diameters Downstream: 8.0

Diameters Upstream: 5.7

**Chlorine**
Method 26a






| Sampling Points | |
|---|---|
| 1 | 1.8 |
| 2 | 6.1 |
| 3 | 12.4 |
| 4 | 29.6 |
| 5 | 35.9 |
| 6 | 40.2 |

Note: Two equal distances, ninety degree ports. Ports are 4 inches long. Two ports with 6 points per port, 12 total points.

Ambient Air Services, Inc
106 Ambient Air Way
Starke, Fl 32091
(904) 964-8440

Figure 2-1

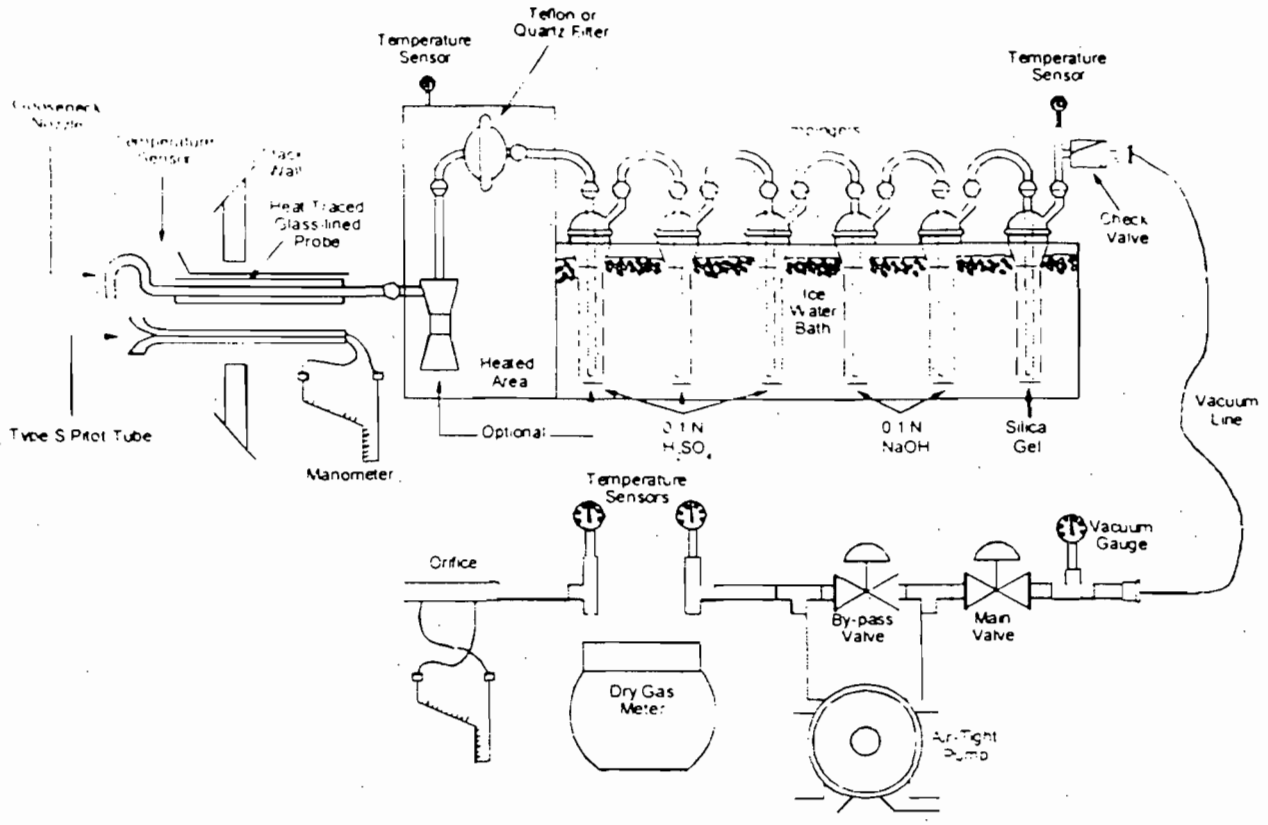
## 5.0 Testing Methodology and Procedures

### 5.1 Chlorine Testing (Method 26a)

USEPA method 26a was conducted on the Bleach Plant. The following is a synopsis of the method and a diagram illustrating the equipment in use.

Gaseous and particulate pollutants are withdrawn isokinetically from the source and collected in an optional cyclone, on a filter, and in absorbing solutions. The cyclone collects any liquid droplets and is not necessary if the source emissions do not contain them; however, it is preferable to include the cyclone in the sampling train to protect the filter from any liquid present. The filter collects particulate matter including halide salts but is not routinely recovered or analyzed. Acidic and alkaline absorbing solutions collect the gaseous hydrogen halides and halogens, respectively. Following sampling of emissions containing liquid droplets, any halides/halogens dissolved in the liquid in the cyclone and on the filter are vaporized to gas and collected in the impingers by pulling conditioned ambient air through the sampling train. The hydrogen halides are solubilized in the acidic solution and form chloride ($Cl^-$), bromide ($Br^-$), and fluoride ($F^-$) ions. The halogens have a very low solubility in the acidic solution and pass through to the alkaline solution where they are hydrolyzed to form a proton ($H^+$), the halide ion, and the hypohalous acid (HClO or HBrO). Sodium thiosulfate is added to the alkaline solution to assure reaction with the hypohalous acid to form a second halide ion such that 2 halide ions are formed for each molecule of halogen gas. The halide ions in the separate solutions are measured by ion chromatography (IC). If desired, the particulate matter recovered from the filter and the probe is analyzed following the procedures in Method 5.

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### 5.2 Carbon Monoxide Testing (Method 10)

An integrated or continuous gas sample is extracted from a sampling point and analyzed for carbon monoxide (CO) content using a Luft-type nondispersive infrared analyzer (NDIR) or equivalent.

## APPENDICES

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| Appendix C | Laboratory Analysis |
| Appendix D | Equipment Calibration Data<br>- Carbon Monoxide Analyzer Calibration<br>- Meter Box Annual Calibration<br>- Meter Box Post Test Calibration<br>- Pitot Calibration<br>- Thermocouple Calibration |
| Appendix E | Sample Chain of Custody |
| Appendix F | Calibration Gas Certificates |
| Appendix G | Process Weight Verification |
| Appendix H | Project Participants |

# APPENDIX – A

**Complete Emission Data**
**- Emissions Run Summaries**
**- Flow Calculation Data**

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**Ambient Air Services, Inc.**
Environmental Consultants

106 Ambient Air Way
Starke, FL. 32091
(904) 964-8440

AASI USEPA Method 5 24 Point Template - Rev 0/11-?-2002

## CI Summary Run 1

| | | | |
|---|---|---|---|
| Facility | Georgia Pacific | Impinger Condensate | 81.0 |
| Location | Palatka, Fl. | Silica Gel Condensate | 7.0 |
| Stack | Bleach Plant | Volume Metered | 37.030 |
| Run Date | 10/29/02 | Meter Temp (Deg R) | 572.0 |
| Run Number | 1 | Carbon Dioxide, % | 0.0 |
| Start Time | 12:18 | Oxygen, % | 20.9 |
| Finish Time | 13:23 | Carbon Monoxide, % | 0.0 |
| Weather | Clear, Warm | Nitrogen, % | 79.1 |
| Total Time (minutes) | 60 | Condensate Volume | 88.0 |
| Barometric Pressure | 30.03 | Delta H (inches H2O) | 1.2900 |
| Stack Diameter (inches) | 42.00 | Stack Pressure | 30.025 |
| Stack Area square feet | 9.621 | Stack Temp (Rainkin Degrees) | 604.3 |
| Nozzle Area square feet | 0.0004125 | Laboratory Results (ug) | 438.9 |
| Number of Points | 12 | Blank Correction | 104.3 |
| Avg of SQRT of V.H. | 0.4616 | Total | 334.6 |
| Meter Correction (Y) | 1.000 | | |
| Nozzle Diameter | 0.275 | | |
| Pitot Correction Factor | 0.84 | | |

| | | |
|---|---|---|
| Volume Water Vapor, SCF | | 4.142 |
| Gas Volume Sampled, STPD | | 34.421 |
| Total Volume, STP | | 38.563 |
| Moisture in stack gas, volume fraction | | 0.107 |
| Dry Stack Gas, volume fraction | | 0.893 |
| Molecular Weight of Stack Gas (Dry Basis) | | 28.84 |
| Molecular Weight of Stack Gas (Stack conditions) | | 27.68 |
| Specific gravity of Stack Gas Relative to Air | | 0.955 |
| Excess Air (%) | | 14864.9 |
| Average Stack Velocity, FPM | | 1695.9 |
| Actual Stack Gas Flow Rate, ACFM | | 16316 |
| Actual Stack Gas Flow Rate, ACFMD | | 14570 |
| Stack Gas Flow Rate, SCFMD | | 12775 |
| Stack Gas Flow Rate Wet, SCFMW | | 14336 |
| Percent Isokinetic | | 105 |
| Stack Emissions: | Grains per DSCF | 0.00115 |
| | Pounds per Hour | 0.013 |

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AASI USEPA Method 5 24 Point Template - Rev 0 11-7-2002

## Cl Summary Run 2

| | | | |
|---|---|---|---|
| Facility | Georgia Pacific | Impinger Condensate | 66.0 |
| Location | Palatka, Fl. | Silica Gel Condensate | 6.9 |
| Stack | Bleach Plant | Volume Metered | 35.145 |
| Run Date | 10/29/02 | Meter Temp (Deg R) | 579.3 |
| Run Number | 2 | Carbon Dioxide, % | 0.0 |
| Start Time | 14:33 | Oxygen, % | 20.9 |
| Finish Time | 15:38 | Carbon Monoxide, % | 0.0 |
| Weather | Partial Clouds | Nitrogen, % | 79.1 |
| Total Time (minutes) | 60 | Condensate Volume | 72.9 |
| Barometric Pressure | 30.03 | Delta H (inches H2O) | 1.1530 |
| Stack Diameter (inches) | 42.00 | Stack Pressure | 30.018 |
| Stack Area square feet | 9.621 | Stack Temp (Rainkin Degrees) | 605.0 |
| Nozzle Area square feet | 0.0004125 | Laboratory Results (ug) | 320.0 |
| Number of Points | 12 | Blank Correction | 104.3 |
| Avg of SQRT of V.H. | 0.4345 | Total | 215.7 |
| Meter Correction (Y) | 1.000 | | |
| Nozzle Diameter | 0.275 | | |
| Pitot Correction Factor | 0.84 | | |

| | | |
|---|---|---|
| Volume Water Vapor, SCF | | 3.431 |
| Gas Volume Sampled, STPD | | 32.247 |
| Total Volume, STP | | 35.678 |
| Moisture in stack gas, volume fraction | | 0.096 |
| Dry Stack Gas, volume fraction | | 0.904 |
| Molecular Weight of Stack Gas (Dry Basis) | | 28.84 |
| Molecular Weight of Stack Gas (Stack conditions) | | 27.8 |
| Specific gravity of Stack Gas Relative to Air | | 0.959 |
| Excess Air (%) | | 14864.9 |
| Average Stack Velocity, FPM | | 1594.0 |
| Actual Stack Gas Flow Rate, ACFM | | 15336 |
| Actual Stack Gas Flow Rate, ACFMD | | 13864 |
| Stack Gas Flow Rate, SCFMD | | 12139 |
| Stack Gas Flow Rate Wet, SCFMW | | 13428 |
| Percent Isokinetic | | 103 |
| Stack Emissions: | Grains per DSCF | 0.00010 |
| | Pounds per Hour | 0.011 |

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AASI USEPA Method 5 24 Point Template - Rev 0/11-7-2002

## CI Summary Run 3

| | | | |
|---|---|---|---|
| Facility | Georgia Pacific | Impinger Condensate | 68.0 |
| Location | Palatka, Fl. | Silica Gel Condensate | 7.1 |
| Stack | Bleach Plant | Volume Metered | 38.870 |
| Run Date | 10/29/02 | Meter Temp (Deg R) | 566.0 |
| Run Number | 3 | Carbon Dioxide, % | 0.0 |
| Start Time | 17:00 | Oxygen, % | 20.9 |
| Finish Time | 18:02 | Carbon Monoxide, % | 0.0 |
| Weather | Partial Clouds | Nitrogen, % | 79.1 |
| Total Time (minutes) | 60 | Condensate Volume | 75.1 |
| Barometric Pressure | 30.03 | Delta H (inches H2O) | 1.3840 |
| Stack Diameter (inches) | 42.00 | Stack Pressure | 30.019 |
| Stack Area square feet | 9.621 | Stack Temp (Rainkin Degrees) | 602.2 |
| Nozzle Area square feet | 0.0004125 | Laboratory Results (ug) | 354.6 |
| Number of Points | 12 | Blank Correction | 104.3 |
| Avg of SQRT of V.H. | 0.4770 | Total | 250.3 |
| Meter Correction (Y) | 1.000 | | |
| Nozzle Diameter | 0.275 | | |
| Pitot Correction Factor | 0.84 | | |

| | | |
|---|---|---|
| Volume Water Vapor, SCF | | 3.535 |
| Gas Volume Sampled, STPD | | 36.523 |
| Total Volume, STP | | 40.058 |
| Moisture in stack gas, volume fraction | | 0.088 |
| Dry Stack Gas, volume fraction | | 0.912 |
| Molecular Weight of Stack Gas (Dry Basis) | | 28.84 |
| Molecular Weight of Stack Gas (Stack conditions) | | 27.89 |
| Specific gravity of Stack Gas Relative to Air | | 0.962 |
| Excess Air (%) | | 14864.9 |
| Average Stack Velocity, FPM | | 1743.1 |
| Actual Stack Gas Flow Rate, ACFM | | 16770 |
| Actual Stack Gas Flow Rate, ACFMD | | 15294 |
| Stack Gas Flow Rate, SCFMD | | 13454 |
| Stack Gas Flow Rate Wet, SCFMW | | 14752 |
| Percent Isokinetic | | 106 |
| Stack Emissions: | Grains per DSCF | 0.00011 |
| | Pounds per Hour | 0.012 |

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AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

## CI Summary Run 1

| | | | |
|---|---|---|---|
| Facility | Georgia Pacific | Impinger Condensate | 54.0 |
| Location | Palatka, Fl. | Silica Gel Condensate | 7.0 |
| Stack | Bleach Plant | Volume Metered | 37.945 |
| Run Date | 10/31/02 | Meter Temp (Deg R) | 564.1 |
| Run Number | 1 | Carbon Dioxide, % | 0.0 |
| Start Time | 13:32 | Oxygen, % | 20.9 |
| Finish Time | 14:43 | Carbon Monoxide, % | 0.0 |
| Weather | Cloudy | Nitrogen, % | 79.1 |
| Total Time (minutes) | 60 | Condensate Volume | 61.0 |
| Barometric Pressure | 30.14 | Delta H (inches H2O) | 1.3530 |
| Stack Diameter (inches) | 42.00 | Stack Pressure | 30.128 |
| Stack Area square feet | 9.621 | Stack Temp (Rainkin Degrees) | 602.0 |
| Nozzle Area square feet | 0.0004125 | Laboratory Results (ug) | 214.2 |
| Number of Points | 12 | Blank Correction | 104.3 |
| Avg of SQRT of V.H. | 0.4683 | Total | 109.9 |
| Meter Correction (Y) | 0.998 | | |
| Nozzle Diameter | 0.275 | | |
| Pitot Correction Factor | 0.84 | | |

| | | |
|---|---|---|
| Volume Water Vapor, SCF | | 2.871 |
| Gas Volume Sampled, STPD | | 35.830 |
| Total Volume, STP | | 38.701 |
| Moisture in stack gas, volume fraction | | 0.074 |
| Dry Stack Gas, volume fraction | | 0.926 |
| Molecular Weight of Stack Gas (Dry Basis) | | 28.84 |
| Molecular Weight of Stack Gas (Stack conditions) | | 28.04 |
| Specific gravity of Stack Gas Relative to Air | | 0.967 |
| Excess Air (%) | | 14864.9 |
| Average Stack Velocity, FPM | | 1703.3 |
| Actual Stack Gas Flow Rate, ACFM | | 16387 |
| Actual Stack Gas Flow Rate, ACFMD | | 15174 |
| Stack Gas Flow Rate, SCFMD | | 13491 |
| Stack Gas Flow Rate Wet, SCFMW | | 14472 |
| Percent Isokinetic | | 104 |
| Stack Emissions: | Grains per DSCF | 0.00385 |
| | Pounds per Hour | 3.035 |

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AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

## CI Summary Run 2

| | | | |
|---|---|---|---|
| Facility | Georgia Pacific | Impinger Condensate | 68.0 |
| Location | Palatka, Fl. | Silica Gel Condensate | 7.1 |
| Stack | Bleach Plant | Volume Metered | 38.025 |
| Run Date | 10/31/02 | Meter Temp (Deg R) | 560.2 |
| Run Number | 2 | Carbon Dioxide, % | 0.0 |
| Start Time | 15:50 | Oxygen, % | 20.9 |
| Finish Time | 16:56 | Carbon Monoxide, % | 0.0 |
| Weather | Partial Clouds | Nitrogen, % | 79.1 |
| Total Time (minutes) | 60 | Condensate Volume | 75.1 |
| Barometric Pressure | 29.95 | Delta H (inches H2O) | 1.3480 |
| Stack Diameter (inches) | 42.00 | Stack Pressure | 29.940 |
| Stack Area square feet | 9.621 | Stack Temp (Rainkin Degrees) | 603.1 |
| Nozzle Area square feet | 0.0004125 | Laboratory Results (ug) | 134.3 |
| Number of Points | 12 | Blank Correction | 104.3 |
| Avg of SQRT of V.H. | 0.4674 | Total | 30.0 |
| Meter Correction (Y) | 0.998 | | |
| Nozzle Diameter | 0.275 | | |
| Pitot Correction Factor | 0.84 | | |

| | | |
|---|---|---|
| Volume Water Vapor, SCF | | 3.535 |
| Gas Volume Sampled, STPD | | 35.928 |
| Total Volume, STP | | 39.463 |
| Moisture in stack gas, volume fraction | | 0.090 |
| Dry Stack Gas, volume fraction | | 0.91 |
| Molecular Weight of Stack Gas (Dry Basis) | | 28.84 |
| Molecular Weight of Stack Gas (Stack conditions) | | 27.86 |
| Specific gravity of Stack Gas Relative to Air | | 0.961 |
| Excess Air (%) | | 14864.9 |
| Average Stack Velocity, FPM | | 1712.4 |
| Actual Stack Gas Flow Rate, ACFM | | 16475 |
| Actual Stack Gas Flow Rate, ACFMD | | 14992 |
| Stack Gas Flow Rate, SCFMD | | 13134 |
| Stack Gas Flow Rate Wet, SCFMW | | 14433 |
| Percent Isokinetic | | 106 |
| Stack Emissions: | Grains per DSCF | 0.00001 |
| | Pounds per Hour | 0.001 |

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AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

## CI Summary Run 3

| | | | |
|---|---|---|---|
| Facility | Georgia Pacific | Impinger Condensate | 70.0 |
| Location | Palatka, Fl. | Silica Gel Condensate | 6.9 |
| Stack | Bleach Plant | Volume Metered | 37.000 |
| Run Date | 10/31/02 | Meter Temp (Deg R) | 557.6 |
| Run Number | 3 | Carbon Dioxide, % | 0.0 |
| Start Time | 17:10 | Oxygen, % | 20.9 |
| Finish Time | 18:16 | Carbon Monoxide, % | 0.0 |
| Weather | Partial Clouds | Nitrogen, % | 79.1 |
| Total Time (minutes) | 60 | Condensate Volume | 76.9 |
| Barometric Pressure | 29.95 | Delta H (inches H2O) | 1.2970 |
| Stack Diameter (inches) | 42.00 | Stack Pressure | 29.938 |
| Stack Area square feet | 9.621 | Stack Temp (Rainkin Degrees) | 600.3 |
| Nozzle Area square feet | 0.0004125 | Laboratory Results (ug) | 151.1 |
| Number of Points | 12 | Blank Correction | 104.3 |
| Avg of SQRT of V.H. | 0.4582 | Total | 46.8 |
| Meter Correction (Y) | 0.998 | | |
| Nozzle Diameter | 0.275 | | |
| Pitot Correction Factor | 0.84 | | |

| | | |
|---|---|---|
| Volume Water Vapor, SCF | | 3.620 |
| Gas Volume Sampled, STPD | | 35.118 |
| Total Volume, STP | | 38.738 |
| Moisture in stack gas, volume fraction | | 0.093 |
| Dry Stack Gas, volume fraction | | 0.907 |
| Molecular Weight of Stack Gas (Dry Basis) | | 28.84 |
| Molecular Weight of Stack Gas (Stack conditions) | | 27.33 |
| Specific gravity of Stack Gas Relative to Air | | 0.950 |
| Excess Air (%) | | 14864.9 |
| Average Stack Velocity, FPM | | 1675.8 |
| Actual Stack Gas Flow Rate, ACFM | | 16123 |
| Actual Stack Gas Flow Rate, ACFMD | | 14624 |
| Stack Gas Flow Rate, SCFMD | | 12870 |
| Stack Gas Flow Rate Wet, SCFMW | | 14190 |
| Percent Isokinetic | | 106 |
| Stack Emissions: | Grains per DSCF | 0.00302 |
| | Pounds per Hour | 0.332 |

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AASI USEPA Method 5 24 Point Template - Rev 0 11-7-2002

## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 1 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/29/02 |
| Run Number | 1 |
| Start Time | 12:18 |
| Finish Time | 13:23 |
| Weather | Clear, Warm |
| Total Time (minutes) | 60.00 |
| Number of Points | 12 |
| Barometric Pressure | 30.03 |
| Static Pressure (inches of water) | -0.05 |
| Stack Diameter (inches) | 42.000 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 1.000 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 193.480 |
| Initial Meter Reading (cubic feet) | 156.450 |
| Condensate (ml) | 81 |
| Silica Gel Weight (grams) | 7.0 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | 0.0 |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 438.9 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.00 |

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AASI USEPA Method 5 24 Point Template - Rev 0[illegible]2002

| Field Data Points - CI Run 1 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.26 | 1.56 | 142 | 106 | 106 | 0.51 |
| | 2 | 0.26 | 1.56 | 142 | 107 | 107 | 0.51 |
| | 3 | 0.23 | 1.38 | 145 | 107 | 107 | 0.48 |
| | 4 | 0.22 | 1.32 | 145 | 108 | 108 | 0.47 |
| | 5 | 0.18 | 1.08 | 143 | 110 | 110 | 0.42 |
| | 6 | 0.16 | 0.96 | 141 | 111 | 111 | 0.40 |
| 2 | 7 | 0.26 | 1.56 | 144 | 113 | 113 | 0.51 |
| | 8 | 0.27 | 1.62 | 145 | 114 | 114 | 0.52 |
| | 9 | 0.22 | 1.32 | 148 | 115 | 115 | 0.47 |
| | 10 | 0.18 | 1.08 | 148 | 117 | 117 | 0.42 |
| | 11 | 0.18 | 1.08 | 145 | 118 | 118 | 0.42 |
| | 12 | 0.16 | 0.96 | 143 | 118 | 118 | 0.40 |

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AASI USEPA Method 5 24 Point Template - Rev 0/11-7-2002

## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 2 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/29/02 |
| Run Number | 2 |
| Start Time | 14:33 |
| Finish Time | 15:38 |
| Weather | Partial Clouds |
| Total Time (minutes) | 60.0 |
| Number of Points | 12 |
| Barometric Pressure | 30.03 |
| Static Pressure (inches of water) | -0.16 |
| Stack Diameter (inches) | 42.00 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 1.000 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 230.200 |
| Initial Meter Reading (cubic feet) | 195.055 |
| Condensate (ml) | 66 |
| Silica Gel Weight (grams) | 6.9 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 320.0 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.04 |

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AASI USEPA Method 5 24 Point Template - Rev 0/11-7-2002

| Field Data Points - CI Run 2 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.21 | 1.27 | 145 | 115 | 115 | 0.46 |
| | 2 | 0.2 | 1.21 | 145 | 117 | 117 | 0.45 |
| | 3 | 0.16 | 0.97 | 146 | 118 | 118 | 0.40 |
| | 4 | 0.16 | 0.97 | 147 | 118 | 118 | 0.40 |
| | 5 | 0.16 | 0.97 | 145 | 119 | 119 | 0.40 |
| | 6 | 0.12 | 0.72 | 139 | 120 | 120 | 0.35 |
| 2 | 7 | 0.25 | 1.51 | 146 | 120 | 120 | 0.50 |
| | 8 | 0.25 | 1.51 | 146 | 120 | 120 | 0.50 |
| | 9 | 0.22 | 1.33 | 147 | 121 | 121 | 0.47 |
| | 10 | 0.22 | 1.33 | 147 | 121 | 121 | 0.47 |
| | 11 | 0.18 | 1.09 | 144 | 121 | 121 | 0.42 |
| | 12 | 0.16 | 0.97 | 143 | 121 | 121 | 0.40 |

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AASI USEPA Method 5 24 Point Template - Rev 0.11-7-2002

## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 3 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/29/02 |
| Run Number | 3 |
| Start Time | 17:00 |
| Finish Time | 18:02 |
| Weather | Partial Clouds |
| Total Time (minutes) | 60.0 |
| Number of Points | 12 |
| Barometric Pressure | 30.03 |
| Static Pressure (inches of water) | -0.15 |
| Stack Diameter (inches) | 42.00 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 1.000 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 269.620 |
| Initial Meter Reading (cubic feet) | 230.750 |
| Condensate (ml) | 68 |
| Silica Gel Weight (grams) | 7.1 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 354.6 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.04 |

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| Field Data Points - CI Run 3 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.26 | 1.57 | 144 | 109 | 109 | 0.51 |
| | 2 | 0.28 | 1.69 | 142 | 102 | 102 | 0.53 |
| | 3 | 0.26 | 1.57 | 144 | 107 | 107 | 0.51 |
| | 4 | 0.25 | 1.51 | 143 | 107 | 107 | 0.50 |
| | 5 | 0.2 | 1.21 | 141 | 107 | 107 | 0.45 |
| | 6 | 0.18 | 1.09 | 140 | 107 | 107 | 0.42 |
| 2 | 7 | 0.26 | 1.57 | 141 | 106 | 106 | 0.51 |
| | 8 | 0.28 | 1.69 | 143 | 106 | 106 | 0.53 |
| | 9 | 0.22 | 1.33 | 144 | 106 | 106 | 0.47 |
| | 10 | 0.2 | 1.21 | 142 | 105 | 105 | 0.45 |
| | 11 | 0.18 | 1.09 | 142 | 105 | 105 | 0.42 |
| | 12 | 0.18 | 1.09 | 140 | 105 | 105 | 0.42 |

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AASI USEPA Method 26A 12 Point Template Rev 0:11-14-2002

## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 1 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/31/02 |
| Run Number | 1 |
| Start Time | 13:32 |
| Finish Time | 14:43 |
| Weather | Cloudy |
| Total Time (minutes) | 60.00 |
| Number of Points | 12 |
| Barometric Pressure | 30.14 |
| Static Pressure (inches of water) | -0.17 |
| Stack Diameter (inches) | 42.000 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 0.998 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 313.155 |
| Initial Meter Reading (cubic feet) | 275.210 |
| Condensate (ml) | 54 |
| Silica Gel Weight (grams) | 7.0 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | 0.0 |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 214.2 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.08 |

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AASI USEPA Method 7/7A 12 Point Template - Rev 0:11-14-2002

| Field Data Points - CI Run 1 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.28 | 1.70 | 142 | 100 | 101 | 0.53 |
| | 2 | 0.26 | 1.58 | 144 | 102 | 100 | 0.51 |
| | 3 | 0.24 | 1.46 | 141 | 103 | 99 | 0.49 |
| | 4 | 0.18 | 1.09 | 141 | 105 | 100 | 0.42 |
| | 5 | 0.16 | 0.97 | 141 | 108 | 101 | 0.40 |
| | 6 | 0.14 | 0.85 | 142 | 108 | 102 | 0.37 |
| 2 | 7 | 0.27 | 1.64 | 141 | 109 | 103 | 0.52 |
| | 8 | 0.29 | 1.76 | 141 | 109 | 103 | 0.54 |
| | 9 | 0.27 | 1.64 | 142 | 109 | 103 | 0.52 |
| | 10 | 0.24 | 1.46 | 142 | 109 | 102 | 0.49 |
| | 11 | 0.18 | 1.09 | 144 | 109 | 102 | 0.42 |
| | 12 | 0.16 | 0.97 | 143 | 109 | 102 | 0.40 |

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AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 2 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, FL. |
| Source | Bleach Plant |
| Date | 10/31/02 |
| Run Number | 2 |
| Start Time | 15:50 |
| Finish Time | 16:56 |
| Weather | Partial Clouds |
| Total Time (minutes) | 60.0 |
| Number of Points | 12 |
| Barometric Pressure | 29.95 |
| Static Pressure (inches of water) | -0.14 |
| Stack Diameter (inches) | 42.00 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 0.998 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 359.105 |
| Initial Meter Reading (cubic feet) | 321.080 |
| Condensate (ml) | 68 |
| Silica Gel Weight (grams) | 7.1 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 134.3 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.08 |

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AASI USEPA Method 2oA 12 Point Template - Rev 0/11-14-2002

| Field Data Points - CI Run 2 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.27 | 1.64 | 140 | 94 | 93 | 0.52 |
| | 2 | 0.28 | 1.70 | 141 | 95 | 92 | 0.53 |
| | 3 | 0.24 | 1.46 | 143 | 103 | 96 | 0.49 |
| | 4 | 0.22 | 1.34 | 145 | 103 | 96 | 0.47 |
| | 5 | 0.18 | 1.09 | 144 | 105 | 97 | 0.42 |
| | 6 | 0.16 | 0.97 | 144 | 105 | 97 | 0.40 |
| 2 | 7 | 0.29 | 1.76 | 141 | 105 | 97 | 0.54 |
| | 8 | 0.3 | 1.82 | 142 | 105 | 97 | 0.55 |
| | 9 | 0.22 | 1.34 | 144 | 108 | 99 | 0.47 |
| | 10 | 0.2 | 1.22 | 145 | 108 | 98 | 0.45 |
| | 11 | 0.16 | 0.97 | 144 | 108 | 98 | 0.40 |
| | 12 | 0.14 | 0.85 | 144 | 108 | 97 | 0.37 |

Ambient Air Services, Inc.
Environmental Consultants
106 Ambient Air Way
Starke, FL. 32091
(904) 964-8440

AASI USEPA Method 26A 12 Point Template - Rev 0.11-14-2002

## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 3 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/31/02 |
| Run Number | 3 |
| Start Time | 17:10 |
| Finish Time | 18:16 |
| Weather | Partial Clouds |
| Total Time (minutes) | 60.0 |
| Number of Points | 12 |
| Barometric Pressure | 29.95 |
| Static Pressure (inches of water) | -0.16 |
| Stack Diameter (inches) | 42.00 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 0.998 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 396.405 |
| Initial Meter Reading (cubic feet) | 359.405 |
| Condensate (ml) | 70 |
| Silica Gel Weight (grams) | 6.9 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 151.1 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.08 |

Ambient Air Services, Inc.
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AASI USEPA Method 26A 12 Point Template - Rev 0.11-14-2002

| Field Data Points - CI Run 3 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.28 | 1.70 | 138 | 97 | 95 | 0.53 |
| | 2 | 0.26 | 1.58 | 140 | 100 | 96 | 0.51 |
| | 3 | 0.22 | 1.34 | 142 | 98 | 95 | 0.47 |
| | 4 | 0.2 | 1.22 | 140 | 100 | 93 | 0.45 |
| | 5 | 0.16 | 0.97 | 139 | 101 | 93 | 0.40 |
| | 6 | 0.14 | 0.85 | 142 | 102 | 94 | 0.37 |
| 2 | 7 | 0.3 | 1.82 | 142 | 102 | 94 | 0.55 |
| | 8 | 0.26 | 1.58 | 141 | 102 | 94 | 0.51 |
| | 9 | 0.24 | 1.46 | 140 | 102 | 94 | 0.49 |
| | 10 | 0.2 | 1.22 | 140 | 102 | 94 | 0.45 |
| | 11 | 0.16 | 0.97 | 139 | 103 | 95 | 0.40 |
| | 12 | 0.14 | 0.85 | 140 | 102 | 95 | 0.37 |

# APPENDIX – B

Field Data Sheets
- Chlorine and Flow Data Sheets
- Carbon Monoxide Data

**Best Available Copy**

M CTM-027

HCl

AMBIENT AIR SERVICES
106 AMBIENT AIR WAY
STARKE FL. 32091 (904) 964-8440

SOURCE SAMPLING FIELD DATA SHEET

FACILITY: GP Palatka — RUN NO: 1

SOURCE: Bleach — DATE: 10/29/02

BAROMETRIC PRESS. 30.03 — WEATHER: Partial Clouds — PRE-TEST.

METER BOX ID: ~~RS1~~ #10 — TYPE TEST: 027 — Ts = 142 602 — CO2 _____

METER DELTA H: 2.050 — TESTERS: BW, R — Tm = 105 565 — O2 20.9

PROBE ID: 63 — 12 PTS. @ 5 MIN/PT = _____ MIN F.D.A. = .94 — CO _____

PITOT CORR. FACTOR 0.84 — Y meter = .998 — Filter No. = _____

NOZZLE DIA. .275 in. — COMMENTS: Nozzle .275, .275, .273 Avg .275

PROBE TEMP. N/A — TIME START 1218 — START VOLUME 156.450

STACK ID (IN.)= 72 — TIME END _____ — END VOLUME 193.480 — -1.9 — 9188.69

UP/DOWN STREAM 28 72 — PORT LENGTH (IN) 7" — Factors: _____ — Fc 6.01 — 1529.08

LEAK CHECK PRE.TEST 0 — CFM@15". POST: _____ " Hg. — PITOT LEAK CHECK = _____ AT 3" — VOL. WATER COLLECTED = _____ — MI ~~200~~ 81 — STAT PRESS= -1.9

WEIGHT MOIS. SILICA GEL = _____ GR

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORRIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGER TEMP. | VACUUM INCHES Hg | PROBE GAS TEMP | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ~~0725~~ | 156.450 | .26 | 1.6 | 142 | 106 | 240 | 76 | 5 | N/A | a) .005053 |
| 2 | 5 5 | 159.8 | .26 | 1.6 | 142 | 107 | 247 | 70 | 5.5 | | b) 1529.08 |
| 3 ~~2~~ | 10 ~~7.5~~ | 162.9 | .23 | 1.4 | 145 | 107 | 255 | 66 | 5 | | c) 58.25 |
| 4 | 15 ~~10~~ | 166.0 | .22 | ~~1.4~~ 1.3 | 145 | 108 | 272 | ~~66~~ 59 | 5 | | |
| 5 | 3 ~~20~~ ~~12.5~~ | 169.2 | .18 | 1.1 | 143 | 110 | 220 | 60 | 5 | | |
| 6 | 25 15 | 172.1 | .16 | .96 | 141 | 111 | 260 | 61 | 4.5 | | |
| 2-1 | ~~4~~ 30 12.5 | 174.98 | .26 | 1.6 | 144 | 113 | 220 | 64 | 5.5 | | |
| 2 | 35 ~~20~~ | 178.0 | .27 ~~4~~ | 1.6 | 145 | 114 | 274 | 62 | 5.5 | | |
| 3 ~~5~~ | 40 ~~22.5~~ | 181.6 | .22 | 1.3 | 148 | 115 | 247 | 62 | 5.5 | | |
| 4 | 45 ~~25~~ | ~~184.6~~ 184.5 | .18 | 1.1 | 148 | 117 | 208 | 63 | 5.5 | | |
| 5 6 | 50 ~~27.5~~ | 187.7 | .18 | 1.1 | 145 | 118 | 264 | 63 | 5.5 | | |
| 6 | 55 ~~30~~ | 190.7 | .16 | .96 | 143 | 115 | 229 | 64 | 5 | | |
| | 60 | 193.480 | — | — | — | — | — | — | — | | |

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CTM-027 4cc
HCL

AMBIENT AIR SERVICES
106 AMBIENT AIR WAY
STARKE FL. 32091 (904) 964-8440

# SOURCE SAMPLING FIELD DATA SHEET

FACILITY: GP Palatka
SOURCE: Bleach Plant
WEATHER: Partial Clouds
TYPE TEST: CTM-027
TESTERS: RW, RD
12 PTS. @ 5 MIN/PT = 60 MIN F.D.A. = .94
Y meter = .998 Filter No. =
COMMENTS:

RUN No 2
DATE 10/29/02

BAROMETRIC PRESS. 30.03
METER BOX ID: RS+ 10
METER DELTA H: 2.050
PROBE ID: 6B
PITOT CORR. FACTOR 0.84
NOZZLE DIA. 0.275 in.
PROBE TEMP N/A
STACK ID (IN.)= 42"
UP/DOWN STREAM 28 22

PRE-TEST- 605
Ts = ~~140 600~~ 163
Tm = ~~105 565~~ 571

TIME START 1133 START VOLUME 195,055
TIME END 1538 END VOLUME
PORT LENGTH (IN) 7" Factors: 6.04

static -.16

4286.22
1570 X 170.35 X .005
1536.7

LEAK CHECK:
PRE-TEST 0 CFM@15". POST: .015 8 " Hg.
PITOT LEAK CHECK = OK AT 3"
VOL. WATER COLLECTED = 66 ML
WEIGHT MOIS. SILICA GEL = GR

STAT PRESS= -.16

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORRIFICE PRESS. DROP | STACK GAS TEMP | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGER TEMP. | VACUUM INCHES Hg | PROBE GAS TEMP |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 ~~1~~ | 0 ~~25~~ | 195,055 | .21 | 1.3 | ~~195~~ HSR | 115 | 125 | 76 | ~~20~~ 5 | N/A |
| 2 | 5 ~~5~~ | 197.7 | .2 | 1.2 | 145 | 117 | 274 | 60 | 6 | |
| 3 ~~2~~ | 10 ~~75~~ | 201.1 | .16 | .96 | 146 | 118 | 254 | 59 | 4.5 | |
| 4 | 15 ~~10~~ | 205.8 | .16 | .96 | 147 | 118 | 220 | 60 | 4.5 | |
| 5 ~~3~~ | 20 ~~125~~ | 206.5 | .16 | .96 | 145 | 119 | 263 | 56 | 4.5 | |
| 6 | 25 ~~15~~ | 209.2 | .12 | .72 | 139 | 120 | 245 | 54 | 4 | |
| 2-1 ~~4~~ | 30 ~~175~~ | ~~3~~ 211.665 | .25 | 1.5 | 146 | 120 | 274 | 54 | 5 | |
| 2 | 35 ~~20~~ | 214.7 | .25 | 1.5 | 146 | 120 | 238 | 50 | 5 | |
| 3 ~~6~~ | 40 ~~225~~ | 218.0 | .22 | 1.3 | 147 | 121 | 284 | 52 | 5 | |
| 4 | 45 ~~25~~ | 221.2 | .22 | 1.3 | 147 | 121 | 272 | 52 | 5 | |
| 5 ~~6~~ | 50 ~~275~~ | 224.4 | .18 | 1.1 | 144 | 121 | 221 | 54 | 5 | |
| 6 | 55 ~~30~~ | 227.4 | .16 | .96 | 143 | 121 | 259 | 55 | ~~7.5~~ | |
| | 60 | 230.2 | — | — | — | — | — | — | — | |

a) $(.28^2 \times .94)^2$
b) $(1.6 \times .94) 605$
c) $571 \times 2.05$

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AMBIENT AIR SERVICES
106 AMBIENT AIR WAY
STARKE FL 32091 (904) 964-8440

SOURCE SAMPLING FIELD DATA SHEET

FACILITY: GP Palatka
SOURCE: Kiln Plant
WEATHER: Partial Clouds PRE-TEST.
TYPE TEST: CTM-027 HCl
TESTERS: RW
12 PTS. @ 5 MIN/PT = 60 MIN F.D.A. = .94
Y meter = 0.998 Filter No =
COMMENTS:

RUN NO: 3
DATE: 10/29/02

BAROMETRIC PRESS. 30.03
METER BOX ID: ~~RS1~~ FF10
METER DELTA H: 2.05
PROBE ID: C03
PITOT CORR. FACTOR 0.84
NOZZLE DIA. 0.275 in.
PROBE TEMP. N/A
STACK ID (IN.)= 42
UP/DOWN STREAM >8 >2

Ts = 245 605
Tm = ~~RMS~~ 115 585

CO2
O2
CO

TIME START 1700 START VOLUME 230.750
TIME END 1802 END VOLUME 269.62 -.15
PORT LENGTH (IN) 7" Factors: 6.04

LEAK CHECK:
PRE-TEST 0 CFM@15": POST: " Hg.
PITOT LEAK CHECK = OK AT 3"
VOL. WATER COLLECTED = 68 ML
WEIGHT MOIS. SILICA GEL = GR
STAT PRESS= -.15

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORRIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGER TEMP. | VACUUM INCHES Hg | PROBE GAS TEMP. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | ~~0~~ 0 | 230.750 | .26 | 1.6 | 144 | 109 | 250 | 63 | 5.5 | N/A |
| 2 | 5 | 234.0 | .28 | 1.7 | 142 | 102 | 243 | 52 | 5.5 | |
| 3 | 2 10 ~~7.5~~ | 237.5 | .26 | 1.6 | 144 | 107 | 278 | 51 | 5.5 | |
| 4 | 15 ~~10~~ | 240.9 | .25 | 1.6 | 143 | 107 | 240 | 50 | 5.5 | |
| 5 | 21 20 ~~12.5~~ | 244.3 | .2 | 1.2 | 141 | 107 | 237 | 50 | 5.5 | |
| 6 | 25 ~~15~~ | 247.5 | .18 | 1.1 | 140 | 107 | 291 | 50 | 5 | |
| 2-1 | 4 30 ~~17.5~~ | 250.56 | .26 | 1.6 | 141 | 106 | 222 | 52 | 7 | |
| 2 | 35 ~~20~~ | 254.2 | .28 | 1.7 | 143 | 106 | 278 | 50 | 7 | |
| 3 | 5 40 ~~22.5~~ | 257.8 | .22 | 1.3 | 144 | 106 | 263 | 50 | 6 | |
| 4 | 45 ~~25~~ | 261.0 | .2 | 1.2 | 142 | 105 | 225 | 50 | 5 | |
| 5 | 6 50 ~~27.5~~ | 264.2 | .18 | 1.1 | 142 | 105 | 225 | 50 | 5 | |
| 6 | 55 ~~30~~ | 266.9 | .18 | 1.1 | 140 | 105 | 242 | 50 | 5 | |
| | 60 | 269.620 | — | — | — | — | — | — | — | |

AMBIENT AIR SERVICES, INC.
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# SOURCE SAMPLING FIELD DATA SHEET

FACILITY: Georgia-Pacific, Palatka **Best Available Copy** RUN No. 1
SOURCE: Bleach Plant DATE 10/31/02
WEATHER: p. cloudy PRE-TES ORSAT
TYPE TEST: HCl method 26A Ts = _____ CO2 _____
TESTERS: _____ Tm = 94 O2 _____
12 PTS. @ 5 MIN/PT = 60 MIN F.D.A. = 2.94 CO _____
Y meter = 0.998 Filter No. = _____
COMMENTS:

BAROMETRIC PRESS _____
METER BOX ID 10
METER DELTA Ha 2.05
PROBE ID _____
PITOT CORR. FACTOR 0.84
NOZZLE DIA. 0.275 in.
PROBE TEMP. ~250
STACK ID (IN): 42"
PORT LENGTH 6"

TIME START 1332
TIME END 1443

START VOLUME 275.210
END VOLUME _____
Factors: _____

F=1570(aXc)/b
a = (Dn^2XFDA)^2
b= (1.6+FDA)Ts
c= Tm X DHa

LEAK CHECK:
PRE.TEST 0.012 CFM@15". POS 0.016/0 "Hg.

PITOT LEAK CHECK = OK AT 3"

VOL.WATER COLLECT = 68 ML STAT.PRESS=
WT. MOIS. SILICA GEL = GR

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGE TEMP. | VACUUM INCHES Hg |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 0 | 275.210 | 0.28 | 1.70 | 142 | 100 | 101 | 246 | 64 | <5 |
| 2 | 5 | 78.64 | 0.26 | 1.58 | 144 | 102 | 100 | 256 | 56 | <6 |
| 3 | 10 | 82.01 | 0.24 | 1.45 | 141 | 103 | 99 | 258 | 56 | <5 |
| 4 | 15 | 85.32 | 0.18 | 1.09 | 141 | 105 | 100 | 259 | 55 | <5 |
| 5 | 20 | 88.35 | 0.16 | 0.97 | 141 | 108 | 101 | 260 | 56 | <5 |
| 6 | 25 | 91.11 | 0.14 | 0.85 | 142 | 108 | 102 | 258 | 56 | <5 |
| 2-1 | 30 | 94.185 | 0.27 | 1.64 | 141 | 109 | 103 | 261 | 57 | <6 |
| 2 | 35 | 97.45 | 0.29 | 1.76 | 141 | 109 | 103 | 260 | 55 | <5 |
| 3 | 40 | 300.74 | 0.27 | 1.64 | 142 | 109 | 103 | 262 | 55 | <6 |
| 4 | 45 | 04.18 | 0.24 | 1.45 | 142 | 109 | 102 | 259 | 56 | <6 |
| 5 | 50 | 07.71 | 0.18 | 1.09 | 144 | 109 | 102 | 261 | 56 | <5 |
| 6 | 55 | 10.44 | 0.16 | 0.97 | 143 | 109 | 102 | 258 | 56 | <5 |
| | 60 | 313.155 | | | | | | | | |

AMBIENT AIR SERVICES, INC.
STARKE, FL
(904)964-8440

# SOURCE SAMPLING FIELD DATA SHEET

FACILITY: Georgia-Pacific, Palatka
SOURCE: Bleach Plant
WEATHER: cloudy
TYPE TEST: HCl method 26A
TESTERS:
12 PTS. @ 5 MIN/PT = 60 MIN
Y meter = 0.998
COMMENTS:

**Best Available Copy**

RUN No. 2
DATE 10/31/02

PRE-TES
Ts =
Tm =
F.D.A. =
Filter No. =

ORSAT
CO2
O2
CO

BAROMETRIC PRESS
METER BOX ID 10
METER DELTA Ha 2.050
PROBE ID
PITOT CORR. FACTOR 0.84
NOZZLE DIA 0.275 in.
PROBE TEMP ~250
STACK ID (IN): 42
PORT LENGTH 6

TIME START 1550
TIME END 1656

START VOLUME 321.080
END VOLUME 359.105
Factors:

F=1570(aXc)/b
a = (Dn^2)(FDA)^2
b= (1.6+FDA)Ts
c= Tm X DHa

LEAK CHECK:
PRE.TEST 0.014 CFM@15". POS 0.009 " Hg.

PITOT LEAK CHECK = OK AT 3"

VOL.WATER COLLECT = 68 ML STAT.PRESS= -0.14
WT. MOIS. SILICA GEL = GR

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGE TEMP. | VACUUM INCHES Hg |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 0 | 321.080 | 0.27 | 1.64 | 140 | 94 | 93 | 242 | 61 | <5 |
| 2 | 5 | 24.27 | 0.28 | 1.70 | 141 | 95 | 92 | 256 | 55 | <6 |
| 3 | 10 | 28.91 | 0.24 | 1.45 | 143 | 103 | 96 | 258 | 56 | <6 |
| 4 | 15 | 31.16 | 0.22 | 1.34 | 145 | 103 | 96 | 260 | 56 | <6 |
| 5 | 20 | 34.18 | 0.18 | 1.09 | 144 | 105 | 97 | 262 | 56 | <5 |
| 6 | 25 | 37.14 | 0.16 | 0.97 | 144 | 105 | 97 | 259 | 56 | <5 |
| 2-1 | 30 | 339.69 | 0.29 | 1.76 | 141 | 105 | 97 | 262 | 55 | <6 |
| 2 | 35 | 43.12 | 0.30 | 1.82 | 142 | 105 | 97 | 260 | 56 | <6 |
| 3 | 40 | 47.32 | 0.22 | 1.34 | 144 | 108 | 99 | 258 | 56 | <6 |
| 4 | 45 | 50.51 | 0.20 | 1.22 | 145 | 108 | 98 | 260 | 57 | <6 |
| 5 | 50 | 53.54 | 0.16 | 0.97 | 144 | 108 | 98 | 261 | 56 | <5 |
| 6 | 55 | 56.52 | 0.14 | 0.85 | 144 | 108 | 97 | 259 | 56 | <5 |
| | 60 | 359.105 | | | | | | | | |

AMBIENT AIR SERVICES, INC.
STARKE, FL
(904)964-8440

# SOURCE SAMPLING FIELD DATA SHEET

FACILITY: Georgia-Pacific, Palatka
SOURCE: Bleach Plant
WEATHER: cloudy
TYPE TEST: HCl method 26A
TESTERS: GH, RB
__12_ PTS. @ _5___ MIN/PT = _60__ MIN
Y meter = 0.998
Filter No. = _____
COMMENTS:

RUN No 3
DATE 10/21/02
PRE-TES
Ts = _____
Tm = _____
F.D.A. = _____
ORSA
CO2 _____
O2 _____
CO _____

BAROMETRIC PRESS _____
METER BOX ID 10
METER DELTA Ha 2.050
PROBE ID _____
PITOT CORR. FACTOR 0.84
NOZZLE DIA. 0.275 in.
PROBE TEMP. ~250
STACK ID (IN) 42
PORT LENGTH 6"

TIME START 1710 1710 1712
TIME END 1816
START VOLUME 359.405
END VOLUME 396.405
Factors: _____

F=1570(aXc)/b
a = (Dn^2XFDA)^2
b= (1.6+FDA)Ts
c= Tm X DHa

LEAK CHECK:
PRE.TEST 0.008 CFM@15". POS 0.006/7 "Hg.
PITOT LEAK CHECK = OK AT 3"
VOL.WATER COLLECT = 70 ML STAT.PRESS= -0.16
WT. MOIS. SILICA GE = GR

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGE TEMP. | VACUUM INCHES Hg |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 0 | 359.405 | 0.30 | 1.70 | 138 | 97 | 95 | 243 | 59 | <6 |
| 2 | 5 | 62.62 | 0.26 | 1.58 | 140 | 100 | 96 | 257 | 54 | <6 |
| 3 | 10 | 66.36 | 0.22 | 1.34 | 142 | 98 | 95 | 260 | 54 | <6 |
| 4 | 15 | 69.28 | 0.20 | 1.21 | 140 | 100 | 93 | 257 | 54 | <6 |
| 5 | 20 | 72.31 | 0.16 | 0.97 | 139 | 101 | 93 | 259 | 54 | <6 |
| 6 | 25 | 77.50 | 0.14 | 0.85 | 142 | 102 | 94 | 260 | 54 | <6 |
| 2-1 | 30 | 77.92 | 0.30 | 1.82 | 142 | 102 | 94 | 258 | 54 | <6 |
| 2 | 35 | 81.40 | 0.26 | 1.58 | 141 | 102 | 94 | 259 | 55 | <6 |
| 3 | 40 | 84.84 | 0.24 | 1.46 | 140 | 102 | 94 | 262 | 55 | <6 |
| 4 | 45 | 88.22 | 0.20 | 1.21 | 140 | 102 | 94 | 263 | 55 | <6 |
| 5 | 50 | 91.11 | 0.16 | 0.97 | 139 | 103 | 95 | 264 | 56 | <6 |
| 6 | 55 | 93.91 | 0.14 | 0.85 | 140 | 102 | 95 | 263 | 55 | <6 |
| | 60 | 396.405 | ... | ... | ... | ... | ... | ... | ... | ... |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

October 29, 2002

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{M,A}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/29/02 12:01 | 1982.2 | | 1994 CO Cal | | | | | | |
| 10/29/02 12:02 | 1929.0 | | | | | | | | |
| 10/29/02 12:03 | 982.2 | | | | | | | | |
| 10/29/02 12:04 | 995.6 | | 991 CO Cal | | | | | | |
| 10/29/02 12:05 | 995.1 | | 991 CO Cal | | | | | | |
| 10/29/02 12:06 | 621.1 | | | | | | | | |
| 10/29/02 12:07 | 580.7 | | | | | | | | |
| 10/29/02 12:08 | 588.0 | | 594.4 CO Cal | | | | | | |
| 10/29/02 12:09 | 588.0 | | 594.4 CO Cal | | | | | | |
| 10/29/02 12:10 | 588.0 | | 594.4 CO Cal | | | | | | |
| 10/29/02 12:11 | 572.3 | | | | | | | | |
| 10/29/02 12:12 | 279.5 | | | | | | | | |
| 10/29/02 12:13 | 299.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 12:14 | 299.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 12:15 | 299.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 12:16 | 299.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 12:17 | 299.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 12:18 | 234.7 | | | | | | | | |
| 10/29/02 12:19 | 10.2 | | | | | | | | |
| 10/29/02 12:20 | 4.0 | | 0 CO Cal | | | | | | |
| 10/29/02 12:21 | 4.6 | | | | | | | | |
| 10/29/02 12:22 | 454.3 | | | | | | | | |
| 10/29/02 12:23 | 917.7 | | | | | | | | |
| 10/29/02 12:24 | 994.3 | | | | | | | | |
| 10/29/02 12:25 | 969.3 | 1 | | 4.80 | 996.85 | 991.00 | 963.5 | 12068 | 54.35 |
| 10/29/02 12:26 | 984.3 | 1 | | 4.80 | 996.85 | 991.00 | 978.5 | 12676 | 57.97 |
| 10/29/02 12:27 | 1002.7 | 1 | | 4.80 | 996.85 | 991.00 | 996.8 | 12676 | 59.06 |
| 10/29/02 12:28 | 987.7 | 1 | | 4.80 | 996.85 | 991.00 | 981.8 | 12676 | 58.17 |
| 10/29/02 12:29 | 981.0 | 1 | | 4.80 | 996.85 | 991.00 | 975.2 | 12676 | 57.78 |
| 10/29/02 12:30 | 996.0 | 1 | | 4.80 | 996.85 | 991.00 | 990.2 | 12676 | 58.67 |
| 10/29/02 12:31 | 1009.3 | 1 | | 4.80 | 996.85 | 991.00 | 1003.5 | 12676 | 59.45 |
| 10/29/02 12:32 | 987.7 | 1 | | 4.80 | 996.85 | 991.00 | 981.8 | 12676 | 58.17 |
| 10/29/02 12:33 | 997.7 | 1 | | 4.80 | 996.85 | 991.00 | 991.8 | 12676 | 58.76 |
| 10/29/02 12:34 | 1004.3 | 1 | | 4.80 | 996.85 | 991.00 | 998.5 | 12676 | 59.16 |
| 10/29/02 12:35 | 996.0 | 1 | | 4.80 | 996.85 | 991.00 | 990.2 | 12676 | 58.67 |
| 10/29/02 12:36 | 992.7 | 1 | | 4.80 | 996.85 | 991.00 | 986.8 | 12676 | 58.47 |
| 10/29/02 12:37 | 976.0 | 1 | | 4.80 | 996.85 | 991.00 | 970.2 | 12676 | 57.48 |
| 10/29/02 12:38 | 961.0 | 1 | | 4.80 | 996.85 | 991.00 | 955.2 | 12676 | 56.59 |
| 10/29/02 12:39 | 954.3 | 1 | | 4.80 | 996.85 | 991.00 | 948.5 | 12676 | 56.20 |
| 10/29/02 12:40 | 972.7 | 1 | | 4.80 | 996.85 | 991.00 | 966.8 | 12676 | 57.28 |
| 10/29/02 12:41 | 959.3 | 1 | | 4.80 | 996.85 | 991.00 | 953.5 | 12676 | 56.50 |
| 10/29/02 12:42 | 949.3 | 1 | | 4.80 | 996.85 | 991.00 | 943.5 | 12676 | 55.90 |
| 10/29/02 12:43 | 977.7 | 1 | | 4.80 | 996.85 | 991.00 | 971.8 | 12676 | 57.58 |
| 10/29/02 12:44 | 971.0 | 1 | | 4.80 | 996.85 | 991.00 | 965.2 | 12676 | 57.19 |
| 10/29/02 12:45 | 974.3 | 1 | | 4.80 | 996.85 | 991.00 | 968.5 | 12676 | 57.38 |
| 10/29/02 12:46 | 981.0 | 1 | | 4.80 | 996.85 | 991.00 | 975.2 | 12676 | 57.78 |
| 10/29/02 12:47 | 956.0 | 1 | | 4.80 | 996.85 | 991.00 | 950.2 | 12676 | 56.30 |
| 10/29/02 12:48 | 966.0 | 1 | | 4.80 | 996.85 | 991.00 | 960.2 | 12676 | 56.89 |
| 10/29/02 12:49 | 957.7 | 1 | | 4.80 | 996.85 | 991.00 | 951.9 | 12676 | 56.40 |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 29, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/29/02 12:50 | 926.0 | 1 | | 4.80 | 996.85 | 991.00 | 920.2 | 12676 | 54.52 |
| 10/29/02 12:51 | 937.7 | 1 | | 4.80 | 996.85 | 991.00 | 931.9 | 12676 | 55.21 |
| 10/29/02 12:52 | 906.0 | 1 | | 4.80 | 996.85 | 991.00 | 900.2 | 12676 | 53.34 |
| 10/29/02 12:53 | 934.3 | 1 | | 4.80 | 996.85 | 991.00 | 928.5 | 12676 | 55.02 |
| 10/29/02 12:54 | 926.0 | 1 | | 4.80 | 996.85 | 991.00 | 920.2 | 12676 | 54.52 |
| 10/29/02 12:55 | 887.7 | 1 | | 4.80 | 996.85 | 991.00 | 881.9 | 12676 | 52.25 |
| 10/29/02 12:56 | 912.7 | 1 | | 4.80 | 996.85 | 991.00 | 906.9 | 12676 | 53.73 |
| 10/29/02 12:57 | 921.0 | 1 | | 4.80 | 996.85 | 991.00 | 915.2 | 12676 | 54.23 |
| 10/29/02 12:58 | 929.3 | 1 | | 4.80 | 996.85 | 991.00 | 923.6 | 12676 | 54.72 |
| 10/29/02 12:59 | 962.7 | 1 | | 4.80 | 996.85 | 991.00 | 956.9 | 12676 | 56.69 |
| 10/29/02 13:00 | 956.0 | 1 | | 4.80 | 996.85 | 991.00 | 950.2 | 12676 | 56.30 |
| 10/29/02 13:01 | 979.3 | 1 | | 4.80 | 996.85 | 991.00 | 973.5 | 12676 | 57.68 |
| 10/29/02 13:02 | 979.3 | 1 | | 4.80 | 996.85 | 991.00 | 973.5 | 12676 | 57.68 |
| 10/29/02 13:03 | 1002.7 | 1 | | 4.80 | 996.85 | 991.00 | 996.8 | 12676 | 59.06 |
| 10/29/02 13:04 | 1026.0 | 1 | | 4.80 | 996.85 | 991.00 | 1020.1 | 12676 | 60.44 |
| 10/29/02 13:05 | 1011.0 | 1 | | 4.80 | 996.85 | 991.00 | 1005.1 | 12676 | 59.55 |
| 10/29/02 13:06 | 1012.7 | 1 | | 4.80 | 996.85 | 991.00 | 1006.8 | 12676 | 59.65 |
| 10/29/02 13:07 | 1014.3 | 1 | | 4.80 | 996.85 | 991.00 | 1008.5 | 12676 | 59.75 |
| 10/29/02 13:08 | 996.0 | 1 | | 4.80 | 996.85 | 991.00 | 990.2 | 12676 | 58.67 |
| 10/29/02 13:09 | 1014.3 | 1 | | 4.80 | 996.85 | 991.00 | 1008.5 | 12676 | 59.75 |
| 10/29/02 13:10 | 1026.0 | 1 | | 4.80 | 996.85 | 991.00 | 1020.1 | 12676 | 60.44 |
| 10/29/02 13:11 | 1007.7 | 1 | | 4.80 | 996.85 | 991.00 | 1001.8 | 12676 | 59.36 |
| 10/29/02 13:12 | 1036.0 | 1 | | 4.80 | 996.85 | 991.00 | 1030.1 | 12676 | 61.03 |
| 10/29/02 13:13 | 1024.3 | 1 | | 4.80 | 996.85 | 991.00 | 1018.5 | 12676 | 60.34 |
| 10/29/02 13:14 | 1001.0 | 1 | | 4.80 | 996.85 | 991.00 | 995.1 | 12676 | 58.96 |
| 10/29/02 13:15 | 1017.7 | 1 | | 4.80 | 996.85 | 991.00 | 1011.8 | 12676 | 59.95 |
| 10/29/02 13:16 | 1032.7 | 1 | | 4.80 | 996.85 | 991.00 | 1026.8 | 12676 | 60.84 |
| 10/29/02 13:17 | 1027.7 | 1 | | 4.80 | 996.85 | 991.00 | 1021.8 | 12676 | 60.54 |
| 10/29/02 13:18 | 1011.0 | 1 | | 4.80 | 996.85 | 991.00 | 1005.1 | 12676 | 59.55 |
| 10/29/02 13:19 | 1024.3 | 1 | | 4.80 | 996.85 | 991.00 | 1018.5 | 12676 | 60.34 |
| 10/29/02 13:20 | 1026.0 | 1 | | 4.80 | 996.85 | 991.00 | 1020.1 | 12676 | 60.44 |
| 10/29/02 13:21 | 1036.0 | 1 | | 4.80 | 996.85 | 991.00 | 1030.1 | 12676 | 61.03 |
| 10/29/02 13:22 | 1051.0 | 1 | | 4.80 | 996.85 | 991.00 | 1045.1 | 12676 | 61.92 |
| 10/29/02 13:23 | 1034.3 | 1 | | 4.80 | 996.85 | 991.00 | 1028.4 | 12676 | 60.93 |
| 10/29/02 13:24 | 1034.3 | 1 | | 4.80 | 996.85 | 991.00 | 1028.4 | 12676 | 60.93 |
| 10/29/02 13:25 | 1037.7 | | | ***Run 1 Average*** | | | ***979.0*** | | ***57.96*** |
| 10/29/02 13:26 | 771.0 | | | | | | | | |
| 10/29/02 13:27 | 54.0 | | | | | | | | |
| 10/29/02 13:28 | 13.8 | | | | | | | | |
| 10/29/02 13:29 | 13.8 | | | | | | | | |
| 10/29/02 13:30 | 5.6 | | 0 CO Cal | | | | | | |
| 10/29/02 13:31 | 723.3 | | | | | | | | |
| 10/29/02 13:32 | 1990.0 | | | | | | | | |
| 10/29/02 13:33 | 1993.1 | | 1994 CO Cal | | | | | | |
| 10/29/02 13:34 | 1993.1 | | 1994 CO Cal | | | | | | |
| 10/29/02 13:35 | 1993.1 | | 1994 CO Cal | | | | | | |
| 10/29/02 13:36 | 1521.4 | | | | | | | | |
| 10/29/02 13:37 | 978.7 | | | | | | | | |
| 10/29/02 13:38 | 998.3 | | 991 CO Cal | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 29, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_w$ | CO $C_{wA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/29/02 13:39 | 645.1 | | | | | | | | |
| 10/29/02 13:40 | 587.4 | | 594.4 CO Cal | | | | | | |
| 10/29/02 13:41 | 464.9 | | | | | | | | |
| 10/29/02 13:42 | 282.6 | | | | | | | | |
| 10/29/02 13:43 | 300.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 13:44 | 204.3 | | | | | | | | |
| 10/29/02 13:45 | 212.6 | | | | | | | | |
| 10/29/02 13:46 | 1138.3 | | | | | | | | |
| 10/29/02 13:47 | 1186.7 | | | | | | | | |
| 10/29/02 13:48 | 1184.7 | | | | | | | | |
| 10/29/02 13:49 | 1186.7 | | | | | | | | |
| 10/29/02 13:50 | 1190.9 | | | | | | | | |
| 10/29/02 13:51 | 1201.2 | | | | | | | | |
| 10/29/02 13:52 | 1212.5 | | | | | | | | |
| 10/29/02 13:53 | 1192.9 | | | | | | | | |
| 10/29/02 13:54 | 1207.3 | | | | | | | | |
| 10/29/02 13:55 | 1193.9 | | | | | | | | |
| 10/29/02 13:56 | 1187.8 | | | | | | | | |
| 10/29/02 13:57 | 1191.9 | | | | | | | | |
| 10/29/02 13:58 | 1190.9 | | | | | | | | |
| 10/29/02 13:59 | 1208.4 | | | | | | | | |
| 10/29/02 14:00 | 1241.3 | | | | | | | | |
| 10/29/02 14:01 | 1223.8 | | | | | | | | |
| 10/29/02 14:02 | 1219.7 | | | | | | | | |
| 10/29/02 14:03 | 1213.5 | | | | | | | | |
| 10/29/02 14:04 | 1212.5 | | | | | | | | |
| 10/29/02 14:05 | 1235.1 | | | | | | | | |
| 10/29/02 14:06 | 1251.6 | | | | | | | | |
| 10/29/02 14:07 | 1234.1 | | | | | | | | |
| 10/29/02 14:08 | 1223.8 | | | | | | | | |
| 10/29/02 14:09 | 1224.8 | | | | | | | | |
| 10/29/02 14:10 | 1227.9 | | | | | | | | |
| 10/29/02 14:11 | 1269.1 | | | | | | | | |
| 10/29/02 14:12 | 1271.2 | | | | | | | | |
| 10/29/02 14:13 | 1253.7 | | | | | | | | |
| 10/29/02 14:14 | 1269.1 | | | | | | | | |
| 10/29/02 14:15 | 1250.6 | | | | | | | | |
| 10/29/02 14:16 | 1227.9 | | | | | | | | |
| 10/29/02 14:17 | 1246.5 | | | | | | | | |
| 10/29/02 14:18 | 1245.4 | | | | | | | | |
| 10/29/02 14:19 | 1193.9 | | | | | | | | |
| 10/29/02 14:20 | 1220.7 | | | | | | | | |
| 10/29/02 14:21 | 1215.6 | | | | | | | | |
| 10/29/02 14:22 | 1155.8 | | | | | | | | |
| 10/29/02 14:23 | 1162.0 | | | | | | | | |
| 10/29/02 14:24 | 1153.8 | | | | | | | | |
| 10/29/02 14:25 | 1111.6 | | | | | | | | |
| 10/29/02 14:26 | 1081.7 | | | | | | | | |
| 10/29/02 14:27 | 1051.8 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 29, 2002**

## *DATA RECORDER PRINTOUT and TEST SUMMARY*

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/29/02 14:28 | 1024.0 | | | | | | | | |
| 10/29/02 14:29 | 1026.1 | | | | | | | | |
| 10/29/02 14:30 | 1002.4 | | | | | | | | |
| 10/29/02 14:31 | 1007.6 | | | | | | | | |
| 10/29/02 14:32 | 978.7 | | | | | | | | |
| 10/29/02 14:33 | 961.2 | 2 | | 4.05 | 997.8 | 991 | 954.5 | 12068 | 53.84 |
| 10/29/02 14:34 | 960.2 | 2 | | 4.05 | 997.8 | 991 | 953.5 | 12068 | 53.78 |
| 10/29/02 14:35 | 933.4 | 2 | | 4.05 | 997.8 | 991 | 926.8 | 12068 | 52.28 |
| 10/29/02 14:36 | 940.6 | 2 | | 4.05 | 997.8 | 991 | 934.0 | 12068 | 52.68 |
| 10/29/02 14:37 | 930.3 | 2 | | 4.05 | 997.8 | 991 | 923.7 | 12068 | 52.10 |
| 10/29/02 14:38 | 905.6 | 2 | | 4.05 | 997.8 | 991 | 899.1 | 12068 | 50.71 |
| 10/29/02 14:39 | 923.1 | 2 | | 4.05 | 997.8 | 991 | 916.5 | 12068 | 51.70 |
| 10/29/02 14:40 | 895.3 | 2 | | 4.05 | 997.8 | 991 | 888.8 | 12068 | 50.13 |
| 10/29/02 14:41 | 897.4 | 2 | | 4.05 | 997.8 | 991 | 890.8 | 12068 | 50.25 |
| 10/29/02 14:42 | 901.5 | 2 | | 4.05 | 997.8 | 991 | 894.9 | 12068 | 50.48 |
| 10/29/02 14:43 | 890.2 | 2 | | 4.05 | 997.8 | 991 | 883.7 | 12068 | 49.84 |
| 10/29/02 14:44 | 897.4 | 2 | | 4.05 | 997.8 | 991 | 890.8 | 12068 | 50.25 |
| 10/29/02 14:45 | 880.9 | 2 | | 4.05 | 997.8 | 991 | 874.4 | 12068 | 49.32 |
| 10/29/02 14:46 | 887.1 | 2 | | 4.05 | 997.8 | 991 | 880.6 | 12068 | 49.67 |
| 10/29/02 14:47 | 853.1 | 2 | | 4.05 | 997.8 | 991 | 846.7 | 12068 | 47.76 |
| 10/29/02 14:48 | 857.2 | 2 | | 4.05 | 997.8 | 991 | 850.8 | 12068 | 47.99 |
| 10/29/02 14:49 | 862.4 | 2 | | 4.05 | 997.8 | 991 | 855.9 | 12068 | 48.28 |
| 10/29/02 14:50 | 840.7 | 2 | | 4.05 | 997.8 | 991 | 834.4 | 12068 | 47.06 |
| 10/29/02 14:51 | 856.2 | 2 | | 4.05 | 997.8 | 991 | 849.8 | 12068 | 47.93 |
| 10/29/02 14:52 | 834.5 | 2 | | 4.05 | 997.8 | 991 | 828.2 | 12068 | 46.72 |
| 10/29/02 14:53 | 811.9 | 2 | | 4.05 | 997.8 | 991 | 805.6 | 12068 | 45.44 |
| 10/29/02 14:54 | 821.2 | 2 | | 4.05 | 997.8 | 991 | 814.8 | 12068 | 45.96 |
| 10/29/02 14:55 | 807.8 | 2 | | 4.05 | 997.8 | 991 | 801.5 | 12068 | 45.21 |
| 10/29/02 14:56 | 802.6 | 2 | | 4.05 | 997.8 | 991 | 796.4 | 12068 | 44.92 |
| 10/29/02 14:57 | 789.2 | 2 | | 4.05 | 997.8 | 991 | 783.0 | 12068 | 44.17 |
| 10/29/02 14:58 | 765.6 | 2 | | 4.05 | 997.8 | 991 | 759.4 | 12068 | 42.84 |
| 10/29/02 14:59 | 768.6 | 2 | | 4.05 | 997.8 | 991 | 762.5 | 12068 | 43.01 |
| 10/29/02 15:00 | 756.3 | 2 | | 4.05 | 997.8 | 991 | 750.2 | 12068 | 42.31 |
| 10/29/02 15:01 | 778.9 | 2 | | 4.05 | 997.8 | 991 | 772.7 | 12068 | 43.59 |
| 10/29/02 15:02 | 772.8 | 2 | | 4.05 | 997.8 | 991 | 766.6 | 12068 | 43.24 |
| 10/29/02 15:03 | 763.5 | 2 | | 4.05 | 997.8 | 991 | 757.3 | 12068 | 42.72 |
| 10/29/02 15:04 | 749.1 | 2 | | 4.05 | 997.8 | 991 | 743.0 | 12068 | 41.91 |
| 10/29/02 15:05 | 728.5 | 2 | | 4.05 | 997.8 | 991 | 722.4 | 12068 | 40.75 |
| 10/29/02 15:06 | 730.5 | 2 | | 4.05 | 997.8 | 991 | 724.5 | 12068 | 40.87 |
| 10/29/02 15:07 | 732.6 | 2 | | 4.05 | 997.8 | 991 | 726.5 | 12068 | 40.98 |
| 10/29/02 15:08 | 722.3 | 2 | | 4.05 | 997.8 | 991 | 716.3 | 12068 | 40.40 |
| 10/29/02 15:09 | 736.7 | 2 | | 4.05 | 997.8 | 991 | 730.6 | 12068 | 41.21 |
| 10/29/02 15:10 | 731.6 | 2 | | 4.05 | 997.8 | 991 | 725.5 | 12068 | 40.92 |
| 10/29/02 15:11 | 742.9 | 2 | | 4.05 | 997.8 | 991 | 736.8 | 12068 | 41.56 |
| 10/29/02 15:12 | 727.4 | 2 | | 4.05 | 997.8 | 991 | 721.4 | 12068 | 40.69 |
| 10/29/02 15:13 | 735.7 | 2 | | 4.05 | 997.8 | 991 | 729.6 | 12068 | 41.16 |
| 10/29/02 15:14 | 742.9 | 2 | | 4.05 | 997.8 | 991 | 736.8 | 12068 | 41.56 |
| 10/29/02 15:15 | 735.7 | 2 | | 4.05 | 997.8 | 991 | 729.6 | 12068 | 41.16 |
| 10/29/02 15:16 | 737.7 | 2 | | 4.05 | 997.8 | 991 | 731.7 | 12068 | 41.27 |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

October 29, 2002

## *DATA RECORDER PRINTOUT and TEST SUMMARY*

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/29/02 15:17 | 730.5 | 2 | | 4.05 | 997.8 | 991 | 724.5 | 12068 | 40.87 |
| 10/29/02 15:18 | 715.1 | 2 | | 4.05 | 997.8 | 991 | 709.1 | 12068 | 40.00 |
| 10/29/02 15:19 | 731.6 | 2 | | 4.05 | 997.8 | 991 | 725.5 | 12068 | 40.92 |
| 10/29/02 15:20 | 739.8 | 2 | | 4.05 | 997.8 | 991 | 733.7 | 12068 | 41.39 |
| 10/29/02 15:21 | 732.6 | 2 | | 4.05 | 997.8 | 991 | 726.5 | 12068 | 40.98 |
| 10/29/02 15:22 | 730.5 | 2 | | 4.05 | 997.8 | 991 | 724.5 | 12068 | 40.87 |
| 10/29/02 15:23 | 720.2 | 2 | | 4.05 | 997.8 | 991 | 714.2 | 12068 | 40.29 |
| 10/29/02 15:24 | 708.9 | 2 | | 4.05 | 997.8 | 991 | 702.9 | 12068 | 39.65 |
| 10/29/02 15:25 | 723.3 | 2 | | 4.05 | 997.8 | 991 | 717.3 | 12068 | 40.46 |
| 10/29/02 15:26 | 732.6 | 2 | | 4.05 | 997.8 | 991 | 726.5 | 12068 | 40.98 |
| 10/29/02 15:27 | 713.0 | 2 | | 4.05 | 997.8 | 991 | 707.0 | 12068 | 39.88 |
| 10/29/02 15:28 | 706.9 | 2 | | 4.05 | 997.8 | 991 | 700.9 | 12068 | 39.53 |
| 10/29/02 15:29 | 714.1 | 2 | | 4.05 | 997.8 | 991 | 708.0 | 12068 | 39.94 |
| 10/29/02 15:30 | 704.8 | 2 | | 4.05 | 997.8 | 991 | 698.8 | 12068 | 39.42 |
| 10/29/02 15:31 | 740.8 | 2 | | 4.05 | 997.8 | 991 | 734.7 | 12068 | 41.44 |
| 10/29/02 15:32 | 749.1 | 2 | | 4.05 | 997.8 | 991 | 743.0 | 12068 | 41.91 |
| 10/29/02 15:33 | 737.7 | | | *Run 2 Average* | | | *788.7* | | *44.49* |
| 10/29/02 15:34 | 739.8 | | | | | | | | |
| 10/29/02 15:35 | 731.6 | | | | | | | | |
| 10/29/02 15:36 | 720.2 | | | | | | | | |
| 10/29/02 15:37 | 726.4 | | | | | | | | |
| 10/29/02 15:38 | 723.3 | | | | | | | | |
| 10/29/02 15:39 | 500.9 | | | | | | | | |
| 10/29/02 15:40 | 6.6 | | | | | | | | |
| 10/29/02 15:41 | 2.5 | | 0 CO Cal | | | | | | |
| 10/29/02 15:42 | 2.5 | | 0 CO Cal | | | | | | |
| 10/29/02 15:43 | 2.5 | | 0 CO Cal | | | | | | |
| 10/29/02 15:44 | 8.7 | | | | | | | | |
| 10/29/02 15:45 | 758.3 | | | | | | | | |
| 10/29/02 15:46 | 996.2 | | 991 CO Cal | | | | | | |
| 10/29/02 15:47 | 998.3 | | 991 CO Cal | | | | | | |
| 10/29/02 15:48 | 850.0 | | | | | | | | |
| 10/29/02 15:49 | 731.6 | | | | | | | | |
| 10/29/02 15:50 | 716.1 | | | | | | | | |
| 10/29/02 15:51 | 716.1 | | | | | | | | |

Georgia Pacific - Palatka, Florida

Bleach Plant Carbon Monoxide Test

October 31, 2002

## DATA RECORDER PRINTOUT and TEST SUMMARY

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{adj}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 7:13 | 684.2 | | | | | | | | |
| 10/31/02 7:14 | 691.4 | | | | | | | | |
| 10/31/02 7:15 | 698.6 | | | | | | | | |
| 10/31/02 7:16 | 687.3 | | | | | | | | |
| 10/31/02 7:17 | 679.0 | | | | | | | | |
| 10/31/02 7:18 | 229.0 | | | | | | | | |
| 10/31/02 7:19 | 15.9 | | | | | | | | |
| 10/31/02 7:20 | 8.7 | | 0 cal | | | | | | |
| 10/31/02 7:21 | 8.7 | | | | | | | | |
| 10/31/02 7:22 | 111.6 | | | | | | | | |
| 10/31/02 7:23 | 896.3 | | | | | | | | |
| 10/31/02 7:24 | 1019.9 | | | | | | | | |
| 10/31/02 7:25 | 1022.0 | | 991 cal | | | | | | |
| 10/31/02 7:26 | 1022.0 | | 991 cal | | | | | | |
| 10/31/02 7:27 | 1022.0 | | 991 cal | | | | | | |
| 10/31/02 7:28 | 1022.0 | | 991 cal | | | | | | |
| 10/31/02 7:29 | 1022.0 | | 991 cal | | | | | | |
| 10/31/02 7:30 | 1730.5 | | | | | | | | |
| 10/31/02 7:31 | 1993.1 | | 1994 cal | | | | | | |
| 10/31/02 7:32 | 1993.1 | | 1994 cal | | | | | | |
| 10/31/02 7:33 | 1993.1 | | 1994 cal | | | | | | |
| 10/31/02 7:34 | 1993.1 | | 1994 cal | | | | | | |
| 10/31/02 7:35 | 1993.1 | | 1994 cal | | | | | | |
| 10/31/02 7:36 | 1971.4 | | | | | | | | |
| 10/31/02 7:37 | 1009.6 | | | | | | | | |
| 10/31/02 7:38 | 610.1 | | | | | | | | |
| 10/31/02 7:39 | 602.8 | | 594 cal | | | | | | |
| 10/31/02 7:40 | 602.8 | | | | | | | | |
| 10/31/02 7:41 | 599.8 | | | | | | | | |
| 10/31/02 7:42 | 657.4 | | | | | | | | |
| 10/31/02 7:43 | 558.6 | | | | | | | | |
| 10/31/02 7:44 | 322.7 | | | | | | | | |
| 10/31/02 7:45 | 309.4 | | 301 cal | | | | | | |
| 10/31/02 7:46 | 309.4 | | | | | | | | |
| 10/31/02 7:47 | 315.5 | | | | | | | | |
| 10/31/02 7:48 | 583.3 | | | | | | #DIV/0! | | #DIV/0 |
| 10/31/02 7:49 | 679.0 | | | | | | | | |
| 10/31/02 7:50 | 680.1 | | | | | | | | |
| 10/31/02 7:51 | 688.3 | | | | | | | | |
| 10/31/02 7:52 | 679.0 | | | | | | | | |
| 10/31/02 7:53 | 673.9 | | | | | | | | |
| 10/31/02 7:54 | 676.0 | | | | | | | | |
| 10/31/02 7:55 | 661.5 | | | | | | | | |
| 10/31/02 7:56 | 670.8 | | | | | | | | |
| 10/31/02 7:57 | 682.1 | | | | | | | | |
| 10/31/02 7:58 | 687.3 | | | | | | | | |
| 10/31/02 7:59 | 683.2 | | | | | | | | |
| 10/31/02 8:00 | 666.7 | | | | | | | | |
| 10/31/02 8:01 | 683.2 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{M,A}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 8:02 | 678.0 | | | | | | | | |
| 10/31/02 8:03 | 673.9 | | | | | | | | |
| 10/31/02 8:04 | 681.1 | | | | | | | | |
| 10/31/02 8:05 | 692.4 | | | | | | | | |
| 10/31/02 8:06 | 672.9 | | | | | | | | |
| 10/31/02 8:07 | 692.4 | | | | | | | | |
| 10/31/02 8:08 | 698.6 | | | | | | | | |
| 10/31/02 8:09 | 680.1 | | | | | | | | |
| 10/31/02 8:10 | 687.3 | | | | | | | | |
| 10/31/02 8:11 | 685.2 | | | | | | | | |
| 10/31/02 8:12 | 680.1 | | | | | | | | |
| 10/31/02 8:13 | 689.3 | | | | | | | | |
| 10/31/02 8:14 | 691.4 | | | | | | | | |
| 10/31/02 8:15 | 682.1 | | | | | | | | |
| 10/31/02 8:16 | 690.4 | | | | | | | | |
| 10/31/02 8:17 | 688.3 | | | | | | | | |
| 10/31/02 8:18 | 690.4 | | | | | | | | |
| 10/31/02 8:19 | 688.3 | | | | | | | | |
| 10/31/02 8:20 | 674.9 | | | | | | | | |
| 10/31/02 8:21 | 682.1 | | | | | | | | |
| 10/31/02 8:22 | 697.6 | | | | | | | | |
| 10/31/02 8:23 | 682.1 | | | | | | | | |
| 10/31/02 8:24 | 682.1 | | | | | | | | |
| 10/31/02 8:25 | 693.5 | | | | | | | | |
| 10/31/02 8:26 | 687.3 | | | | | | | | |
| 10/31/02 8:27 | 692.4 | | | | | | | | |
| 10/31/02 8:28 | 680.1 | | | | | | | | |
| 10/31/02 8:29 | 689.3 | | | | | | | | |
| 10/31/02 8:30 | 694.5 | | | | | | | | |
| 10/31/02 8:31 | 681.1 | | | | | | | | |
| 10/31/02 8:32 | 687.3 | | | | | | | | |
| 10/31/02 8:33 | 687.3 | | | | | | | | |
| 10/31/02 8:34 | 667.7 | | | | | | | | |
| 10/31/02 8:35 | 664.6 | | | | | | | | |
| 10/31/02 8:36 | 667.7 | | | | | | | | |
| 10/31/02 8:37 | 655.4 | | | | | | | | |
| 10/31/02 8:38 | 670.8 | | | | | | | | |
| 10/31/02 8:39 | 667.7 | | | | | | | | |
| 10/31/02 8:40 | 674.9 | | | | | | | | |
| 10/31/02 8:41 | 691.4 | | | | | | | | |
| 10/31/02 8:42 | 693.5 | | | | | | | | |
| 10/31/02 8:43 | 704.8 | | | | | | | | |
| 10/31/02 8:44 | 717.2 | | | | | | | | |
| 10/31/02 8:45 | 717.2 | | | | | | | | |
| 10/31/02 8:46 | 728.5 | | | | | | | | |
| 10/31/02 8:47 | 721.3 | | | | | | | | |
| 10/31/02 8:48 | 720.2 | | | | | | | | |
| 10/31/02 8:49 | 719.2 | | | | | | | | |
| 10/31/02 8:50 | 719.2 | | | | | | | | |

Georgia Pacific - Palatka, Florida

Bleach Plant Carbon Monoxide Test

October 31, 2002

## DATA RECORDER PRINTOUT and TEST SUMMARY

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_w$ | CO $C_{wA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 8:51 | 714.1 | | | | | | | | |
| 10/31/02 8:52 | 708.9 | | | | | | | | |
| 10/31/02 8:53 | 699.6 | | | | | | | | |
| 10/31/02 8:54 | 702.7 | | | | | | | | |
| 10/31/02 8:55 | 688.3 | | | | | | | | |
| 10/31/02 8:56 | 698.6 | | | | | | | | |
| 10/31/02 8:57 | 700.7 | | | | | | | | |
| 10/31/02 8:58 | 695.5 | | | | | | | | |
| 10/31/02 8:59 | 705.8 | | | | | | | | |
| 10/31/02 9:00 | 707.9 | | | | | | | | |
| 10/31/02 9:01 | 701.7 | | | | | | | | |
| 10/31/02 9:02 | 711.0 | | | | | | | | |
| 10/31/02 9:03 | 709.9 | | | | | | | | |
| 10/31/02 9:04 | 705.8 | | | | | | | | |
| 10/31/02 9:05 | 721.3 | | | | | | | | |
| 10/31/02 9:06 | 681.1 | | | | | | | | |
| 10/31/02 9:07 | 678.0 | | | | | | | | |
| 10/31/02 9:08 | 681.1 | | | | | | | | |
| 10/31/02 9:09 | 679.0 | | | | | | | | |
| 10/31/02 9:10 | 679.0 | | | | | | | | |
| 10/31/02 9:11 | 680.1 | | | | | | | | |
| 10/31/02 9:12 | 673.9 | | | | | | | | |
| 10/31/02 9:13 | 680.1 | | | | | | | | |
| 10/31/02 9:14 | 674.9 | | | | | | | | |
| 10/31/02 9:15 | 673.9 | | | | | | | | |
| 10/31/02 9:16 | 676.0 | | | | | | | | |
| 10/31/02 9:17 | 663.6 | | | | | | | | |
| 10/31/02 9:18 | 667.7 | | | | | | | | |
| 10/31/02 9:19 | 664.6 | | | | | | | | |
| 10/31/02 9:20 | 648.2 | | | | | | | | |
| 10/31/02 9:21 | 642.0 | | | | | | | | |
| 10/31/02 9:22 | 633.7 | | | | | | | | |
| 10/31/02 9:23 | 618.3 | | | | | | | | |
| 10/31/02 9:24 | 616.2 | | | | | | | | |
| 10/31/02 9:25 | 609.0 | | | | | | | | |
| 10/31/02 9:26 | 597.7 | | | | | | | | |
| 10/31/02 9:27 | 566.8 | | | | | | | | |
| 10/31/02 9:28 | 553.4 | | | | | | | | |
| 10/31/02 9:29 | 78.7 | | | | | | | | |
| 10/31/02 9:30 | 6.6 | | | | | | | | |
| 10/31/02 9:31 | 16.9 | | | | | | | | |
| 10/31/02 9:32 | 263.0 | | | | | | | | |
| 10/31/02 9:33 | 614.2 | | | | | | | | |
| 10/31/02 9:34 | 685.2 | | | | | | | | |
| 10/31/02 9:35 | 680.1 | | | | | | | | |
| 10/31/02 9:36 | 689.3 | | | | | | | | |
| 10/31/02 9:37 | 685.2 | | | | | | | | |
| 10/31/02 9:38 | 673.9 | | | | | | | | |
| 10/31/02 9:39 | 699.6 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 9:40 | 700.7 | | | | | | | | |
| 10/31/02 9:41 | 686.3 | | | | | | | | |
| 10/31/02 9:42 | 686.3 | | | | | | | | |
| 10/31/02 9:43 | 690.4 | | | | | | | | |
| 10/31/02 9:44 | 673.9 | | | | | | | | |
| 10/31/02 9:45 | 679.0 | | | | | | | | |
| 10/31/02 9:46 | 691.4 | | | | | | | | |
| 10/31/02 9:47 | 680.1 | | | | | | | | |
| 10/31/02 9:48 | 696.6 | | | | | | | | |
| 10/31/02 9:49 | 689.3 | | | | | | | | |
| 10/31/02 9:50 | 680.1 | | | | | | | | |
| 10/31/02 9:51 | 679.0 | | | | | | | | |
| 10/31/02 9:52 | 676.0 | | | | | | | | |
| 10/31/02 9:53 | 671.8 | | | | | | | | |
| 10/31/02 9:54 | 681.1 | | | | | | | | |
| 10/31/02 9:55 | 670.8 | | | | | | | | |
| 10/31/02 9:56 | 678.0 | | | | | | | | |
| 10/31/02 9:57 | 668.8 | | | | | | | | |
| 10/31/02 9:58 | 661.5 | | | | | | | | |
| 10/31/02 9:59 | 661.5 | | | | | | | | |
| 10/31/02 10:00 | 660.5 | | | | | | | | |
| 10/31/02 10:01 | 654.3 | | | | | | | | |
| 10/31/02 10:02 | 666.7 | | | | | | | | |
| 10/31/02 10:03 | 664.6 | | | | | | | | |
| 10/31/02 10:04 | 658.5 | | | | | | | | |
| 10/31/02 10:05 | 674.9 | | | | | | | | |
| 10/31/02 10:06 | 671.8 | | | | | | | | |
| 10/31/02 10:07 | 666.7 | | | | | | | | |
| 10/31/02 10:08 | 677.0 | | | | | | | | |
| 10/31/02 10:09 | 685.2 | | | | | | | | |
| 10/31/02 10:10 | 673.9 | | | | | | | | |
| 10/31/02 10:11 | 671.8 | | | | | | | | |
| 10/31/02 10:12 | 659.5 | | | | | | | | |
| 10/31/02 10:13 | 662.6 | | | | | | | | |
| 10/31/02 10:14 | 666.7 | | | | | | | | |
| 10/31/02 10:15 | 650.2 | | | | | | | | |
| 10/31/02 10:16 | 656.4 | | | | | | | | |
| 10/31/02 10:17 | 660.5 | | | | | | | | |
| 10/31/02 10:18 | 649.2 | | | | | | | | |
| 10/31/02 10:19 | 658.5 | | | | | | | | |
| 10/31/02 10:20 | 661.5 | | | | | | | | |
| 10/31/02 10:21 | 654.3 | | | | | | | | |
| 10/31/02 10:22 | 663.6 | | | | | | | | |
| 10/31/02 10:23 | 662.6 | | | | | | | | |
| 10/31/02 10:24 | 659.5 | | | | | | | | |
| 10/31/02 10:25 | 678.0 | | | | | | | | |
| 10/31/02 10:26 | 672.9 | | | | | | | | |
| 10/31/02 10:27 | 667.7 | | | | | | | | |
| 10/31/02 10:28 | 671.8 | | | | | | | | |

Georgia Pacific - Palatka, Florida

Bleach Plant Carbon Monoxide Test

October 31, 2002

## DATA RECORDER PRINTOUT and TEST SUMMARY

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{M,a}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 10:29 | 670.8 | | | | | | | | |
| 10/31/02 10:30 | 676.0 | | | | | | | | |
| 10/31/02 10:31 | 680.1 | | | | | | | | |
| 10/31/02 10:32 | 670.8 | | | | | | | | |
| 10/31/02 10:33 | 660.5 | | | | | | | | |
| 10/31/02 10:34 | 664.6 | | | | | | | | |
| 10/31/02 10:35 | 658.5 | | | | | | | | |
| 10/31/02 10:36 | 664.6 | | | | | | | | |
| 10/31/02 10:37 | 662.6 | | | | | | | | |
| 10/31/02 10:38 | 658.5 | | | | | | | | |
| 10/31/02 10:39 | 672.9 | | | | | | | | |
| 10/31/02 10:40 | 662.6 | | | | | | | | |
| 10/31/02 10:41 | 653.3 | | | | | | | | |
| 10/31/02 10:42 | 666.7 | | | | | | | | |
| 10/31/02 10:43 | 664.6 | | | | | | | | |
| 10/31/02 10:44 | 678.0 | | | | | | | | |
| 10/31/02 10:45 | 678.0 | | | | | | | | |
| 10/31/02 10:46 | 671.8 | | | | | | | | |
| 10/31/02 10:47 | 680.1 | | | | | | | | |
| 10/31/02 10:48 | 684.2 | | | | | | | | |
| 10/31/02 10:49 | 672.9 | | | | | | | | |
| 10/31/02 10:50 | 681.1 | | | | | | | | |
| 10/31/02 10:51 | 677.0 | | | | | | | | |
| 10/31/02 10:52 | 666.7 | | | | | | | | |
| 10/31/02 10:53 | 667.7 | | | | | | | | |
| 10/31/02 10:54 | 661.5 | | | | | | | | |
| 10/31/02 10:55 | 656.4 | | | | | | | | |
| 10/31/02 10:56 | 655.4 | | | | | | | | |
| 10/31/02 10:57 | 652.3 | | | | | | | | |
| 10/31/02 10:58 | 662.6 | | | | | | | | |
| 10/31/02 10:59 | 649.2 | | | | | | | | |
| 10/31/02 11:00 | 657.4 | | | | | | | | |
| 10/31/02 11:01 | 661.5 | | | | | | | | |
| 10/31/02 11:02 | 661.5 | | | | | | | | |
| 10/31/02 11:03 | 678.0 | | | | | | | | |
| 10/31/02 11:04 | 666.7 | | | | | | | | |
| 10/31/02 11:05 | 654.3 | | | | | | | | |
| 10/31/02 11:06 | 673.9 | | | | | | | | |
| 10/31/02 11:07 | 672.9 | | | | | | | | |
| 10/31/02 11:08 | 669.8 | | | | | | | | |
| 10/31/02 11:09 | 676.0 | | | | | | | | |
| 10/31/02 11:10 | 666.7 | | | | | | | | |
| 10/31/02 11:11 | 680.1 | | | | | | | | |
| 10/31/02 11:12 | 674.9 | | | | | | | | |
| 10/31/02 11:13 | 666.7 | | | | | | | | |
| 10/31/02 11:14 | 679.0 | | | | | | | | |
| 10/31/02 11:15 | 680.1 | | | | | | | | |
| 10/31/02 11:16 | 672.9 | | | | | | | | |
| 10/31/02 11:17 | 682.1 | | | | | | | | |

Georgia Pacific - Palatka, Florida

Bleach Plant Carbon Monoxide Test

October 31, 2002

## DATA RECORDER PRINTOUT and TEST SUMMARY

| Time | CO, ppm | Run Number | COMMENTS | CO $C_s$ | CO $C_w$ | CO $C_{wA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 11:18 | 673.9 | | | | | | | | |
| 10/31/02 11:19 | 687.3 | | | | | | | | |
| 10/31/02 11:20 | 691.4 | | | | | | | | |
| 10/31/02 11:21 | 679.0 | | | | | | | | |
| 10/31/02 11:22 | 690.4 | | | | | | | | |
| 10/31/02 11:23 | 686.3 | | | | | | | | |
| 10/31/02 11:24 | 681.1 | | | | | | | | |
| 10/31/02 11:25 | 691.4 | | | | | | | | |
| 10/31/02 11:26 | 693.5 | | | | | | | | |
| 10/31/02 11:27 | 699.6 | | | | | | | | |
| 10/31/02 11:28 | 704.8 | | | | | | | | |
| 10/31/02 11:29 | 700.7 | | | | | | | | |
| 10/31/02 11:30 | 695.5 | | | | | | | | |
| 10/31/02 11:31 | 700.7 | | | | | | | | |
| 10/31/02 11:32 | 694.5 | | | | | | | | |
| 10/31/02 11:33 | 697.6 | | | | | | | | |
| 10/31/02 11:34 | 697.6 | | | | | | | | |
| 10/31/02 11:35 | 701.7 | | | | | | | | |
| 10/31/02 11:36 | 699.6 | | | | | | | | |
| 10/31/02 11:37 | 687.3 | | | | | | | | |
| 10/31/02 11:38 | 680.1 | | | | | | | | |
| 10/31/02 11:39 | 688.3 | | | | | | | | |
| 10/31/02 11:40 | 686.3 | | | | | | | | |
| 10/31/02 11:41 | 689.3 | | | | | | | | |
| 10/31/02 11:42 | 700.7 | | | | | | | | |
| 10/31/02 11:43 | 695.5 | | | | | | | | |
| 10/31/02 11:44 | 699.6 | | | | | | | | |
| 10/31/02 11:45 | 695.5 | | | | | | | | |
| 10/31/02 11:46 | 703.8 | | | | | | | | |
| 10/31/02 11:47 | 701.7 | | | | | | | | |
| 10/31/02 11:48 | 706.9 | | | | | | | | |
| 10/31/02 11:49 | 700.7 | | | | | | | | |
| 10/31/02 11:50 | 705.8 | | | | | | | | |
| 10/31/02 11:51 | 697.6 | | | | | | | | |
| 10/31/02 11:52 | 701.7 | | | | | | | | |
| 10/31/02 11:53 | 704.8 | | | | | | | | |
| 10/31/02 11:54 | 698.6 | | | | | | | | |
| 10/31/02 11:55 | 695.5 | | | | | | | | |
| 10/31/02 11:56 | 704.8 | | | | | | | | |
| 10/31/02 11:57 | 693.5 | | | | | | | | |
| 10/31/02 11:58 | 694.5 | | | | | | | | |
| 10/31/02 11:59 | 698.6 | | | | | | | | |
| 10/31/02 12:00 | 686.3 | | | | | | | | |
| 10/31/02 12:01 | 694.5 | | | | | | | | |
| 10/31/02 12:02 | 699.6 | | | | | | | | |
| 10/31/02 12:03 | 689.3 | | | | | | | | |
| 10/31/02 12:04 | 703.8 | | | | | | | | |
| 10/31/02 12:05 | 699.6 | | | | | | | | |
| 10/31/02 12:06 | 699.6 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

October 31, 2002

## *DATA RECORDER PRINTOUT and TEST SUMMARY*

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_a$ | CO $C_{aa}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 12:07 | 704.8 | | | | | | | | |
| 10/31/02 12:08 | 711.0 | | | | | | | | |
| 10/31/02 12:09 | 697.6 | | | | | | | | |
| 10/31/02 12:10 | 706.9 | | | | | | | | |
| 10/31/02 12:11 | 715.1 | | | | | | | | |
| 10/31/02 12:12 | 709.9 | | | | | | | | |
| 10/31/02 12:13 | 693.5 | | | | | | | | |
| 10/31/02 12:14 | 708.9 | | | | | | | | |
| 10/31/02 12:15 | 712.0 | | | | | | | | |
| 10/31/02 12:16 | 702.7 | | | | | | | | |
| 10/31/02 12:17 | 708.9 | | | | | | | | |
| 10/31/02 12:18 | 701.7 | | | | | | | | |
| 10/31/02 12:19 | 760.4 | | | | | | | | |
| 10/31/02 12:20 | 988.0 | | | | | | | | |
| 10/31/02 12:21 | 1000.3 | | Interim Cal 991 | | | | | | |
| 10/31/02 12:22 | 1000.3 | | | | | | | | |
| 10/31/02 12:23 | 789.2 | | | | | | | | |
| 10/31/02 12:24 | 56.0 | | | | | | | | |
| 10/31/02 12:25 | 4.5 | | Interim Cal 0 | | | | | | |
| 10/31/02 12:26 | 3.5 | | | | | | | | |
| 10/31/02 12:27 | 103.4 | | | | | | | | |
| 10/31/02 12:28 | 628.6 | | | | | | | | |
| 10/31/02 12:29 | 717.2 | | | | | | | | |
| 10/31/02 12:30 | 702.7 | | | | | | | | |
| 10/31/02 12:31 | 705.8 | | | | | | | | |
| 10/31/02 12:32 | 708.9 | | | | | | | | |
| 10/31/02 12:33 | 708.9 | | | | | | | | |
| 10/31/02 12:34 | 696.6 | | | | | | | | |
| 10/31/02 12:35 | 702.7 | | | | | | | | |
| 10/31/02 12:36 | 700.7 | | | | | | | | |
| 10/31/02 12:37 | 699.6 | | | | | | | | |
| 10/31/02 12:38 | 695.5 | | | | | | | | |
| 10/31/02 12:39 | 702.7 | | | | | | | | |
| 10/31/02 12:40 | 706.9 | | | | | | | | |
| 10/31/02 12:41 | 703.8 | | | | | | | | |
| 10/31/02 12:42 | 699.6 | | | | | | | | |
| 10/31/02 12:43 | 700.7 | | | | | | | | |
| 10/31/02 12:44 | 692.4 | | | | | | | | |
| 10/31/02 12:45 | 701.7 | | | | | | | | |
| 10/31/02 12:46 | 714.1 | | | | | | | | |
| 10/31/02 12:47 | 706.9 | | | | | | | | |
| 10/31/02 12:48 | 730.5 | | | | | | | | |
| 10/31/02 12:49 | 719.2 | | | | | | | | |
| 10/31/02 12:50 | 719.2 | | | | | | | | |
| 10/31/02 12:51 | 735.7 | | | | | | | | |
| 10/31/02 12:52 | 729.5 | | | | | | | | |
| 10/31/02 12:53 | 723.3 | | | | | | | | |
| 10/31/02 12:54 | 738.8 | | | | | | | | |
| 10/31/02 12:55 | 753.2 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_d$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 12:56 | 764.5 | | | | | | | | |
| 10/31/02 12:57 | 791.3 | | | | | | | | |
| 10/31/02 12:58 | 805.7 | | | | | | | | |
| 10/31/02 12:59 | 824.2 | | | | | | | | |
| 10/31/02 13:00 | 852.1 | | | | | | | | |
| 10/31/02 13:01 | 875.7 | | | | | | | | |
| 10/31/02 13:02 | 887.1 | | | | | | | | |
| 10/31/02 13:03 | 900.5 | | | | | | | | |
| 10/31/02 13:04 | 941.6. | | | | | | | | |
| 10/31/02 13:05 | 969.4 | | | | | | | | |
| 10/31/02 13:06 | 981.8 | | | | | | | | |
| 10/31/02 13:07 | 1003.4 | | | | | | | | |
| 10/31/02 13:08 | 1006.5 | | | | | | | | |
| 10/31/02 13:09 | 1008.6 | | | | | | | | |
| 10/31/02 13:10 | 1039.5 | | | | | | | | |
| 10/31/02 13:11 | 1036.4 | | | | | | | | |
| 10/31/02 13:12 | 1032.3 | | | | | | | | |
| 10/31/02 13:13 | 1035.4 | | | | | | | | |
| 10/31/02 13:14 | 1015.8 | | | | | | | | |
| 10/31/02 13:15 | 1006.5 | | | | | | | | |
| 10/31/02 13:16 | 1027.1 | | | | | | | | |
| 10/31/02 13:17 | 1038.4 | | | | | | | | |
| 10/31/02 13:18 | 1039.5 | | | | | | | | |
| 10/31/02 13:19 | 1047.7 | | | | | | | | |
| 10/31/02 13:20 | 1064.2 | | | | | | | | |
| 10/31/02 13:21 | 1057.0 | | | | | | | | |
| 10/31/02 13:22 | 1073.5 | | | | | | | | |
| 10/31/02 13:23 | 1094.1 | | | | | | | | |
| 10/31/02 13:24 | 1092.0 | | | | | | | | |
| 10/31/02 13:25 | 1104.4 | | | | | | | | |
| 10/31/02 13:26 | 1106.4 | | | | | | | | |
| 10/31/02 13:27 | 1111.56 | | | | | | | | |
| 10/31/02 13:28 | 1142.453 | | | | | | | | |
| 10/31/02 13:29 | 1165.109 | | *Begin Run 1* | | | | | | |
| 10/31/02 13:30 | 1159.96 | 1 | | 6.25 | 1008 | 991 | 1141 3 | 13401 | 71 49 |
| 10/31/02 13:31 | 1182.615 | 1 | | 6.25 | 1008 | 991 | 1163 7 | 13401 | 72 89 |
| 10/31/02 13:32 | 1194.973 | 1 | | 6.25 | 1008 | 991 | 1176 0 | 13401 | 73 66 |
| 10/31/02 13:33 | 1188.794 | 1 | | 6.25 | 1008 | 991 | 1169 9 | 13401 | 73 28 |
| 10/31/02 13:34 | 1167.168 | 1 | | 6.25 | 1008 | 991 | 1148 5 | 13401 | 71 94 |
| 10/31/02 13:35 | 1166.139 | 1 | | 6.25 | 1008 | 991 | 1147 4 | 13401 | 71 87 |
| 10/31/02 13:36 | 1157.9 | 1 | | 6.25 | 1008 | 991 | 1139 3 | 13401 | 71 36 |
| 10/31/02 13:37 | 1151.722 | 1 | | 6.25 | 1008 | 991 | 1133 2 | 13401 | 70 98 |
| 10/31/02 13:38 | 1162.02 | 1 | | 6.25 | 1008 | 991 | 1143 4 | 13401 | 71 62 |
| 10/31/02 13:39 | 1171.288 | 1 | | 6.25 | 1008 | 991 | 1152 5 | 13401 | 72 19 |
| 10/31/02 13:40 | 1135.245 | 1 | | 6.25 | 1008 | 991 | 1116 9 | 13401 | 69 96 |
| 10/31/02 13:41 | 1149.662 | 1 | | 6.25 | 1008 | 991 | 1131 1 | 13401 | 70 85 |
| 10/31/02 13:42 | 1164.079 | 1 | | 6.25 | 1008 | 991 | 1145 4 | 13401 | 71 75 |
| 10/31/02 13:43 | 1155.841 | 1 | | 6.25 | 1008 | 991 | 1137 3 | 13401 | 71 24 |
| 10/31/02 13:44 | 1170 258 | 1 | | 6.25 | 1008 | 991 | 1151 5 | 13401 | 72 13 |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

October 31, 2002

## *DATA RECORDER PRINTOUT and TEST SUMMARY*

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_w$ | CO $C_{wa}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 13:45 | 1171.288 | 1 | | 6.25 | 1008 | 991 | 1152.5 | 13401 | 72.19 |
| 10/31/02 13:46 | 1153.781 | 1 | | 6.25 | 1008 | 991 | 1135.2 | 13401 | 71.11 |
| 10/31/02 13:47 | 1178.496 | 1 | | 6.25 | 1008 | 991 | 1159.7 | 13401 | 72.64 |
| 10/31/02 13:48 | 1194.973 | 1 | | 6.25 | 1008 | 991 | 1176.0 | 13401 | 73.66 |
| 10/31/02 13:49 | 1194.973 | 1 | | 6.25 | 1008 | 991 | 1176.0 | 13401 | 73.66 |
| 10/31/02 13:50 | 1215.569 | 1 | | 6.25 | 1008 | 991 | 1196.3 | 13401 | 74.94 |
| 10/31/02 13:51 | 1181.585 | 1 | | 6.25 | 1008 | 991 | 1162.7 | 13401 | 72.83 |
| 10/31/02 13:52 | 1190.854 | 1 | | 6.25 | 1008 | 991 | 1171.9 | 13401 | 73.40 |
| 10/31/02 13:53 | 1165.109 | 1 | | 6.25 | 1008 | 991 | 1146.4 | 13401 | 71.81 |
| 10/31/02 13:54 | 1147.602 | 1 | | 6.25 | 1008 | 991 | 1129.1 | 13401 | 70.72 |
| 10/31/02 13:55 | 1141.424 | 1 | | 6.25 | 1008 | 991 | 1123.0 | 13401 | 70.34 |
| 10/31/02 13:56 | 1135.245 | 1 | | 6.25 | 1008 | 991 | 1116.9 | 13401 | 69.96 |
| 10/31/02 13:57 | 1142.453 | 1 | | 6.25 | 1008 | 991 | 1124.0 | 13401 | 70.41 |
| 10/31/02 13:58 | 1144.513 | 1 | | 6.25 | 1008 | 991 | 1126.0 | 13401 | 70.53 |
| 10/31/02 13:59 | 1130.096 | 1 | | 6.25 | 1008 | 991 | 1111.8 | 13401 | 69.64 |
| 10/31/02 14:00 | 1141.424 | 1 | | 6.25 | 1008 | 991 | 1123.0 | 13401 | 70.34 |
| 10/31/02 14:01 | 1115.679 | 1 | | 6.25 | 1008 | 991 | 1097.5 | 13401 | 68.75 |
| 10/31/02 14:02 | 1139.364 | 1 | | 6.25 | 1008 | 991 | 1121.0 | 13401 | 70.21 |
| 10/31/02 14:03 | 1142.453 | 1 | | 6.25 | 1008 | 991 | 1124.0 | 13401 | 70.41 |
| 10/31/02 14:04 | 1132.156 | 1 | | 6.25 | 1008 | 991 | 1113.8 | 13401 | 69.77 |
| 10/31/02 14:05 | 1147.602 | 1 | | 6.25 | 1008 | 991 | 1129.1 | 13401 | 70.72 |
| 10/31/02 14:06 | 1182.615 | 1 | | 6.25 | 1008 | 991 | 1163.7 | 13401 | 72.89 |
| 10/31/02 14:07 | 1173.347 | 1 | | 6.25 | 1008 | 991 | 1154.6 | 13401 | 72.32 |
| 10/31/02 14:08 | 1190.854 | 1 | | 6.25 | 1008 | 991 | 1171.9 | 13401 | 73.40 |
| 10/31/02 14:09 | 1227.926 | 1 | | 6.25 | 1008 | 991 | 1208.6 | 13401 | 75.70 |
| 10/31/02 14:10 | 1205.271 | 1 | | 6.25 | 1008 | 991 | 1186.2 | 13401 | 74.30 |
| 10/31/02 14:11 | 1191.883 | 1 | | 6.25 | 1008 | 991 | 1172.9 | 13401 | 73.47 |
| 10/31/02 14:12 | 1225.866 | 1 | | 6.25 | 1008 | 991 | 1206.5 | 13401 | 75.57 |
| 10/31/02 14:13 | 1212.479 | 1 | | 6.25 | 1008 | 991 | 1193.3 | 13401 | 74.74 |
| 10/31/02 14:14 | 1186.734 | 1 | | 6.25 | 1008 | 991 | 1167.8 | 13401 | 73.15 |
| 10/31/02 14:15 | 1221.747 | 1 | | 6.25 | 1008 | 991 | 1202.5 | 13401 | 75.32 |
| 10/31/02 14:16 | 1196.003 | 1 | | 6.25 | 1008 | 991 | 1177.0 | 13401 | 73.72 |
| 10/31/02 14:17 | 1157.9 | 1 | | 6.25 | 1008 | 991 | 1139.3 | 13401 | 71.36 |
| 10/31/02 14:18 | 1186.734 | 1 | | 6.25 | 1008 | 991 | 1167.8 | 13401 | 73.15 |
| 10/31/02 14:19 | 1186.734 | 1 | | 6.25 | 1008 | 991 | 1167.8 | 13401 | 73.15 |
| 10/31/02 14:20 | 1178.496 | 1 | | 6.25 | 1008 | 991 | 1159.7 | 13401 | 72.64 |
| 10/31/02 14:21 | 1200.122 | 1 | | 6.25 | 1008 | 991 | 1181.1 | 13401 | 73.98 |
| 10/31/02 14:22 | 1172.317 | 1 | | 6.25 | 1008 | 991 | 1153.6 | 13401 | 72.26 |
| 10/31/02 14:23 | 1178.496 | 1 | | 6.25 | 1008 | 991 | 1159.7 | 13401 | 72.64 |
| 10/31/02 14:24 | 1200.122 | 1 | | 6.25 | 1008 | 991 | 1181.1 | 13401 | 73.98 |
| 10/31/02 14:25 | 1184.675 | 1 | | 6.25 | 1008 | 991 | 1165.8 | 13401 | 73.02 |
| 10/31/02 14:26 | 1194.973 | 1 | | 6.25 | 1008 | 991 | 1176.0 | 13401 | 73.66 |
| 10/31/02 14:27 | 1186.734 | 1 | | 6.25 | 1008 | 991 | 1167.8 | 13401 | 73.15 |
| 10/31/02 14:28 | 1185.705 | 1 | | 6.25 | 1008 | 991 | 1166.8 | 13401 | 73.09 |
| 10/31/02 14:29 | 1218.658 | 1 | | 6.25 | 1008 | 991 | 1199.4 | 13401 | 75.13 |
| 10/31/02 14:30 | 1220.718 | | | ***Run 1 Average*** | | | ***1155.1*** | | ***72.35*** |
| 10/31/02 14:31 | 1206.3 | | | | | | | | |
| 10/31/02 14:32 | 1236.164 | | | | | | | | |
| 10/31/02 14:33 | 1218.768 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

## *DATA RECORDER PRINTOUT and TEST SUMMARY*

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_u$ | CO $C_{adj}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 14:34 | 159.004 | | | | | | | | |
| 10/31/02 14:35 | 6.5951 | | | | | | | | |
| 10/31/02 14:36 | 3.5057 | | Zero CO Cal | | | | | | |
| 10/31/02 14:37 | 3.5057 | | Zero CO Cal | | | | | | |
| 10/31/02 14:38 | 8.6546 | | | | | | | | |
| 10/31/02 14:39 | 656.3926 | | | | | | | | |
| 10/31/02 14:40 | 989.0148 | | | | | | | | |
| 10/31/02 14:41 | 995.1935 | | 991 CO Cal | | | | | | |
| 10/31/02 14:42 | 995.1935 | | 991 CO Cal | | | | | | |
| 10/31/02 14:43 | 1068.309 | | | | | | | | |
| 10/31/02 14:44 | 1213.509 | | | | | | | | |
| 10/31/02 14:45 | 1194.973 | | | | | | | | |
| 10/31/02 14:46 | 1191.883 | | | | | | | | |
| 10/31/02 14:47 | 1166.139 | | | | | | | | |
| 10/31/02 14:48 | 1138.334 | | | | | | | | |
| 10/31/02 14:49 | 1182.615 | | | | | | | | |
| 10/31/02 14:50 | 1179.526 | | | | | | | | |
| 10/31/02 14:51 | 1163.049 | | | | | | | | |
| 10/31/02 14:52 | 1172.317 | | | | | | | | |
| 10/31/02 14:53 | 1160.99 | | | | | | | | |
| 10/31/02 14:54 | 1174.377 | | | | | | | | |
| 10/31/02 14:55 | 1160.99 | | | | | | | | |
| 10/31/02 14:56 | 1171.288 | | | | | | | | |
| 10/31/02 14:57 | 1190.854 | | | | | | | | |
| 10/31/02 14:58 | 1191.883 | | | | | | | | |
| 10/31/02 14:59 | 1176.437 | | | | | | | | |
| 10/31/02 15:00 | 1190.854 | | | | | | | | |
| 10/31/02 15:01 | 1192.913 | | | | | | | | |
| 10/31/02 15:02 | 1191.883 | | | | | | | | |
| 10/31/02 15:03 | 1215.569 | | | | | | | | |
| 10/31/02 15:04 | 1186.734 | | | | | | | | |
| 10/31/02 15:05 | 1169.228 | | | | | | | | |
| 10/31/02 15:06 | 1178.496 | | | | | | | | |
| 10/31/02 15:07 | 1181.585 | | | | | | | | |
| 10/31/02 15:08 | 1187.764 | | | | | | | | |
| 10/31/02 15:09 | 1217.628 | | | | | | | | |
| 10/31/02 15:10 | 1228.956 | | | | | | | | |
| 10/31/02 15:11 | 1193.943 | | | | | | | | |
| 10/31/02 15:12 | 1201.151 | | | | | | | | |
| 10/31/02 15:13 | 1210.42 | | | | | | | | |
| 10/31/02 15:14 | 1228.956 | | | | | | | | |
| 10/31/02 15:15 | 1200.122 | | | | | | | | |
| 10/31/02 15:16 | 1233.075 | | | | | | | | |
| 10/31/02 15:17 | 1228.956 | | | | | | | | |
| 10/31/02 15:18 | 1199.092 | | | | | | | | |
| 10/31/02 15:19 | 1219.688 | | | | | | | | |
| 10/31/02 15:20 | 1237.194 | | | | | | | | |
| 10/31/02 15:21 | 1208.36 | | | | | | | | |
| 10/31/02 15:22 | 1221.747 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{ma}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 15:23 | 1214.539 | | | | | | | | |
| 10/31/02 15:24 | 1203.211 | | | | | | | | |
| 10/31/02 15:25 | 1205.271 | | | | | | | | |
| 10/31/02 15:26 | 1229.986 | | | | | | | | |
| 10/31/02 15:27 | 1212.479 | | | | | | | | |
| 10/31/02 15:28 | 1200.122 | | | | | | | | |
| 10/31/02 15:29 | 1242.343 | | | | | | | | |
| 10/31/02 15:30 | 1227.926 | | | | | | | | |
| 10/31/02 15:31 | 1227.926 | | | | | | | | |
| 10/31/02 15:32 | 1243.373 | | | | | | | | |
| 10/31/02 15:33 | 1216.598 | | | | | | | | |
| 10/31/02 15:34 | 1221.747 | | | | | | | | |
| 10/31/02 15:35 | 1202.181 | | | | | | | | |
| 10/31/02 15:36 | 1218.658 | | | | | | | | |
| 10/31/02 15:37 | 1213.509 | | | | | | | | |
| 10/31/02 15:38 | 1211.449 | | | | | | | | |
| 10/31/02 15:39 | 1221.747 | | | | | | | | |
| 10/31/02 15:40 | 1209.39 | | | | | | | | |
| 10/31/02 15:41 | 1217.628 | | | | | | | | |
| 10/31/02 15:42 | 1234.105 | | | | | | | | |
| 10/31/02 15:43 | 1216.598 | | | | | | | | |
| 10/31/02 15:44 | 1205.271 | | | | | | | | |
| 10/31/02 15:45 | 1209.39 | | | | | | | | |
| 10/31/02 15:46 | 1194.973 | | ***Begin Run 2*** | | | | | | |
| 10/31/02 15:47 | 1190.854 | 2 | | 4 | 995.5 | 991 | 1186.3 | 13171 | 73.03 |
| 10/31/02 15:48 | 1209.39 | 2 | | 4 | 995.5 | 991 | 1204.8 | 13171 | 74.17 |
| 10/31/02 15:49 | 1221.747 | 2 | | 4 | 995.5 | 991 | 1217.1 | 13171 | 74.93 |
| 10/31/02 15:50 | 1209.39 | 2 | | 4 | 995.5 | 991 | 1204.8 | 13171 | 74.17 |
| 10/31/02 15:51 | 1240.284 | 2 | | 4 | 995.5 | 991 | 1235.7 | 13171 | 76.07 |
| 10/31/02 15:52 | 1235.135 | 2 | | 4 | 995.5 | 991 | 1230.5 | 13171 | 75.75 |
| 10/31/02 15:53 | 1231.015 | 2 | | 4 | 995.5 | 991 | 1226.4 | 13171 | 75.50 |
| 10/31/02 15:54 | 1245.432 | 2 | | 4 | 995.5 | 991 | 1240.8 | 13171 | 76.39 |
| 10/31/02 15:55 | 1211.449 | 2 | | 4 | 995.5 | 991 | 1206.8 | 13171 | 74.30 |
| 10/31/02 15:56 | 1201.151 | 2 | | 4 | 995.5 | 991 | 1196.5 | 13171 | 73.66 |
| 10/31/02 15:57 | 1229.986 | 2 | | 4 | 995.5 | 991 | 1225.4 | 13171 | 75.44 |
| 10/31/02 15:58 | 1215.569 | 2 | | 4 | 995.5 | 991 | 1211.0 | 13171 | 74.55 |
| 10/31/02 15:59 | 1216.598 | 2 | | 4 | 995.5 | 991 | 1212.0 | 13171 | 74.61 |
| 10/31/02 16:00 | 1223.807 | 2 | | 4 | 995.5 | 991 | 1219.2 | 13171 | 75.06 |
| 10/31/02 16:01 | 1196.003 | 2 | | 4 | 995.5 | 991 | 1191.4 | 13171 | 73.35 |
| 10/31/02 16:02 | 1197.032 | 2 | | 4 | 995.5 | 991 | 1192.4 | 13171 | 73.41 |
| 10/31/02 16:03 | 1182.615 | 2 | | 4 | 995.5 | 991 | 1178.0 | 13171 | 72.52 |
| 10/31/02 16:04 | 1170.258 | 2 | | 4 | 995.5 | 991 | 1165.7 | 13171 | 71.76 |
| 10/31/02 16:05 | 1185.705 | 2 | | 4 | 995.5 | 991 | 1181.1 | 13171 | 72.71 |
| 10/31/02 16:06 | 1177.466 | 2 | | 4 | 995.5 | 991 | 1172.9 | 13171 | 72.21 |
| 10/31/02 16:07 | 1186.734 | 2 | | 4 | 995.5 | 991 | 1182.1 | 13171 | 72.78 |
| 10/31/02 16:08 | 1192.913 | 2 | | 4 | 995.5 | 991 | 1188.3 | 13171 | 73.16 |
| 10/31/02 16:09 | 1198.062 | 2 | | 4 | 995.5 | 991 | 1193.5 | 13171 | 73.47 |
| 10/31/02 16:10 | 1226.896 | 2 | | 4 | 995.5 | 991 | 1222.3 | 13171 | 75.25 |
| 10/31/02 16:11 | 1211.449 | 2 | | 4 | 995.5 | 991 | 1206.8 | 13171 | 74.30 |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | $CO/C_o$ | CO $C_d$ | CO $C_{dA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 16:12 | 1214.539 | 2 | | 4 | 995.5 | 991 | 1209.9 | 13171 | 74 49 |
| 10/31/02 16:13 | 1219.688 | 2 | | 4 | 995.5 | 991 | 1215.1 | 13171 | 74 80 |
| 10/31/02 16:14 | 1215.569 | 2 | | 4 | 995.5 | 991 | 1211.0 | 13171 | 74 55 |
| 10/31/02 16:15 | 1200.122 | 2 | | 4 | 995.5 | 991 | 1195.5 | 13171 | 73 60 |
| 10/31/02 16:16 | 1198.062 | 2 | | 4 | 995.5 | 991 | 1193.5 | 13171 | 73 47 |
| 10/31/02 16:17 | 1194.973 | 2 | | 4 | 995.5 | 991 | 1190.4 | 13171 | 73 28 |
| 10/31/02 16:18 | 1206.3 | 2 | | 4 | 995.5 | 991 | 1201.7 | 13171 | 73 98 |
| 10/31/02 16:19 | 1210.42 | 2 | | 4 | 995.5 | 991 | 1205.8 | 13171 | 74 23 |
| 10/31/02 16:20 | 1221.747 | 2 | | 4 | 995.5 | 991 | 1217.1 | 13171 | 74 93 |
| 10/31/02 16:21 | 1216.598 | 2 | | 4 | 995.5 | 991 | 1212.0 | 13171 | 74 61 |
| 10/31/02 16:22 | 1208.36 | 2 | | 4 | 995.5 | 991 | 1203.8 | 13171 | 74 11 |
| 10/31/02 16:23 | 1199.092 | 2 | | 4 | 995.5 | 991 | 1194.5 | 13171 | 73 54 |
| 10/31/02 16:24 | 1219.688 | 2 | | 4 | 995.5 | 991 | 1215.1 | 13171 | 74 80 |
| 10/31/02 16:25 | 1216.598 | 2 | | 4 | 995.5 | 991 | 1212.0 | 13171 | 74 61 |
| 10/31/02 16:26 | 1207.33 | 2 | | 4 | 995.5 | 991 | 1202.7 | 13171 | 74 04 |
| 10/31/02 16:27 | 1217.628 | 2 | | 4 | 995.5 | 991 | 1213.0 | 13171 | 74 68 |
| 10/31/02 16:28 | 1211.449 | 2 | | 4 | 995.5 | 991 | 1206.8 | 13171 | 74 30 |
| 10/31/02 16:29 | 1224.837 | 2 | | 4 | 995.5 | 991 | 1220.2 | 13171 | 75 12 |
| 10/31/02 16:30 | 1244.403 | 2 | | 4 | 995.5 | 991 | 1239.8 | 13171 | 76 32 |
| 10/31/02 16:31 | 1240.284 | 2 | | 4 | 995.5 | 991 | 1235.7 | 13171 | 76 07 |
| 10/31/02 16:32 | 1235.135 | 2 | | 4 | 995.5 | 991 | 1230.5 | 13171 | 75 75 |
| 10/31/02 16:33 | 1241.313 | 2 | | 4 | 995.5 | 991 | 1236.7 | 13171 | 76 13 |
| 10/31/02 16:34 | 1231.015 | 2 | | 4 | 995.5 | 991 | 1226.4 | 13171 | 75 50 |
| 10/31/02 16:35 | 1238.224 | 2 | | 4 | 995.5 | 991 | 1233.6 | 13171 | 75.94 |
| 10/31/02 16:36 | 1251.611 | 2 | | 4 | 995.5 | 991 | 1247.0 | 13171 | 76 77 |
| 10/31/02 16:37 | 1236.164 | 2 | | 4 | 995.5 | 991 | 1231.5 | 13171 | 75 82 |
| 10/31/02 16:38 | 1234.105 | 2 | | 4 | 995.5 | 991 | 1229.5 | 13171 | 75 69 |
| 10/31/02 16:39 | 1234.105 | 2 | | 4 | 995.5 | 991 | 1229.5 | 13171 | 75 69 |
| 10/31/02 16:40 | 1232.045 | 2 | | 4 | 995.5 | 991 | 1227.4 | 13171 | 75 56 |
| 10/31/02 16:41 | 1222.777 | 2 | | 4 | 995.5 | 991 | 1218.2 | 13171 | 74 99 |
| 10/31/02 16:42 | 1225.866 | 2 | | 4 | 995.5 | 991 | 1221.2 | 13171 | 75 18 |
| 10/31/02 16:43 | 1233.075 | 2 | | 4 | 995.5 | 991 | 1228.5 | 13171 | 75 63 |
| 10/31/02 16:44 | 1225.866 | 2 | | 4 | 995.5 | 991 | 1221.2 | 13171 | 75 18 |
| 10/31/02 16:45 | 1233.075 | 2 | | 4 | 995.5 | 991 | 1228.5 | 13171 | 75 63 |
| 10/31/02 16:46 | 1241.313 | 2 | | 4 | 995.5 | 991 | 1236.7 | 13171 | 76 13 |
| 10/31/02 16:47 | 1240.284 | | | ***Run 2 Average*** | | | ***1212.2*** | | ***74.6*** |
| 10/31/02 16:48 | 1232.045 | | | | | | | | |
| 10/31/02 16:49 | 1254.701 | | | | | | | | |
| 10/31/02 16:50 | 1280.445 | | | | | | | | |
| 10/31/02 16:51 | 1276.326 | | | | | | | | |
| 10/31/02 16:52 | 1218.658 | | | | | | | | |
| 10/31/02 16:53 | 982.836 | | | | | | | | |
| 10/31/02 16:54 | 996.2233 | | 991 CO Cal | | | | | | |
| 10/31/02 16:55 | 996.2233 | | | | | | | | |
| 10/31/02 16:56 | 862.3506 | | | | | | | | |
| 10/31/02 16:57 | 81.7697 | | | | | | | | |
| 10/31/02 16:58 | 4.5355 | | | | | | | | |
| 10/31/02 16:59 | 4.5355 | | 0 CO Cal | | | | | | |
| 10/31/02 17:00 | 4.5355 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_s$ | CO $C_{ad}$ | CO $C_{ma}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 17:01 | 4.5355 | | | | | | | | |
| 10/31/02 17:02 | 4.5355 | | | | | | | | |
| 10/31/02 17:03 | 713.031 | | | | | | | | |
| 10/31/02 17:04 | 1258.82 | | | | | | | | |
| 10/31/02 17:05 | 1270.147 | | | | | | | | |
| 10/31/02 17:06 | 1279.416 | | | | | | | | |
| 10/31/02 17:07 | 1303.101 | | | | | | | | |
| 10/31/02 17:08 | 1293.833 | | | | | | | | |
| 10/31/02 17:09 | 1296.922 | | ***Begin Run 3*** | | | | | | |
| 10/31/02 17:10 | 1322.667 | 3 | | 4.5 | 996.5 | 991 | 1316.8 | 12999 | 80.01 |
| 10/31/02 17:11 | 1314.428 | 3 | | 4.5 | 996.5 | 991 | 1308.6 | 12999 | 79.51 |
| 10/31/02 17:12 | 1292.803 | 3 | | 4.5 | 996.5 | 991 | 1287.0 | 12999 | 78.20 |
| 10/31/02 17:13 | 1296.922 | 3 | | 4.5 | 996.5 | 991 | 1291.1 | 12999 | 78.45 |
| 10/31/02 17:14 | 1282.505 | 3 | | 4.5 | 996.5 | 991 | 1276.7 | 12999 | 77.57 |
| 10/31/02 17:15 | 1256.76 | 3 | | 4.5 | 996.5 | 991 | 1251.0 | 12999 | 76.01 |
| 10/31/02 17:16 | 1223.807 | 3 | | 4.5 | 996.5 | 991 | 1218.1 | 12999 | 74.01 |
| 10/31/02 17:17 | 1246.462 | 3 | | 4.5 | 996.5 | 991 | 1240.7 | 12999 | 75.38 |
| 10/31/02 17:18 | 1213.509 | 3 | | 4.5 | 996.5 | 991 | 1207.8 | 12999 | 73.38 |
| 10/31/02 17:19 | 1224.837 | 3 | | 4.5 | 996.5 | 991 | 1219.1 | 12999 | 74.07 |
| 10/31/02 17:20 | 1255.73 | 3 | | 4.5 | 996.5 | 991 | 1250.0 | 12999 | 75.95 |
| 10/31/02 17:21 | 1256.76 | 3 | | 4.5 | 996.5 | 991 | 1251.0 | 12999 | 76.01 |
| 10/31/02 17:22 | 1245.432 | 3 | | 4.5 | 996.5 | 991 | 1239.7 | 12999 | 75.32 |
| 10/31/02 17:23 | 1259.849 | 3 | | 4.5 | 996.5 | 991 | 1254.1 | 12999 | 76.20 |
| 10/31/02 17:24 | 1260.879 | 3 | | 4.5 | 996.5 | 991 | 1255.1 | 12999 | 76.26 |
| 10/31/02 17:25 | 1267.058 | 3 | | 4.5 | 996.5 | 991 | 1261.3 | 12999 | 76.63 |
| 10/31/02 17:26 | 1287.654 | 3 | | 4.5 | 996.5 | 991 | 1281.9 | 12999 | 77.88 |
| 10/31/02 17:27 | 1280.445 | 3 | | 4.5 | 996.5 | 991 | 1274.7 | 12999 | 77.45 |
| 10/31/02 17:28 | 1263.969 | 3 | | 4.5 | 996.5 | 991 | 1258.2 | 12999 | 76.45 |
| 10/31/02 17:29 | 1277.356 | 3 | | 4.5 | 996.5 | 991 | 1271.6 | 12999 | 77.26 |
| 10/31/02 17:30 | 1294.862 | 3 | | 4.5 | 996.5 | 991 | 1289.1 | 12999 | 78.32 |
| 10/31/02 17:31 | 1281.475 | 3 | | 4.5 | 996.5 | 991 | 1275.7 | 12999 | 77.51 |
| 10/31/02 17:32 | 1269.118 | 3 | | 4.5 | 996.5 | 991 | 1263.3 | 12999 | 76.76 |
| 10/31/02 17:33 | 1268.088 | 3 | | 4.5 | 996.5 | 991 | 1262.3 | 12999 | 76.70 |
| 10/31/02 17:34 | 1252.641 | 3 | | 4.5 | 996.5 | 991 | 1246.9 | 12999 | 75.76 |
| 10/31/02 17:35 | 1231.015 | 3 | | 4.5 | 996.5 | 991 | 1225.3 | 12999 | 74.45 |
| 10/31/02 17:36 | 1248.522 | 3 | | 4.5 | 996.5 | 991 | 1242.8 | 12999 | 75.51 |
| 10/31/02 17:37 | 1234.105 | 3 | | 4.5 | 996.5 | 991 | 1228.4 | 12999 | 74.63 |
| 10/31/02 17:38 | 1242.343 | 3 | | 4.5 | 996.5 | 991 | 1236.6 | 12999 | 75.13 |
| 10/31/02 17:39 | 1253.671 | 3 | | 4.5 | 996.5 | 991 | 1247.9 | 12999 | 75.82 |
| 10/31/02 17:40 | 1234.105 | 3 | | 4.5 | 996.5 | 991 | 1228.4 | 12999 | 74.63 |
| 10/31/02 17:41 | 1227.926 | 3 | | 4.5 | 996.5 | 991 | 1222.2 | 12999 | 74.26 |
| 10/31/02 17:42 | 1250.581 | 3 | | 4.5 | 996.5 | 991 | 1244.8 | 12999 | 75.63 |
| 10/31/02 17:43 | 1240.284 | 3 | | 4.5 | 996.5 | 991 | 1234.5 | 12999 | 75.01 |
| 10/31/02 17:44 | 1247.492 | 3 | | 4.5 | 996.5 | 991 | 1241.7 | 12999 | 75.45 |
| 10/31/02 17:45 | 1254.701 | 3 | | 4.5 | 996.5 | 991 | 1248.9 | 12999 | 75.88 |
| 10/31/02 17:46 | 1238.224 | 3 | | 4.5 | 996.5 | 991 | 1232.5 | 12999 | 74.88 |
| 10/31/02 17:47 | 1240.284 | 3 | | 4.5 | 996.5 | 991 | 1234.5 | 12999 | 75.01 |
| 10/31/02 17:48 | 1256.76 | 3 | | 4.5 | 996.5 | 991 | 1251.0 | 12999 | 76.01 |
| 10/31/02 17:49 | 1249.552 | 3 | | 4.5 | 996.5 | 991 | 1243.8 | 12999 | 75.5 |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_s$ | CO $C_{ma}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 17:50 | 1278.386 | 3 | | 4.5 | 996.5 | 991 | 1272.6 | 12999 | 77.32 |
| 10/31/02 17:51 | 1292.803 | 3 | | 4.5 | 996.5 | 991 | 1287.0 | 12999 | 78.20 |
| 10/31/02 17:52 | 1252.641 | 3 | | 4.5 | 996.5 | 991 | 1246.9 | 12999 | 75.76 |
| 10/31/02 17:53 | 1244.403 | 3 | | 4.5 | 996.5 | 991 | 1238.7 | 12999 | 75.26 |
| 10/31/02 17:54 | 1267.058 | 3 | | 4.5 | 996.5 | 991 | 1261.3 | 12999 | 76.63 |
| 10/31/02 17:55 | 1237.194 | 3 | | 4.5 | 996.5 | 991 | 1231.5 | 12999 | 74.82 |
| 10/31/02 17:56 | 1227.926 | 3 | | 4.5 | 996.5 | 991 | 1222.2 | 12999 | 74.26 |
| 10/31/02 17:57 | 1244.403 | 3 | | 4.5 | 996.5 | 991 | 1238.7 | 12999 | 75.26 |
| 10/31/02 17:58 | 1236.164 | 3 | | 4.5 | 996.5 | 991 | 1230.4 | 12999 | 74.76 |
| 10/31/02 17:59 | 1232.045 | 3 | | 4.5 | 996.5 | 991 | 1226.3 | 12999 | 74.51 |
| 10/31/02 18:00 | 1203.211 | 3 | | 4.5 | 996.5 | 991 | 1197.5 | 12999 | 72.76 |
| 10/31/02 18:01 | 1145.543 | 3 | | 4.5 | 996.5 | 991 | 1139.9 | 12999 | 69.26 |
| 10/31/02 18:02 | 1080.666 | 3 | | 4.5 | 996.5 | 991 | 1075.1 | 12999 | 65.32 |
| 10/31/02 18:03 | 1049.772 | 3 | | 4.5 | 996.5 | 991 | 1044.2 | 12999 | 63.45 |
| 10/31/02 18:04 | 1069.338 | 3 | | 4.5 | 996.5 | 991 | 1063.8 | 12999 | 64.63 |
| 10/31/02 18:05 | 1129.066 | 3 | | 4.5 | 996.5 | 991 | 1123.4 | 12999 | 68.26 |
| 10/31/02 18:06 | 1173.347 | 3 | | 4.5 | 996.5 | 991 | 1167.7 | 12999 | 70.95 |
| 10/31/02 18:07 | 1174.377 | 3 | | 4.5 | 996.5 | 991 | 1168.7 | 12999 | 71.01 |
| 10/31/02 18:08 | 1167.168 | 3 | | 4.5 | 996.5 | 991 | 1161.5 | 12999 | 70.57 |
| 10/31/02 18:09 | 1150.692 | 3 | | 4.5 | 996.5 | 991 | 1145.0 | 12999 | 69.57 |
| 10/31/02 18:10 | 1134.215 | | | ***Run 3 Average*** | | | ***1231.0*** | | ***74.8*** |
| 10/31/02 18:11 | 1163.049 | | | | | | | | |
| 10/31/02 18:12 | 350.5449 | | | | | | | | |
| 10/31/02 18:13 | 17.9228 | | | | | | | | |
| 10/31/02 18:14 | 4.5355 | | 0 CO Cal | | | | | | |
| 10/31/02 18:15 | 4.5355 | | | | | | | | |
| 10/31/02 18:16 | 149.7359 | | | | | | | | |
| 10/31/02 18:17 | 894.274 | | | | | | | | |
| 10/31/02 18:18 | 997.2531 | | 991 CO Cal | | | | | | |
| 10/31/02 18:19 | 998.2829 | | | | | | | | |
| 10/31/02 18:20 | 968.4189 | | | | | | | | |

# APPENDIX – C

## Laboratory Analysis

# TECHNICAL SERVICES, INC.
## ENVIRONMENTAL CONSULTANTS

For Ambient Air Services, Inc.
106 AMBIENT AIR WAY
STARKE, FL 32091
Contact: Joe Cooksey

*Report Date* 11-Nov-02
Date Received 11/01/2002 @ 16 15
Purchase Order #

## CERTIFICATE OF ANALYSIS

| LAB<br>SAMPLE DESCRIPTION | MATRIX | SAMPLE DATE | SAMPLE TIME | SAMPLED BY |
|---|---|---|---|---|
| 02110037<br>GP/PALATKA, BLEACH PLANT, RUN 1 | IMP. CATCH | 10/31/2002 | UNKNOWN | |
| 02110038<br>GP/PALATKA, BLEACH PLANT, RUN 2 | IMP. CATCH | 10/31/2002 | UNKNOWN | |
| 02110039<br>GP/PALATKA, BLEACH PLANT, RUN 3 | IMP. CATCH | 10/31/2002 | UNKNOWN | |
| 02110040<br>GP/PALATKA, BLEACH PLANT, RUN 1 | IMP. CATCH | 10/29/2002 | UNKNOWN | |
| 02110041<br>GP/PALATKA, BLEACH PLANT, RUN 2 | IMP. CATCH | 10/29/2002 | UNKNOWN | |
| 02110042<br>GP/PALATKA, BLEACH PLANT, RUN 3 | IMP. CATCH | 10/29/2002 | UNKNOWN | |
| 02110043<br>GP/PALATKA, BLEACH PLANT, FIELD BLANK | | UNKNOWN | UNKNOWN | |

Respectfully submitted,
Technical Services, Inc

Ambient Air Services, Inc

| Lab No | Parameter | Result | | Code | Method | Detection Limit |
|---|---|---|---|---|---|---|
| 02110037 | Chloride in base | 214 2 | ug/ml Cl- | A | Method 26A | 0 02 |
| 02110038 | Chloride in base | 134 3 | ug/ml Cl- | | Method 26A | 0 02 |
| 02110039 | Chloride in base | 151 1 | TOTAL UG | | Method 26A | 0 02 |
| 02110040 | Chloride in base | 438 9 | TOTAL UG | | Method 26A | 0 02 |
| 02110041 | Chloride in base | 320 0 | TOTAL UG | | Method 26A | 0 02 |
| 02110042 | Chloride in base | 354 6 | TOTAL UG | | Method 26A | 0 02 |
| 02110043 | Chloride in base | 104 3 | TOTAL UG | A | Method 26A | 0 02 |

Ambient Air Services, Inc

| Lab No | Parameter | Date of Analysis | Analysis Time | Analyst | Prep Date |
|---|---|---|---|---|---|
| 02110037 | Chloride in base | 11/11/2002 | | CRB | |
| 02110038 | Chloride in base | 11/11/2002 | | CRB | |
| 02110039 | Chloride in base | 11/11/2002 | | CRB | |
| 02110040 | Chloride in base | 11/11/2002 | | CRB | |
| 02110041 | Chloride in base | 11/11/2002 | | CRB | |
| 02110042 | Chloride in base | 11/11/2002 | | CRB | |
| 02110043 | Chloride in base | 11/11/2002 | | CRB | |

# APPENDIX – D

**Equipment Calibration Data**
**- Carbon Monoxide Analyzer Calibration**
**- Annual Meter Calibration**
**- Post Test Meter Calibration**
**- Pitot Tube Calibration**
**- Thermocouple Calibration**

**Georgia Pacific - Palatka, Florida**
**Bleach Plant Carbon Monoxide Test**

**October 29, 2002**
***Equipment List***

**Carbon Monoxide Instrument:** **Manufacturer -** Thermo Environmental Instruments **Model -** 48 CHL
**Serial Number -** 63892-341
**CO Range -** zero to 2000 ppm

| Calibration Gas Standards | | Concentration | Manufacturer | Cylinder Number | Expiration Date | PSI |
|---|---|---|---|---|---|---|
| Zero | Zero | 0.00 | Air Products | Nitrogen | N/A | 1200 |
| Low | CO | 991.00 | Air Liquide | CC121974 | Jul-04 | 800 |
| | CO | 1994.00 | Air Liquide | CC70989 | Jul-04 | 900 |
| Mid | CO | 594.40 | Praxair | SA12251 | Jan-04 | 1200 |
| High | CO | 301.90 | Air Liquide | CC121974 | Jul-04 | 1100 |

**Description of Sampling System :**
6', 1/4" SS probe to valve to $H_2O$ condenser to 200 feet 3/8 Teflon sample line to SS pump to instruments
all calibration gases injected direct to probe valve location
Sampling probe located nominally mid of 42" stack

**Test Participants :**
CO Testing - Joe Cooksey, Ambient Air Services, Inc.
Joe Taylor - Georgia-Pacific Representitive

**Other Comments :**

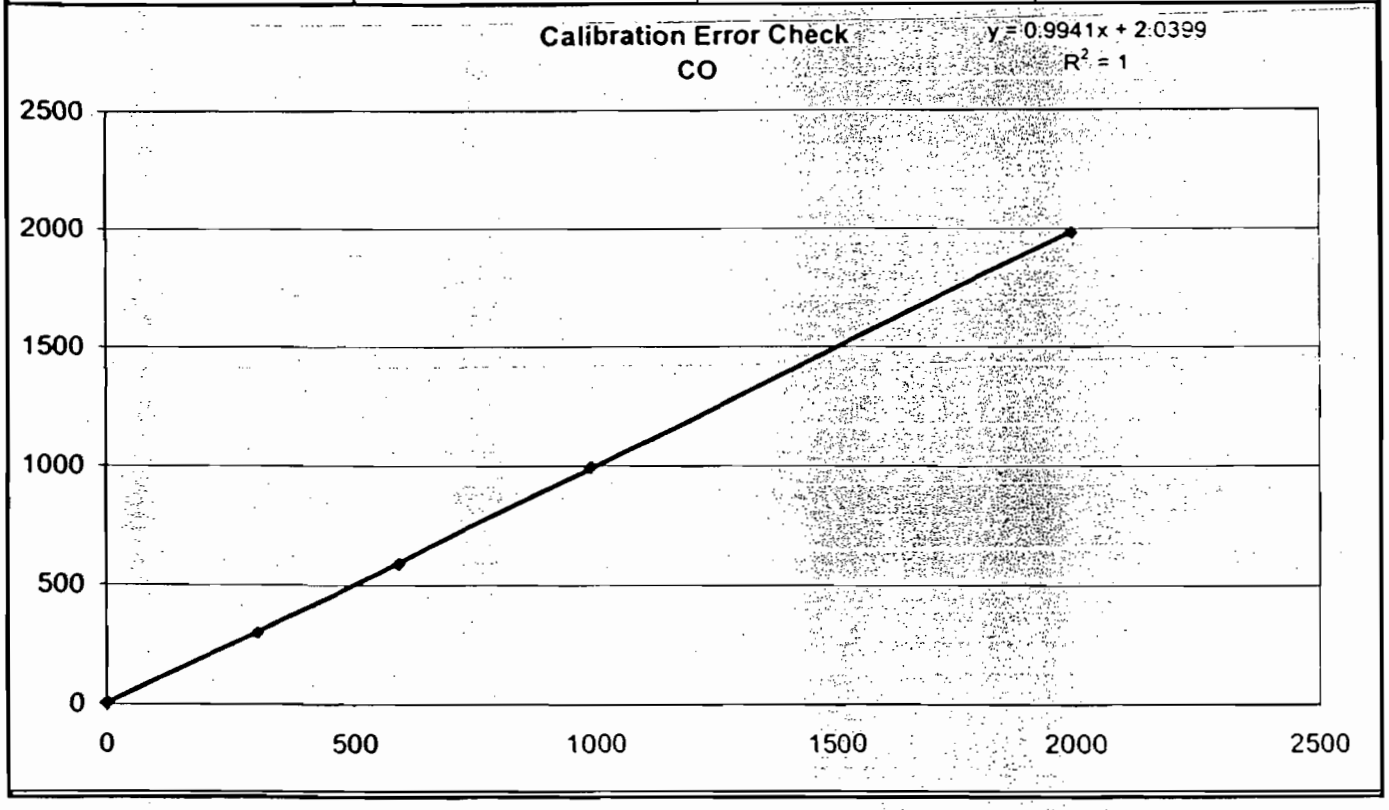
Georgia Pacific - Palatka, Florida
Bleach Plant Carbon Monoxide Test
0
October 29, 2002
*Calibration Sheet*

**Initial Calibration**
**Response Table**

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 12:00 | 4 |
| CO | 991 | 12:00 | 995.4 |
| CO | 1994 | 12:00 | 1982.2 |
| CO | 594.4 | 12:00 | 588 |
| CO | 301.9 | 12:00 | 299.1 |

**% Error of Range Table**

| Inject (ppm) | | Time | % Error of Range |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 12:00 | 0.20% |
| CO | 991 | 12:00 | 0.22% |
| CO | 1994 | 12:00 | -0.59% |
| CO | 594.4 | 12:00 | -0.32% |
| CO | 301.9 | 12:00 | -0.14% |



Georgia Pacific - Palatka, Florida
Bleach Plant Carbon Monoxide Test
0
October 29, 2002
*Calibration Sheet*

## Calibration - Post Run 1

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 13:30 | 5.6 |
| CO | 991 | 13:30 | 998.3 |

### Drift Analysis From Initial Calibrations to the End of Run 1

| Inject (ppm) | | Time | Drift Analysis (%) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 13:30 | 0.08% |
| CO | 991 | 13:30 | 0.14% |

### Drift Variables for Run 1

| Variable | CO | |
|---|---|---|
| Co | 4.80 | |
| Cm | 996.85 | |
| Cma | 991.00 | |

## Calibration - Post Run 2

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | | 2.5 |
| CO | 991 | | 997.3 |

### Drift Analysis From Initial Calibrations to the End of Run 2

| Inject (ppm) | | Time | Drift Analysis (%) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 0:00 | -0.08% |
| CO | 991 | 0:00 | 0.09% |

### Drift Variables for Run 2

| Variable | CO | |
|---|---|---|
| Co | 4.05 | |
| Cm | 997.80 | |
| Cma | 991 | |

## Calibration - Post Run 3

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | | |
| CO | 991 | | |

### Drift Analysis From Initial Calibrations to the End of Run 3

| Inject (ppm) | Time | Drift Analysis (%) |
|---|---|---|

**Georgia Pacific - Palatka, Florida**
**Bleach Plant Carbon Monoxide Test**
**0**
**October 29, 2002**
***Calibration Sheet***

| Gas | Conc. | | CO |
|---|---|---|---|
| Zero | 0 | 0:00 | -0.20% |
| CO | 991 | 0:00 | -49.77% |

**Drift Variables for Run 3**

| Variable | CO | |
|---|---|---|
| Co | 1.25 | |
| Cm | 498.65 | |
| Cma | 991 | |

**Georgia Pacific - Palatka, Florida**
**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**
***Equipment List***

**Carbon Monoxide Instrument:** **Manufacturer -** Thermo Environmental Instruments **Model -** 48 CHL
**Serial Number -** 63892-341
**CO Range -** zero to 2000 ppm

| Calibration Gas Standards | | Concentration | Manufacturer | Cylinder Number | Expiration Date | PSI |
|---|---|---|---|---|---|---|
| Zero | Zero | 0.00 | Air Products | Nitrogen | N/A | 1200 |
| Low | CO | 991.00 | Air Liquide | CC121974 | Jul-04 | 800 |
| | CO | 1994.00 | Air Liquide | CC70989 | Jul-04 | 900 |
| Mid | CO | 594.40 | Praxair | SA12251 | Jan-04 | 1200 |
| High | CO | 301.90 | Air Liquide | CC121974 | Jul-04 | 1100 |

**Description of Sampling System :**
6', 1/4" SS probe to valve to $H_2O$ condenser to 200 feet 3/8 Teflon sample line to SS pump to instruments
all calibration gases injected direct to probe valve location
Sampling probe located nominally mid of 42" stack

**Test Participants :**
CO Testing - Randy Weston, Ambient Air Services, Inc.
Joe Taylor, Georgia Pacific Palatka Environmental contact

**Other Comments :**

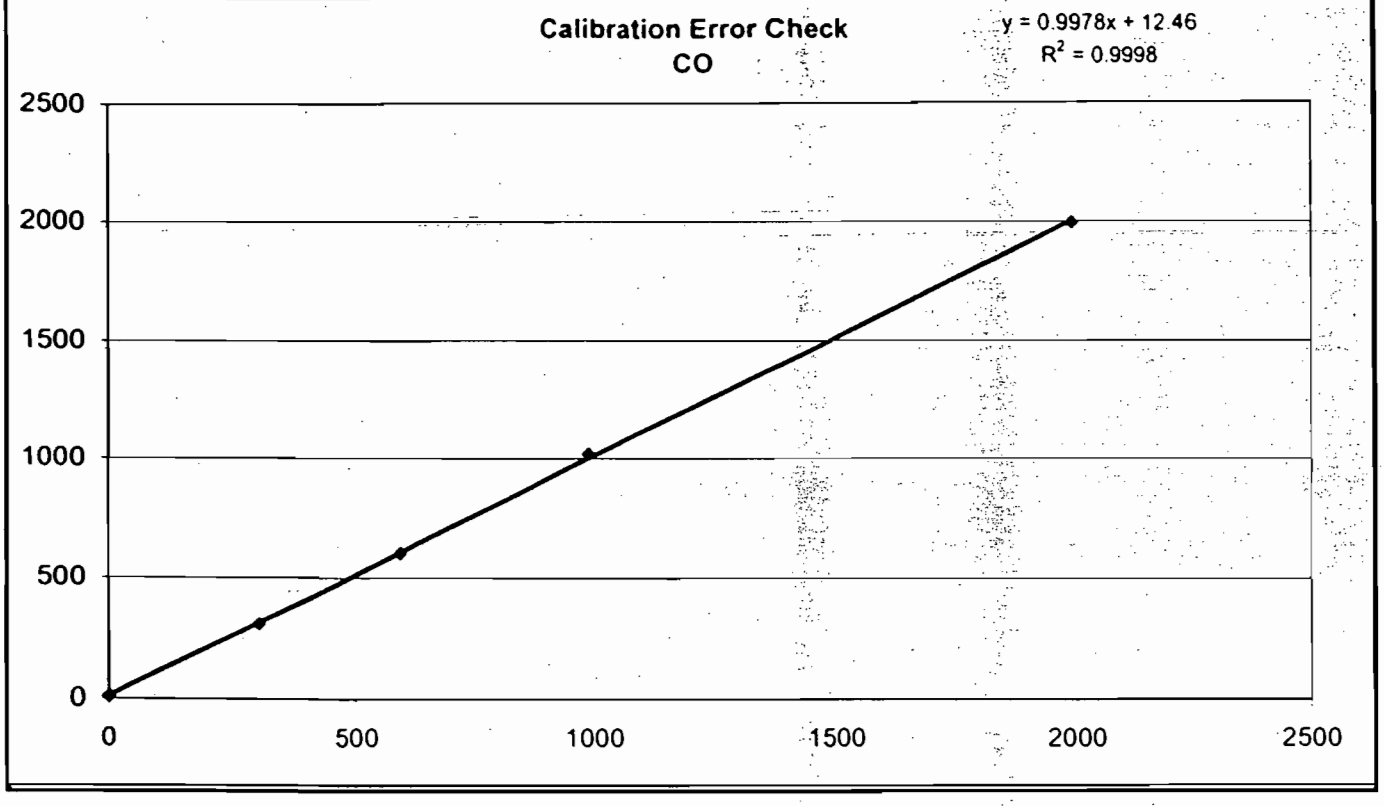
**Georgia Pacific - Palatka, Florida**
**Bleach Plant Carbon Monoxide Test**
**0**
**October 31, 2002**
***Calibration Sheet***

**Initial Calibration**
**Response Table**

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 12:00 | 9 |
| CO | 991 | 12:00 | 1021 |
| CO | 1994 | 12:00 | 1994 |
| CO | 594.4 | 12:00 | 602 |
| CO | 301.9 | 12:00 | 309 |

**% Error of Range Table**

| Inject (ppm) | | Time | % Error of Range |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 12:00 | 0.45% |
| CO | 991 | 12:00 | 1.50% |
| CO | 1994 | 12:00 | 0.00% |
| CO | 594.4 | 12:00 | 0.38% |
| CO | 301.9 | 12:00 | 0.36% |



Georgia Pacific - Palatka, Florida
Bleach Plant Carbon Monoxide Test
0
October 31, 2002
*Calibration Sheet*

## Calibration - Post Run 1

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 14:36 | 3.5 |
| CO | 991 | 14:42 | 995 |

### Drift Analysis From Initial Calibrations to the End of Run 1

| Inject (ppm) | | Time | Drift Analysis (%) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 14:36 | -0.28% |
| CO | 991 | 14:42 | -1.30% |

### Drift Variables for Run 1

| Variable | CO | |
|---|---|---|
| Co | 6.25 | |
| Cm | 1008.00 | |
| Cma | 991.00 | |

## Calibration - Post Run 2

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 16:59 | 4.5 |
| CO | 991 | 16:54 | 996 |

### Drift Analysis From Initial Calibrations to the End of Run 2

| Inject (ppm) | | Time | Drift Analysis (%) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 16:59 | -0.23% |
| CO | 991 | 16:54 | -1.25% |

### Drift Variables for Run 2

| Variable | CO | |
|---|---|---|
| Co | 4 | |
| Cm | 995.50 | |
| Cma | 991 | |

## Calibration - Post Run 3

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 18:14 | 4.5 |
| CO | 991 | 18:18 | 997 |

### Drift Analysis From Initial Calibrations to the End of Run 3

| Inject (ppm) | Time | Drift Analysis (%) |
|---|---|---|

**Georgia Pacific - Palatka, Florida**
**Bleach Plant Carbon Monoxide Test**
**0**
**October 31, 2002**
***Calibration Sheet***

| Gas | Conc. | | CO |
|---|---|---|---|
| Zero | 0 | 18:14 | -0.23% |
| CO | 991 | 18:18 | -1.20% |

**Drift Variables for Run 3**

| Variable | CO |
|---|---|
| Co | 4.5 |
| Cm | 996.50 |
| Cma | 991 |

Ambient Air Services, Inc. - Method 5 Dry Gas Meter Annual Calibration

USING CALIBRATED CRITICAL ORIFICES

5-POINT ENGLISH UNITS

**Best Available Copy**

| Meter Console Information | |
|---|---|
| Console Model Number | AASI |
| Console Serial Number | Box 10 |
| DGM Model Number | 6947372 |
| DGM Serial Number | |

| Calibration Conditions | | | |
|---|---|---|---|
| Date | Time | 5-Sep-02 | 10:00 |
| Barometric Pressure | | 29.8 | in Hg |
| Theoretical Critical Vacuum[1] | | 14.1 | in Hg |
| Calibration Technician | | JOE ELLIOTT | |

| Factors/Conversions | | |
|---|---|---|
| Std Temp | 528 | °R |
| Std Press | 29.92 | in Hg |
| $K_1$ | 17.647 | °R/in Hg |

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3 * °R^{1/2})/(in.Hg * min)$.

**Calibration Data**

| Run Time | Metering Console | | | | | Critical Orifice | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed | DGM Orifice ΔH | Volume Initial | Volume Final | Outlet Temp Initial | Outlet Temp Final | Serial Number | Coefficient | Amb Temp Initial | Amb Temp Final | Actual Vacuum |
| (θ) | ($P_m$) | ($V_{mi}$) | ($V_{mf}$) | ($t_{mi}$) | ($t_{mf}$) | | K' | ($t_{amb}$) | ($t_{amb}$) | |
| min | in $H_2O$ | cubic feet | cubic feet | °F | °F | | see above2 | °F | °F | in Hg |
| 14.1 | 2.8 | 55.603 | 67.154 | 92 | 92 | 63 | 0.6213 | 89 | 89 | 21 |
| 6.0 | 4.6 | 67.154 | 75.011 | 98 | 98 | 73 | 0.8486 | 83 | 80 | 19 |
| 11.7 | 1.4 | 75.011 | 82.876 | 99 | 98 | 55 | 0.4793 | 81 | 79 | 22 |
| 11.4 | 0.8 | 82.876 | 88.974 | 98 | 99 | 48 | 0.3740 | 79 | 77 | 24 |
| 18.4 | 0.4 | 88.974 | 95.110 | 99 | 99 | 40 | 0.2511 | 77 | 77 | 24 |

**Results**

| Standardized Data | | | | Dry Gas Meter | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Calibration Factor | | Flowrate | ΔH@ | |
| Dry Gas Meter | | Critical Orifice | | Value | Variation | Std & Corr | 0.75 SCFM | Variation |
| ($V_{mi(std)}$) | ($Q_{m(std)}$) | ($Vcr_{(std)}$) | ($Q_{cr(std)}$) | (Y) | (ΔY) | ($Q_{m(std)corr}$) | (ΔH@) | (ΔΔH@) |
| cubic feet | cfm | cubic feet | cfm | | | cfm | in H2O | |
| 11.080 | 0.786 | 11.142 | 0.790 | 1.006 | 0.007 | 0.790 | 2.438 | 0.388 |
| 7.489 | 1.248 | 8.520 | 1.087 | 0.871 | -0.128 | 1.087 | 2.114 | 0.063 |
| 7.431 | 0.635 | 7.191 | 0.615 | 0.968 | -0.031 | 0.615 | 1.978 | -0.072 |
| 5.753 | 0.429 | 6.439 | 0.481 | 1.119 | 0.121 | 0.481 | 1.890 | -0.160 |
| 5.778 | 0.314 | 5.941 | 0.323 | 1.028 | 0.030 | 0.323 | 1.832 | -0.219 |
| | | | | 0.998 | Y Average | | 2.050 | ΔH@ Average |

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.)

Signature _____ Date 5 Sept 02

Quality Assurance Data Review

Signature _____ Date 5 Sept 02

Best Available Copy

**Ambient Air Services, Inc. - Method 5 Post Test Dry Gas Meter Calibration**

**USING CALIBRATED CRITICAL ORIFICES**

**3-POINT ENGLISH UNITS**

| Meter Console Information | |
|---|---|
| Console Model Number | AASI |
| Console Serial Number | Box 10 |
| Pre Test Y Value | 0.989 |
| DGM Serial Number | ########## |

| Calibration Conditions | | | |
|---|---|---|---|
| Date | Time | 1-Nov-02 | 13 12 |
| Barometric Pressure | | 29 9 | in Hg |
| Theoretical Critical Vacuum[1] | | 14 1 | in Hg |
| Calibration Technician | | JE | |

| Factors/Conversions | | |
|---|---|---|
| Std Temp | 528 | °R |
| Std Press | 29 92 | in Hg |
| $K_1$ | 17.647 | °R/in. Hg |

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3 \cdot {}^oR^{1/2})/(in.Hg \cdot min)$.

**Calibration Data**

| Run Time | Metering Console | | | | | Critical Orifice | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed | DGM Orifice ΔH | Volume Initial | Volume Final | Outlet Temp Initial | Outlet Temp Final | Serial Number | Coefficient | Amb Temp Initial | Amb Temp Final | Actual Vacuum |
| (Θ) | ($P_m$) | ($V_m$) | ($V_m$) | ($t_m$) | ($t_m$) | | K' | ($t_{amb}$) | ($t_{amb}$) | |
| min | in $H_2O$ | cubic feet | cubic feet | °F | °F | | see above2 | °F | °F | in Hg |
| 7 5 | 2 3 | 401.578 | 407 667 | 72 | 75 | 63 | 0 6213 | 71 | 72 | 21 |
| 62 9 | 2 3 | 407.667 | 459.392 | 75 | 76 | 63 | 0.6213 | 73 | 74 | 21 |
| 14 5 | 2.3 | 459 392 | 471.442 | 79 | 79 | 63 | 0.6213 | 74 | 75 | 21 |

**Results**

| Standardized Data | | | | Dry Gas Meter | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Calibration Factor | | Flowrate | ΔH@ | |
| Dry Gas Meter | | Critical Orifice | | Value | Variation | Std & Corr | 0.75 SCFM | Variation |
| ($V_{m(std)}$) | ($Q_{m(std)}$) | ($Vcr_{(std)}$) | ($Q_{cr(std)}$) | (Y) | (ΔY) | ($Q_{m(std)(corr)}$) | (ΔH@) | (ΔΔH@) |
| cubic feet | cfm | cubic feet | cfm | | | cfm | in H2O | |
| 6 056 | 0 808 | 6.043 | 0 806 | 0 998 | 0 009 | 0 806 | 1 995 | 0 003 |
| 51 255 | 0 815 | 50 589 | 0 804 | 0 987 | -0 002 | 0 804 | 1 995 | 0 003 |
| 11 863 | 0 818 | 11 651 | 0 804 | 0 982 | -0 007 | 0 804 | 1 985 | -0 006 |
| | | | | 0 989 | Y Average | | 1 992 | ΔH@ Average |

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0 02

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3786, certificate # F107, which is traceable to the National Bureau of Standards (N I S.T ).

Signature Joe Elliott Date 11-01-02

Quality Assurance Data Review

Signature [illegible] Date 11-01-02

Best Available Copy

AAS Inc. AMBIENT AIR SERVICES INCORPORATED
ENVIRONMENTAL CONSULTANTS

## PITOT TUBE CALIBRATION MEASUREMENTS

DATE CALIBRATED 11/02/02 PITOT TUBE 6B

Pitot tube assembly level? ✓ (Yes) ____ No

Pitot tube openings damaged? ____ Yes (explain below) ✓ (No)

$\alpha_1$ = 1.0 ° (<10°), $\alpha_2$ = 0.5 ° (<10°), $\beta_1$ = 0.0 ° (<5°),

$\beta_2$ = 0.0 ° (<5°)

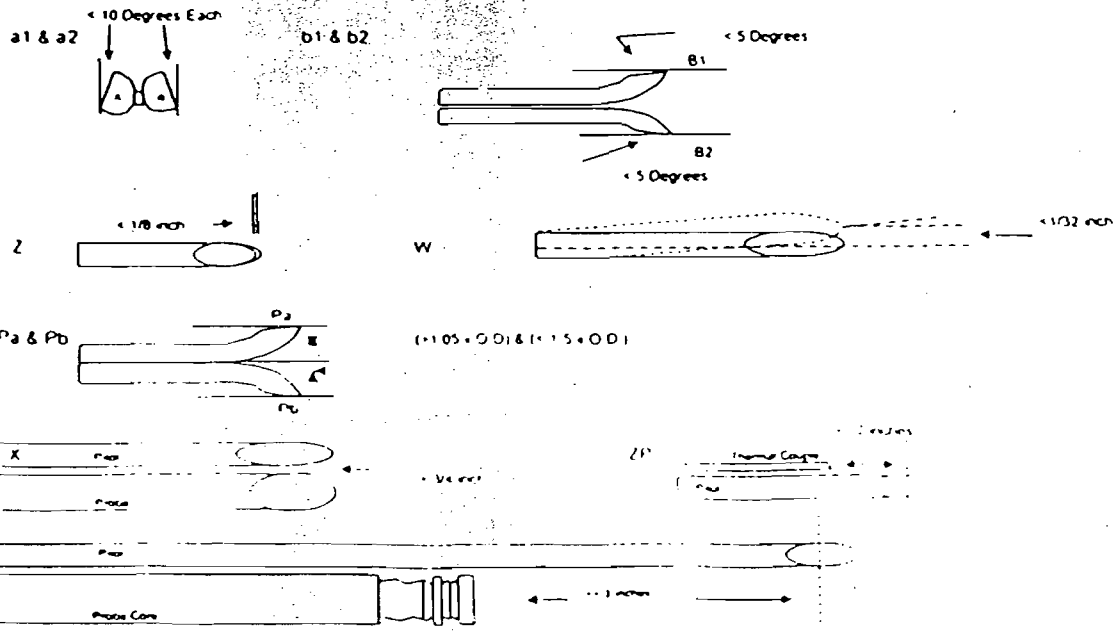
$\gamma$ = 1.5 °, $\theta$ = .5 °, A = 1202 in. = (Pa + Pb)

z = A sin $\gamma$ = .0031 in.; <0.32 / <1/8 in.

w = A sin $\theta$ = .0010 in.; <0.08 / <1/32 in.

$P_a$ .600 in. $P_b$ .602 in. $D_t$ = .375

Calibration required? ____ Yes ✓ (No)



# THERMOCOUPLE CALIBRATION FORM

**Best Available Copy**

ient Temperature 79 Source CP PALATKA

metric Pressure 30.05 Source

nician's Signature Dan Stanfield

Time 08 30

11/02/02

Standard Thermometer Type MERCURY IN GLASS

Manufacturer PRINCO

Serial Number 0932

Pyrometer Manufacturer ATKINS Model 396 E

Serial Number AA-3T #4 Meter Box # 10

| EMPERATURE SOURCE (A) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FERENCE RMOMETER | Actual Reading | AMBIENT AIR | | | BOILING $H_2O$ | | | ICE BATH | | | | | | |
| | Corrected Temperature | 79° | | | 212° | | | 32° | | | | | | |
| LIBRATED THERMOCOUPLE | | Indicated Temp. | Difference (B) | Percent Diff. (C) | Indicated Temp. | Difference | Percent Diff. | Indicated Temp. | Difference | Percent Diff. | Indicated Temp. | Difference | Percent Diff. | |
| nal Number | Location | | | | | | | | | | | | | |
| 2B | Stack | 79 | 0 | | 212 | 0 | | 32 | 0 | | | | | |
| 2x 10 | Filter | 78 | -1 | | 211 | -1 | | 32 | 0 | | | | | |
| 2x 4 | Impinger | 80 | +1 | | 212 | 0 | | 31 | -1 | | | | | |
| 2x 16 | Meter In | 79 | 0 | | 212 | 0 | | 32 | 0 | | | | | |
| 2x 16 | Meter Out | 79 | 0 | | 213 | +1 | | 33 | +1 | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

ents

ion Tolerances Stack = 1.5% of value, Filter Box = ±5.4°F, Impinger = ±2°F, Meter = ±5.4°F (40CFR Pt 60, App. A Method 5, and QA Handbook Section 3.4, Method 5, page 13, Rev. 0)

Type of calibration system used (B) Reference - Indicated = Difference

$$\left| \frac{(\text{ref. temp. °F} + 460) - (\text{indicated temp °F} + 460)}{(\text{reference temp °F} + 460)} \right| \times 100$$

AASI 68A

# APPENDIX – E

## Sample Chain of Custody

Best Available Copy

**Technical Services, Inc.**
**2901 Danese St., Jacksonville, FL 32206**
**(904) 353-5761 / fax (904) 358-2908**

# CHAIN of CUSTODY RECORD

| CLIENT NAME & ADDRESS (REPORT TO BE SENT TO) | REMARKS |
|---|---|
| Ambient Air Services, Inc. | Na2S2O3 added in sampling @ TS- |

| PROJ. NO. | PROJECT NAME/ ADDRESS |
|---|---|
| | GP/Pedrick Bleach Plant |

SAMPLERS: (SIGNATURE)

| Sample Location ID | SAMPLE DATE | TIME | COMP | GRAB | TOTAL NO. of Containers | BOTTLE MAKEUP: 0.1 N NaOH 1/2 gl. Poly | BOTTLE MAKEUP: Amber Glass 1/2 gl. 0.1 N NaOH | BOTTLE MAKEUP: 1/2 gal. Poly unpres. | PARAMETERS |
|---|---|---|---|---|---|---|---|---|---|
| Run 1 Imp. Catch | 10/31/02 | | | | 1 | ✓ | | | Cl- / BASE |
| 2 | " | | | | 1 | ✓ | | | |
| 3 | " | | | | 1 | ✓ | | | |
| Run 1 Imp Catch | 10/29/02 | | | | 1 | | ✓ | | |
| 2 | " | | | | 1 | | ✓ | | |
| 3 | " | | | | 1 | | ✓ | | |
| FIELD Blank | | | | | 1 | | | 1 | |

| RELINQUISHED BY | DATE/TIME | RECEIVED BY | DATE/TIME |
|---|---|---|---|
| | | | |
| RELINQUISHED BY | DATE/TIME | RECEIVED BY | DATE/TIME |
| | | H. C. [illegible] | 1130 - 11 02 |
| RELINQUISHED BY | DATE/TIME | RECEIVED BY | DATE/TIME |
| [illegible] | 1115- 02 | | |
| | | RECEIVED FOR LABORATORY BY | DATE/TIME |
| | | [illegible] | 11/1/02 1615 |

Best Available Copy

Technical Services, Inc.
2901 Danese St., Jacksonville, FL 32206
(904) 353-5761 / fax (904) 358-2908

0211037 1 thru 0211043 1

# CHAIN of CUSTODY RECORD

CLIENT NAME & ADDRESS (REPORT TO BE SENT TO)
Ambient Air Services, Inc

REMARKS

PROJ NO

PROJECT NAME/ ADDRESS
GP/Pedrick
Bleach Plant

SAMPLERS (SIGNATURE)

TOTAL NO of Containers

BOTTLE MAKEUP
0.1 N NaOH in 2L Poly
Amber Glass 2 1/2 gal NaOH

| Sample Location ID | SAMPLE DATE | TIME | COMP/GRAB | PARAMETERS |
|---|---|---|---|---|
| Run 1 Imp Catch 1 | 10/31/02 | | | Cl⁻ / Base |
| 2 | | | | |
| 3 | | | | |
| Run 1 Imp Catch 1 | 10/29/02 | | | |
| 2 | | | | |
| 3 | | | | |
| Field Blank | | | | |

| RELINQUISHED BY | DATE/TIME | RECEIVED BY | DATE/TIME |
|---|---|---|---|
| Ross Spillman | 10-30-02 0900 | D.W. Penfield | 10/30/02 09:00 |
| D.W. Penfield | 11/1/02 1430 | H. C. Gray | 1430 - 11/1/02 |
| H C Gray | 11/1/02 1615 | | |
| | | RECEIVED FOR LABORATORY BY: Melissa A. Sutton | DATE/TIME 11/1/02 1615 |

# APPENDIX - F

## Calibration Gas Certificates

145 Shimersville Road
Bethlehem, PA 18015
Tel (610) 691-2474
Fax (610) 758-8384

Best Available Copy

# CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

**CUSTOMER** PRAXAIR SOUTHEAST **P.O NUMBER** 333045 00

## REFERENCE STANDARD

| COMPONENT | NIST SRM NO. | CYLINDER NO. | CONCENTRATION |
|---|---|---|---|
| CARBON MONOXIDE 503 2PPM GMIS VS | 1680B | CLM-009396 | 490 PPM |

## ANALYZER READINGS

*R = REFERENCE STANDARD* *Z = ZERO GAS* *C = GAS CANDIDATE*

1. **COMPONENT** CARBON MONOXIDE 503.2PPM GMI **ANALYZER MAKE-MODEL-S/N** Siemens Ultramat 5E S/N B8-900

**ANALYTICAL PRINCIPLE** NON-DISPERSIVE INFRARED **LAST CALIBRATION DATE**

**FIRST ANALYSIS DATE** **SECOND ANALYSIS DATE**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Z | R | C | CONC | | Z | R | C | CONC | |
| R 502 | Z 0 | C 502 | CONC. 502.0 | | R 503 | Z 0 | C 502 | CONC | |
| Z 0 | C 502 | R 503 | CONC. 502.0 | | Z 0 | C 503 | R 504 | CONC | |
| U/M ppm | | MEAN TEST ASSAY | | | U/M ppm | | | MEAN TEST ASSAY | |

VALUES NOT VALID BELOW 150 PSIG

UNCERTAINTY OF CARBON MONOXIDE ±1.0 PPM

THIS CYLINDER NO. CC114911 **CERTIFIED CONCENTRATION**

HAS BEEN CERTIFIED ACCORDING TO SECTION CARBON MONOXIDE 490 PPM

OF TRACEABILITY PROTOCOL NO. EPA 600 R97 121 AIR BALANCE

PROCEDURE G1

CERTIFIED ACCURACY ± 1 % NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE

EXPIRATION DATE TERM

*ANALYZED BY* *CERTIFIED BY*

145 Shimersville Road
Bethlehem, PA 18015
Tel. (610) 691-2474
Fax (610) 758-8384

Best Available Copy

# CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

**CUSTOMER** PRAXAIR SOUTHEAST **P.O NUMBER** 333045-00

## REFERENCE STANDARD

| COMPONENT | NIST SRM NO. | CYLINDER NO. | CONCENTRATION |
|---|---|---|---|
| CARBON MONOXIDE 503.2PPM GMIS VS | 1680B | CLM-009396 | 493.4 PPM |

## ANALYZER READINGS

*R = REFERENCE STANDARD* *Z = ZERO GAS* *C = GAS CANDIDATE*

1. **COMPONENT** CARBON MONOXIDE 503.2PPM GMI **ANALYZER MAKE-MODEL-S/N** Siemens Ultramat 5E S/N B8-900

**ANALYTICAL PRINCIPLE** NON-DISPERSIVE INFRARED **LAST CALIBRATION DATE** 12/31/00

**FIRST ANALYSIS DATE** 12/27/00 **SECOND ANALYSIS DATE** 01/03/01

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Z 0 | R 503 | C 595 | CONC. 595.6 | Z 0 | R 504 | C 595 | CONC. 594.1 | | |
| R 502 | Z 0 | C 595 | CONC. 595.6 | R 504 | Z 0 | C 595 | CONC. 594.1 | | |
| Z 1 | C 594 | R 503 | CONC. 595.6 | Z 0 | C 595 | R 504 | CONC. 594.1 | | |
| U/M PPM | | MEAN TEST ASSAY 595.3 | | U/M PPM | | MEAN TEST ASSAY 594.1 | | | |

VALUES NOT VALID BELOW 150 PSIG

UNCERTAINTY OF CARBON MONOXIDE ±4 2PPM

THIS CYLINDER NO. SA12251

HAS BEEN CERTIFIED ACCORDING TO SECTION 2.2

OF TRACEABILITY PROTOCOL NO. EPA 600/R97/121

PROCEDURE G1

CERTIFIED ACCURACY ± 1% NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE 01/03/01

EXPIRATION DATE 01/03/09 TERM

**CERTIFIED CONCENTRATION**

CARBON MONOXIDE 594 PPM

AIR BALANCE

*ANALYZED BY* *CERTIFIED BY*

Matheson Gas Products

AIR LIQUIDE

**Best Available Copy**

# CERTIFICATE of ANALYSIS

Interference-Free Multi-Component EPA Protocol Gases

| Cyl. Number: | Cyl. Pressure:* | Document Number: |
|---|---|---|
| CC121974 | 1667psig | 9032348 |
| **Assay Date:** | **Expiration Date:** | **Item Number:** |
| 07/23/01 | 07/22/04 | |
| **Customer:** | **P.O. Number:** | **Notes:** |
| Technical Services | 070601 | |

*Mixture is valid only to 150 psig

| COMPONENT Name | REQUESTED Concentration | ASSAY Concentration |
|---|---|---|
| Carbon Monoxide | 1000 ppm | 991 ±15 ppm |
| Nitrogen | Balance | Balance |

EPA Protocol Section No. 2.0 Procedure: G1

NOTE: Analytical uncertainty and NIST traceability are in compliance with EPA-600/R-97/123

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

| Std Name | Std # | Conc. | Units | Std. Error | Comp. | Balance | Cyl. No. | Exp. Date | Sample # |
|---|---|---|---|---|---|---|---|---|---|
| GMIS91 | GMIS91 | 1500.0 | ppm | 21.0 | CO | N2 | CC113811 | 06/22/03 | N.A |

| Component 1: Carbon Monoxide<br>Gas Analyzer Employed | | Component 2: None<br>Gas Analyzer Employed | | Component 3:<br>Gas Analyzer Employed | |
|---|---|---|---|---|---|
| Manufacturer: | KVB/Analect | Manufacturer: | | Manufacturer: | |
| Model Number: | EN3024 | Model Number: | | Model Number: | |
| Serial Number: | 3024 | Serial Number: | | Serial Number: | |
| Analytical Principle: | FTIR | Analytical Principle: | | Analytical Principle: | |
| MPC Calibrated: | 07/05/01 | MPC Calibrated: | | MPC Calibrated: | |

| 07/16/01 | Trial 1 | Trial 2 | Trial 3 | Units |
|---|---|---|---|---|
| Zero | -0.11 | -0.33 | -0.28 | |
| Reference 1 | 1614.16 | 1639.01 | 1648.95 | |
| Reference 2 | | | | |
| Candidate | 1061.20 | 1082.36 | 1088.32 | |
| Result | 974.23 | 993.65 | 999.12 | ppm |
| | Mean Result: | | 989.00 | ppm |

Component 1

Carbon Monoxide

| 07/23/01 | Trial 1 | Trial 2 | Trial 3 | Units |
|---|---|---|---|---|
| Zero | -0.02 | 0.05 | 0.16 | |
| Reference 1 | 1673.01 | 1678.36 | 1674.41 | |
| Reference 2 | | | | |
| Candidate | 1113.28 | 1105.85 | 1105.95 | |
| Result | 996.79 | 990.14 | 990.23 | ppm |
| | Mean Result: | | 992.39 | ppm |

Analyst

Air Liquide America Corporation
11426 Fairmont Parkway La Porte, Texas 77571-6000
Phone (281) 474-8400 Fax (281) 474-8419

AIR LIQUIDE

**Best Available Copy**

# CERTIFICATE of ANALYSIS

## Interference-Free Multi-Component EPA Protocol Gases

| Cyl. Number: | Cyl. Pressure:* | Document Number: |
|---|---|---|
| CC70989 | 1667psig | 9032348 |
| **Assay Date:** | **Expiration Date:** | **Item Number:** |
| 07/23/01 | 07/22/04 | |
| **Customer:** | **P.O. Number:** | **Notes:** |
| Technical Services | 070601 | |

*Mixture is valid only to 150 psig

| COMPONENT Name | REQUESTED Concentration | ASSAY Concentration |
|---|---|---|
| Carbon Monoxide | 2000 ppm | 1994 ±3% ppm |
| Nitrogen | Balance | Balance |

**EPA Protocol Section No. 2.2**
**Procedure: G1**

NOTE: Analytical uncertainty and NIST traceability are in compliance with EPA-600/R-97/123

**REFERENCE STANDARD EMPLOYED FOR ANALYSIS**

| Standard | Type | Conc | Units | Sys. Error | Comp. | Balance | Cyl. No. | Exp. Date | Sample No. |
|---|---|---|---|---|---|---|---|---|---|
| GMIS91 | GMIS91 | 1500.0 | ppm | 21.0 | CO | N2 | CC113811 | 06/22/03 | N A |

| Component 1: Carbon Monoxide | Component 2: None | Component 3: |
|---|---|---|
| **Gas Analyzer Employed** | **Gas Analyzer Employed** | **Gas Analyzer Employed** |
| Manufacturer: KVB/Analect | Manufacturer: | Manufacturer: |
| Model Number: EN3024 | Model Number: | Model Number: |
| Serial Number: 3024 | Serial Number: | Serial Number: |
| Analytical Principle: FTIR | Analytical Principle: | Analytical Principle: |
| MPC Calibrated: 07/05/01 | MPC Calibrated: | MPC Calibrated: |

| 07/16/01 | Trial 1 | Trial 2 | Trial 3 | Units |
|---|---|---|---|---|
| Zero | -0.11 | -0.33 | -0.28 | |
| Reference 1 | 1614.16 | 1639.01 | 1648.95 | |
| Reference 2 | | | | |
| Candidate | 2132.25 | 2176.69 | 2193.10 | |
| Result | 1957.28 | 1998.07 | 2013.12 | ppm |
| | | Mean Result: | 1989.49 | ppm |

Component 1
Carbon Monoxide

| 07/23/01 | Trial 1 | Trial 2 | Trial 3 | Units |
|---|---|---|---|---|
| Zero | -0.02 | 0.05 | 0.16 | |
| Reference 1 | 1673.01 | 1678.36 | 1674.41 | |
| Reference 2 | | | | |
| Candidate | 2226.87 | 2236.96 | 2235.43 | |
| Result | 1993.92 | 2002.95 | 2001.58 | ppm |
| | | Mean Result: | 1999.49 | ppm |

Analyst

Air Liquide America Corporation
11426 Fairmont Parkway La Porte Texas 77571-6000
Phone (281) 474-8400 Fax (281) 474-8419

Airgas

Best Available Copy

Airgas Specialty Gases

# Certificate of Analysis: E.P.A. Protocol Gas Mixture

Certification performed in accordance with "EPA Traceability Protocol (Sept.1997)" using assay procedures listed.

| | | | |
|---|---|---|---|
| Cylinder No: | SG9140092BAL | Order No: | 008973-00 |
| Certification Date: | 09/9/2002 | Expiration Date: | 09/9/2005 |
| Cylinder Pressure: | 2000 | Part No: | E02NI95E15A0077 |

*Do not use cylinder below 150 psig.

| Component | Certified Concentration | Unit of Measure | Accuracy | Procedure | Analytical Principle |
|---|---|---|---|---|---|
| Carbon Dioxide | 5.049 | % | 1% | G-1 | NDIR |
| Nitrogen | Balance | | | | |
| Nox (Reference Value Only) | | ppm | | | |

## Reference Standard Information

| Type | Component | Concentration | Unit | Cylinder Number |
|---|---|---|---|---|
| Ntrm | Carbon Dioxide | 4.204 | % | SG9169571BAL |

## Analytical Data

Component 1: Carbon Dioxide

1st Analysis Date: 09/9/2002

| | | | | | |
|---|---|---|---|---|---|
| Zero | 0.000 | Cand | 5.046 | Ref | 4.202 |
| Zero | 0.000 | Cand | 5.045 | Ref | 4.200 |
| Zero | 0.000 | Cand | 5.046 | Ref | 4.201 |

2nd Analysis Date:

| | | | | | |
|---|---|---|---|---|---|
| Zero | | Cand | | Ref | |
| Zero | | Cand | | Ref | |
| Zero | | Cand | | Ref | |

Analyzed by: _____

Approved by: _____

# APPENDIX – G

## Process Data

# PRODUCTION DATA FOR OCTOBER 29 AND 31, 2002 CO TESTING

| | | | | | | |
|---|---|---|---|---|---|---|
| **DATE** | 10/29/02 | | 10/31/02 | | | |
| **RUN** | 1 | 2 | 1 | 2 | 3 | |
| **TIME** | 1225-1324 | 1433-1532 | 1330-1429 | 1547-1646 | 1710-1809 | |

Notes: ADTBPH is air-dried tons of bleached pulp per hour
Kappa is the pre-washer kappa
%ClO2 is the %ClO2 applied in that stage

| | | Do Stage | | | | Eop Stage | | D1 Stage | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Run | ADTBPH | %SW | %HW | Kappa | %ClO2 | %SW | %HW | %SW | %HW | %ClO2 |
| 1 (29th) | 49.8 | 100 | 0 | 22.0 | 2.0 | 100 | 0 | 100 | 0 | 0.5 |
| 2 (29th) | 30.1 | 100 | 0 | 22.4 | 2.0 | 100 | 0 | 100 | 0 | 0.6 |
| 1 (31st) | 50.0 | 100 | 0 | 22.8 | 2.2 | 100 | 0 | 100 | 0 | 0.7 |
| 2 (31st) | 50.2 | 100 | 0 | 23.3 | 2.2 | 100 | 0 | 100 | 0 | 0.7 |
| 3 (31st) | 50.1 | 100 | 0 | 23.3 | 2.2 | 100 | 0 | 100 | 0 | 0.7 |

***THE KAPPA AND %ClO2 APPLIED ARE CONFIDENTIAL BUSINESS INFORMATION.***

# PRODUCTION AND SCRUBBER DATA FOR OCTOBER 29 AND 31, 2002 CHLORINATED HAP (METHOD 26A) TESTS

| **DATE** | 10/29/02 | | | 10/31/02 | | |
|---|---|---|---|---|---|---|
| **RUN** | 1 | 2 | 3 | 1 | 2 | 3 |
| **TIME** | 1218-1323 | 1433-1538 | 1700-1802 | 1332-1443 | 1550-1656 | 1710-1816 |

Notes: ADTBPH is air-dried tons of bleached pulp per hour
Kappa is the pre-washer kappa
%$ClO_2$ is the %$ClO_2$ applied in that stage

| | | Do Stage | | | | Eop Stage | | D1 Stage | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Run | ADTBPH | %SW | %HW | Kappa | %$ClO_2$ | %SW | %HW | %SW | %HW | %$ClO_2$ |
| 1 (29th) | 49.8 | 100.0 | 0.0 | 21.9 | 2.0 | 100.0 | 0.0 | 100.0 | 0.0 | 0.5 |
| 2 (29th) | 30.1 | 100.0 | 0.0 | 22.4 | 2.0 | 100.0 | 0.0 | 100.0 | 0.0 | 0.7 |
| 3 (29th) | 30.0 | 100.0 | 0.0 | 22.9 | 1.6 | 100.0 | 0.0 | 100.0 | 0.0 | 0.7 |
| 1 (31st) | 49.8 | 100.0 | 0.0 | 21.9 | 2.2 | 100.0 | 0.0 | 100.0 | 0.0 | 0.5 |
| 2 (31st) | 49.8 | 100.0 | 0.0 | 21.9 | 2.2 | 100.0 | 0.0 | 100.0 | 0.0 | 0.5 |
| 3 (31st) | 49.8 | 100.0 | 0.0 | 21.9 | 2.2 | 100.0 | 0.0 | 100.0 | 0.0 | 0.5 |

***THE KAPPA AND %$ClO_2$ APPLIED ARE CONFIDENTIAL BUSINESS INFORMATION.***

| Run | Flow, gpm | pH | Fan Load, % | Fan Amps | Fan Differential, in. $H_2O$ |
|---|---|---|---|---|---|
| 1 (29th) | 1262 | 9.2 | 84 | 15.0 | 20.8 |
| 2 (29th) | 1207 | 8.9 | 84 | 15.1 | 20.8 |
| 3 (29th) | 1153 | 9.0 | 85 | 15.2 | 21.1 |
| 1 (31st) | 1252 | 9.3 | 85 | 15.4 | 21.3 |
| 2 (31st) | 1258 | 9.3 | 85 | 15.4 | 21.3 |
| 3 (31st) | 1263 | 9.2 | 86 | 15.4 | 21.4 |

# Cl2 Testing Raw Scrubber Data

Run 1 10/29/02 1218-1323

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential, in H2O |
|---|---|---|---|---|---|
| 1218-1233 | 1263 | 9.2 | 85 | 15.2 | 20.9 |
| 1233-1248 | 1263 | 9.1 | 84 | 15.1 | 20.9 |
| 1248-1303 | 1263 | 9.1 | 84 | 15.1 | 20.8 |
| 1303-1318 | 1262 | 9.0 | 83 | 15.0 | 20.8 |
| Average | 1262 | 9.1 | 84 | 15.1 | 20.9 |

# Cl2 Testing Raw Scrubber Data

Run 2 10/29/02 1433-1538

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential, in H2O |
|---|---|---|---|---|---|
| 1433-1448 | 1239 | 8.9 | 83 | 15.0 | 20.8 |
| 1448-1503 | 1228 | 8.9 | 83 | 15.0 | 20.8 |
| 1503-1518 | 1217 | 8.9 | 83 | 15.0 | 20.8 |
| 1518-1533 | 1207 | 8.9 | 84 | 15.1 | 20.9 |
| Average | 1223 | 8.9 | 84 | 15.0 | 20.8 |

# Cl2 Testing Raw Scrubber Data

Run 3 10/29/02 1700-1802

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential, in H2O |
|---|---|---|---|---|---|
| 1700-1715 | 1163 | 9.0 | 84 | 15.2 | 21.1 |
| 1715-1730 | 1159 | 9.0 | 84 | 15.2 | 21.1 |
| 1730-1745 | 1156 | 9.0 | 85 | 15.2 | 21.1 |
| 1745-1800 | 1153 | 9.0 | 85 | 15.2 | 21.1 |
| Average | 1158 | 9.0 | 84 | 15.2 | 21.1 |

# Cl2 Testing Raw Scrubber Data

Run 1 10/31/02 1332-1443

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential, in H2O |
|---|---|---|---|---|---|
| 1332-1347 | 1252 | 9 3 | 86 | 15.4 | 21 4 |
| 1347-1402 | 1252 | 9.3 | 85 | 15.4 | 21.3 |
| 1402-1417 | 1252 | 9.3 | 85 | 15.4 | 21.3 |
| 1417-1432 | 1254 | 9.3 | 86 | 15.4 | 21.3 |
| 1432-1447 | 1254 | 9 3 | 86 | 15 4 | 21 3 |
| Average | 1253 | 9 3 | 85 | 15 4 | 21 3 |

# Cl2 Testing Raw Scrubber Data

Run 2 10/31/02 1550-1656

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential in H2O |
|---|---|---|---|---|---|
| 1550-1605 | 1258 | 9.3 | 85 | 15.4 | 21.3 |
| 1605-1620 | 1258 | 9.3 | 85 | 15.4 | 21.4 |
| 1620-1635 | 1259 | 9.3 | 85 | 15.4 | 21.4 |
| 1635-1650 | 1259 | 9.3 | 86 | 15.4 | 21.4 |
| Average | 1259 | 9.3 | 85 | 15.4 | 21.4 |

# Cl2 Testing Raw Scrubber Data

Run 3 10/31/02 1710-1816

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential in H2O |
|---|---|---|---|---|---|
| 1710-1725 | 1261 | 9.3 | 86 | 15.5 | 21.4 |
| 1725-1740 | 1261 | 9.3 | 86 | 15.4 | 21.4 |
| 1740-1755 | 1262 | 9.3 | 86 | 15.5 | 21.5 |
| 1755-1810 | 1263 | 9.2 | 86 | 15.4 | 21.5 |
| Average | 1262 | 9.3 | 86 | 15.4 | 21.4 |

## APPENDIX – H

## Project Participants

| | |
|---|---|
| Joe Cooksey of AASI | Report Review |
| Randy L Weston of AASI | Project Manager<br>Report Preparation<br>Field Testing |
| George Hawkins of AASI | Field Testing |
| Roger Dilinger of AASI | Field Testing |
| Joe Taylor of GP | Testing Support |

# ATTACHMENT C

**Subsection K. This section addresses the following emissions unit(s).**

| E.U. ID No. | Brief Description |
|---|---|
| 036 | Elemental Chlorine Free (ECF) No. 3 Bleach Plant |

Emissions Unit 036 consists of an ECF bleach plant. This plant uses chlorine dioxide in the bleaching process. Emissions are controlled by a wet scrubber. This emissions unit is regulated under 40 CFR 63 Subpart S - National Emission Standards for Hazardous Air Pollutants for Pulp Mills, adopted and incorporated by reference in Rule 62-204.800, F.A.C.; Rule 212.400(5), F.A.C., Prevention of Significant Deterioration (PSD): Permit(s) No. PSD-FL-264; Rule 62-212.400(6), F.A.C., and Best Available Control Technology (BACT) Determination, dated June 30, 1999.

**The following specific conditions apply to the emissions unit(s) listed above:**

## Operational Parameters

**K.0.** The Permittee shall meet the compliance milestones stated in Appendix CP-Compliance Plan.

**K.1.** Permitted Capacity. Until compliance is demonstrated with the air construction permit issued pursuant to the PSD review identified in the Compliance Schedule of the Compliance Plan, Appendix CP, Condition X.1, the maximum production rate of this emissions unit shall not exceed 840 tons per day of air-dried bleached pulp (ADBP) as a maximum monthly average. [Consent Order OGC File No. 02-1886]

**K.2.** Hours of Operation. The hours of operation are not restricted, i.e. 8,760 hours per year. [Rules 62-4.1610(2) and 62-210.200(PTE), F.A.C., Construction Permit No. 1070005-006-AC/PSD/FL-264]

## Operating Standards

**K.3.** Bleaching Stage Equipment. The equipment at each bleaching stage, of the No. 3 Bleach Plant, where chlorinated compounds are introduced shall be enclosed and vented into a closed-vent system and routed to the wet scrubber stack for control. The enclosures and closed-vent system shall meet the requirements specified in Condition K.5.
[63.445(b)]

**K.4.** Chloroform air emissions. To reduce chloroform air emissions to the atmosphere, the No. 3 Bleach Plant shall not use hypochlorite or chlorine for bleaching in the bleaching system or line. [63.445(d)(2), Construction Permit No. 1070005-006-AC/PSD-FL-264]

**K.5.** Enclosures and Closed-Vent Systems. The enclosure and closed-vent system specified in Condition K.3 for capturing and transporting vent streams that contain HAP shall meet the following requirements:

(a) Each enclosure shall maintain negative pressure at each enclosure or hood opening as demonstrated by the procedures specified in Condition K.18. Each enclosure or hood opening closed during the initial performance test specified in 40 CFR 63.457(a) shall be maintained in the same closed and sealed position as during the performance test at all times except when necessary to use the opening for sampling, inspection, maintenance, or repairs.

(b) Each component of the closed-vent system used to comply with Condition K.3. that is operated at positive pressure and located prior to a control device shall be designed for and operated with no detectable leaks as indicated by an instrument reading of less than 500 parts per million by volume above background, as measured by the procedures specified in Condition K.17..

(c)Each bypass line in the closed-vent system that could divert vent streams containing HAP to the atmosphere without meeting the emission limitations in 40 CFR 63.445 shall comply with either of the following requirements:

(1) On each bypass line, the owner or operator shall install, calibrate, maintain, and operate according to manufacturer's specifications a flow indicator that provides a record of the presence of gas stream flow in the bypass line at least once every 15 minutes. The flow indicator shall be installed in the bypass line in such a way as to indicate flow in the bypass line; or

(2) For bypass line valves that are not computer controlled, the owner or operator shall maintain the bypass line valve in the closed position with a car seal or a seal placed on the valve or closure mechanism in such a way that valve or closure mechanism cannot be opened without breaking the seal.

[63.450]

## Emission Limitations and Standards

{Permitting note: Table 1-1, Summary of Air Pollutant Standards and Terms, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

{Permitting Note: Unless otherwise specified, the averaging time for this condition is based on the specified averaging time of the applicable test method.}

**K.6.** Carbon Monoxide. Carbon monoxide emissions shall not exceed 46 lbs/hr and 201 tons per year[1]. Carbon monoxide emissions shall be minimized to the extent practicable by efficient bleaching operations.

[1] Compliance issues associated with CO emissions from this emissions unit are addressed within Consent Order OGC File No. 02-1886 until compliance is demonstrated with the air construction permit issued pursuant to the PSD review identified in the Compliance Schedule of the Compliance Plan, Appendix CP, Condition X.1.

[Rule 62-212.410, F.A.C., Construction Permit No. 1070005-006-AC/PSD-FL-264, Consent Order OGC File No. 02-1886]

*Please reference the Permit No., Facility ID No., and appropriate Emissions Unit(s) ID No(s). on all correspondence, test report submittals, applications, etc.*

**K.7.** Total Chlorinated HAPs. The total chlorinated HAP outlet concentration shall not exceed 10 parts per million by volume
[63.445(c)(2); Construction Permit No. 1070005-006-AC/PSD-FL-264]

**K.8.** Visible Emissions. Visible Emissions form this emissions unit shall not exceed 20% opacity. The visible emissions limit shall only be effective if the visible emission measurement can be made without being substantially affected by plume mixing or moisture condensation.
[Rule 62-296.320, F.A.C.; Rule 62-296.404(2)(b), F.A.C.; Construction Permit No. 1070005-006-AC/PSD-FL-264]

**Excess Emissions**

**K.9.** Excess emissions resulting from startup, shutdown or malfunction of any source shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24 hour period unless specifically authorized by the Department for longer duration.
[62-201.700(1), F.A.C.]

**K.10.** Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown, or malfunction shall be prohibited.
[Rule 62-210.700(4), F.A.C.]

**K.11.** Considering operational variations in types of industrial equipment operations affected by this rule, the Department may adjust maximum and minimum factors to provide reasonable and practical regulatory controls consistent with the public interest.
[Rule 62-210.700(5), F.A.C.]

**K.12.** In case of excess emissions resulting from malfunctions, each source shall notify the Department or the appropriate Local program in accordance with Rule 62-4.130, F.A.C. A full written report on the malfunctions shall be submitted in a quarterly report, if requested by the Department.
[Rule 62-210.700(6), F.A.C.]

## Test Methods and Procedures

{Permitting note: Table 2-1, Summary of Compliance Requirements, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

**K.13.** Carbon Monoxide. The test method for carbon monoxide emissions shall be EPA Method 10 as incorporated in 40 CFR 60, Appendix A. The compliance testing shall be conducted annually with a frequency base date of 05/25[1].

[1] Compliance issues associated with CO emissions from this emissions unit are addressed within Consent Order OGC File No. 02-1886 until compliance is demonstrated with the air construction permit issued pursuant to the PSD review identified in the Compliance Schedule of the Compliance Plan, Appendix CP, Condition X.1.

[Construction Permit No. 1070005-006-AC/PSD-FL-264, Rule 62-204.800, F.A.C., Consent Order OGC File No. 02-1886]

*Please reference the Permit No., Facility ID No., and appropriate Emissions Unit(s) ID No(s). on all correspondence, test report submittals, applications, etc.*

**K.14.** Total Chlorinated HAPs. The test method for total chlorinated HAPs shall be EPA Method 26A as incorporated in 40 CFR 60, Appendix A. The compliance testing shall be conducted annually with a frequency base date of 05/26.
[Construction Permit No. 1070005-006-AC/PSD-FL-264; Rule 62-297.310(7)(a)4.c., F.A.C.]

**K.15.** Visible Emissions. The test method for visible emissions shall be EPA Method 9 as incorporated in 40 CFR 60, Appendix A. The compliance testing shall be conducted annually with a frequency base date of 05/25.
[Construction Permit No. 1070005-006-AC/PSD-FL-264, Rule 62-204.800, F.A.C.]

**K.16.** Vent sampling port locations and gas stream properties. For purposes of selecting vent sampling port locations and determining vent gas stream properties, required in 40 CFR 63.445, the owner or operator shall comply with the following procedures:

(1) Method 1 or 1A of part 60, appendix A, as appropriate, shall be used for selection of the sampling site as follows:

(i) To sample for vent gas concentrations and volumetric flow rates, the sampling site shall be located prior to dilution of the vent gas stream and prior to release to the atmosphere;

(ii) For determining compliance with percent reduction requirements, sampling sites shall be located prior to the inlet of the control device and at the outlet of the control device; measurements shall be performed simultaneously at the two sampling sites; and

(iii) For determining compliance with concentration limits or mass emission rate limits, the sampling site shall be located at the outlet of the control device.

(2) No traverse site selection method is needed for vents smaller than 0.10 meter (4.0 inches) in diameter.

(3) The vent gas volumetric flow rate shall be determined using Method 2, 2A, 2C, or 2D of part 60, appendix A, as appropriate.

(4) The moisture content of the vent gas shall be measured using Method 4 of part 60, appendix A.

(5) To determine vent gas concentrations, the owner or operator shall collect a minimum of three test runs that are representative of normal conditions and average the resulting pollutant concentrations using the following procedures.

(i) Method 308 in Appendix A of this part shall be used to determine the methanol concentration.

(ii) Except for the modifications specified in paragraphs (b)(5)(ii)(A) through (b)(5)(ii)(K) of this section, Method 26A of part 60, appendix A shall be used to determine chlorine concentration in the vent stream.

(A) *Probe/Sampling Line.* A separate probe is not required. The sampling line shall be an appropriate length of 0.64 cm (0.25 in) OD Teflon® tubing. The sample inlet end of the sampling line shall be inserted into the stack in such a way as to not entrain liquid condensation from the vent gases. The other end shall be connected to the impingers. The length of the tubing may vary from one sampling site to another, but shall be as short as possible in each situation. If sampling is conducted in sunlight, opaque tubing shall be used. Alternatively, if transparent tubing is used, it shall be covered with opaque tape.

(B) *Impinger Train.* Three 30 milliliter (ml) capacity midget impingers shall be connected in series to the sampling line. The impingers shall have regular tapered stems.

Silica gel shall be placed in the third impinger as a desiccant. All impinger train connectors shall be glass and/or Teflon®.

(C) *Critical Orifice.* The critical orifice shall have a flow rate of 200 to 250 ml/min and shall be followed by a vacuum pump capable of providing a vacuum of 640 millimeters of mercury (mm Hg). A 45 millimeter diameter in-line Teflon® 0.8 micrometer filter shall follow the impingers to project the critical orifice and vacuum pump.

(D) The following are necessary for the analysis apparatus:

(*1*) Wash bottle filled with deionized water;

(*2*) 25 or 50 ml graduated burette and stand;

(*3*) Magnetic stirring apparatus and stir bar;

(*4*) Calibrated pH Meter;

(*5*) 150-250 ml beaker or flask; and

(*6*) A 5 ml pipette.

(E) The procedures listed in paragraphs (b)(5)(ii)(E)(*1*) through (b)(5)(ii)(E)(*7*) of this section shall be used to prepare the reagents.

(*1*) To prepare the 1 molarity (M) potassium dihydrogen phosphate solution, dissolve 13.61 grams (g) of potassium dihydrogen phosphate in water and dilute to 100 ml.

(*2*) To prepare the 1 M sodium hydroxide solution (NaOH), dissolve 4.0 g of sodium hydroxide in water and dilute to 100 ml.

(*3*) To prepare the buffered 2 percent potassium iodide solution, dissolve 20 g of potassium iodide in 900 ml water. Add 50 ml of the 1 M potassium dihydrogen phosphate solution and 30 ml of the 1 M sodium hydroxide solution. While stirring solution, measure the pH of solution electrometrically and add the 1 M sodium hydroxide solution to bring pH to between 6.95 and 7.05.

(*4*) To prepare the 0.1 normality (N) sodium thiosulfate solution, dissolve 25 g of sodium thiosulfate, pentahydrate, in 800 ml of freshly boiled and cooled distilled water in a 1-liter volumetric flask. Dilute to volume. To prepare the 0.01 N sodium thiosulfate solution, add 10.0 ml standardized 0.1 N sodium thiosulfate solution to a 100 ml volumetric flask, and dilute to volume with water.

(*5*)To standardize the 0.1 N sodium thiosulfate solution, dissolve 3.249 g of anhydrous potassium bi-iodate, primary standard quality, or 3.567 g potassium iodate dried at 103 +/- 2 degrees Centigrade for 1 hour, in distilled water and dilute to 1000 ml to yield a 0.1000 N solution. Store in a glass-stoppered bottle. To 80 ml distilled water, add, with constant stirring, 1 ml concentrated sulfuric acid, 10.00 ml 0.1000 N anhydrous potassium bi-iodate, and 1 g potassium iodide. Titrate immediately with 0.1 n sodium thiosulfate titrant until the yellow color of the liberated iodine is almost discharged. Add 1 ml starch indicator solution and continue titrating until the blue color disappears. The normality of the sodium thiosulfate solution is inversely proportional to the ml of sodium thiosulfate solution consumed:

$$\text{Normality of Sodium Thiosulfate} = \frac{1}{\text{ml Sodium Thiosulfate Consumed}}$$

(6) To prepare the starch indicator solution, add a small amount of cold water to 5 g starch and grind in a mortar to obtain a thin paste. Pour paste into 1 L of boiling distilled water, stir, and let settle overnight. Use clear supernate for starch indicator solution.

(7) To prepare the 10 percent sulfuric acid solution, add 10 ml of concentrated sulfuric acid to 80 ml water in an 100 ml volumetric flask. Dilute to volume.

(F) The procedures specified in paragraphs (b)(5)(ii)(F)(1) through (b)(5)(ii)(F)(5) of this section shall be used to perform the sampling.

(1) Preparation of Collection Train. Measure 20 ml buffered potassium iodide solution into each of the first two impingers and connect probe, impingers, filter, critical orifice, and pump. The sampling line and the impingers shall be shielded from sunlight.

(2) Leak and Flow Check Procedure. Plug sampling line inlet tip and turn on pump. If a flow of bubbles is visible in either of the liquid impingers, tighten fittings and adjust connections and impingers. A leakage rate not in excess of 2 percent of the sampling rate is acceptable. Carefully remove the plug from the end of the probe. Check the flow rate at the probe inlet with a bubble tube flow meter. The flow should be comparable or slightly less than the flow rate of the critical orifice with the impingers off-line. Record the flow and turn off the pump.

(3) Sample Collection. Insert the sampling line into the stack and secure it with the tip slightly lower than the port height. Start the pump, recording the time. End the sampling after 60 minutes, or after yellow color is observed in the second in-line impinger. Record time and remove the tubing from the vent. Recheck flow rate at sampling line inlet and turn off pump. If the flow rate has changed significantly, redo sampling with fresh capture solution. A slight variation (less than 5 percent) in flow may be averaged. With the inlet end of the line elevated above the impingers, add about 5 ml water into the inlet tip to rinse the line into the first impinger.

(4) Sample Analysis. Fill the burette with 0.01 N sodium thiosulfate solution to the zero mark. Combine the contents of the impingers in the beaker or flask. Stir the solution and titrate with thiosulfate until the solution is colorless. Record the volume of the first endpoint (TN, ml). Add 5 ml of the 10 percent sulfuric acid solution, and continue the titration until the contents of the flask are again colorless. Record the total volume of titrant required to go through the first and to the second endpoint (TA, ml). If the volume of neutral titer is less than 0.5 ml, repeat the testing for a longer period of time. It is important that sufficient lighting be present to clearly see the endpoints, which are

determined when the solution turns from pale yellow to colorless. A lighted stirring plate and a white background are useful for this purpose.

(5) Interferences. Known interfering agents of this method are sulfur dioxide and hydrogen peroxide. Sulfur dioxide, which is used to reduce oxidant residuals in some bleaching systems, reduces formed iodine to iodide in the capture solution. It is therefore a negative interference for chlorine, and in some cases could result in erroneous negative chlorine concentrations. Any agent capable of reducing iodine to iodide could interfere in this manner. A chromium trioxide impregnated filter will capture sulfur dioxide and pass chlorine and chlorine dioxide. Hydrogen peroxide, which is commonly used as a bleaching agent in modern bleaching systems, reacts with iodide to form iodine and thus can cause a positive interference in the chlorine measurement. Due to the chemistry involved, the precision of the chlorine analysis will decrease as the ratio of chlorine dioxide to chlorine increases. Slightly negative calculated concentrations of chlorine may occur when sampling a vent gas with high concentrations of chlorine dioxide and very low concentrations of chlorine.

(6) The minimum sampling time for each of the three test runs shall be 1 hour in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, then the samples shall be taken at approximately equal intervals in time, such as 15 minute intervals during the test run.

(G) The following calculation shall be performed to determine the corrected sampling flow rate:

$$S_c = \frac{S_u(BP - PW)(293)}{(760)(273 + t)}$$

where:

$S_C$ = Corrected (dry standard) sampling flow rate, liters per minute;
$S_U$ = Uncorrected sampling flow rate, L/min;
BP = Barometric pressure at time of sampling;
PW = Saturated partial pressure of water vapor, mm Hg at temperature; and
t = Ambient temperature, °C.

(H) The following calculation shall be performed to determine the moles of chlorine in the sample:

$Cl_2$ Moles = 1/8000 (5 $T_N$ - $T_A$) x $N_{Thio}$

where:

$T_N$ = Volume neutral titer, ml;
$T_A$ = Volume acid titer (total), ml; and
$N_{Thio}$ = Normality of sodium thiosulfate titrant.

(I) The following calculation shall be performed to determine the concentration of chlorine in the sample:

$$ClO_2\ Moles = 1/4000\,(T_A - T_N) \times N_{Thio}$$

where:

$T_A$ = Volume acid titer (total), ml;
$T_N$ = Volume neutral titer, ml; and
$N_{Thio}$ = Normality of sodium thiosulfate titrant.

(K) The following calculation shall be performed to determine the concentration of chlorine dioxide in the sample:

$$ClO_2\ ppmv = \frac{6010(T_A - T_N) \times N_{Thio}}{S_c \times t_s}$$

where:

$S_C$ = Corrected (dry standard) sampling flow rate, liters per minute;
$t_S$ = Time sampled, minutes;
$T_A$ = Volume acid titer (total), ml;
$T_N$ = Volume neutral titer, ml; and
$N_{Thio}$ = Normality of sodium thiosulfate titrant.

(iii) Any other method that measures the total HAP or methanol concentration that has been demonstrated to the Administrator's satisfaction.

(6) The minimum sampling time for each of the three runs per method shall be 1 hour in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, then the samples shall be taken at approximately equal intervals in time, such as 15 minute intervals during the run.
[63.457(b)]

**K.17.** Detectable leak procedures. To measure detectable leaks for closed-vent systems as specified in Condition K.5., the owner or operator shall comply with the following:

(1) Method 21, of Part 60, Appendix A; and

(2) The instrument specified in Method 21 shall be calibrated before use according to the procedures specified in Method 21 on each day that leak checks are performed. The following calibration gases shall be used:

(i) Zero air (less than 10 parts per million by volume of hydrocarbon in air); and

(ii) A mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 parts per million by volume methane or n-hexane.
[63.457(d)]

**K.18.** Negative pressure procedures. To demonstrate negative pressure at process equipment enclosure openings as specified in Condition K.5., the owner or operator shall use one of the following procedures:

(1) An anemometer to demonstrate flow into the enclosure opening;

(2) Measure the static pressure across the opening;

(3) Smoke tubes to demonstrate flow into the enclosure opening; or

(4) Any other industrial ventilation test method demonstrated to the Administrator's satisfaction.
[63.457(e)]

*Please reference the Permit No., Facility ID No., and appropriate Emissions Unit(s) ID No(s). on all correspondence, test report submittals, applications, etc.*

**K.19.** Bleaching HAP concentration measurement. For purposes of complying with the bleaching system requirements in § 63.445, the owner or operator shall measure the total HAP concentration as the sum of all individual chlorinated HAPs or as chlorine.
[63.457(h)]

**Continuous Monitoring Requirements**

**K.20.** The permittee shall install, calibrate, certify, operate, and maintain according to the manufacturer's specifications, a continuous monitoring system (CMS, as defined in §63.2) as specified in Condition K.21. The CMS shall include a continuous recorder.
[63.453(a), Construction Permit No. 1070005-006-AC/PSD-FL-264]

**K.21.** A CMS shall be operated to measure the following parameters:
(1) The pH or the oxidation/reduction potential of the gas scrubber effluent;
(2) Fan amperage of the bleaching system vent gas fan*; and
(3) The gas scrubber liquid influent flow rate.

*EPA Approved Alternative Monitoring Parameter dated December 22, 2000.
[63.453(c), Construction Permit No. 1070005-006-AC/PSD-FL-264]

**K.22.** Enclosure and Closed-Vent System. The enclosure and closed-vent system shall comply with the following requirements:

(1) For each enclosure opening, a visual inspection of the closure mechanism specified in K.5.(a) shall be performed at least once every 30 days to ensure the opening is maintained in the closed position and sealed.

(2) The closed-vent system shall be visually inspected every 30 days and at other times as requested by the Administrator. The visual inspection shall include inspection of ductwork, piping, enclosures, and connections to covers for visible evidence of defects.

(3) For positive pressure closed-vent systems or portions of closed-vent systems, demonstrate no detectable leaks as specified in Condition K.5.(b) measured initially and annually by the procedures in Condition K.17..

(4) Demonstrate initially and annually that each enclosure opening is maintained at negative pressure as specified in Condition K.18..

(5) The valve or closure mechanism specified in Condition K.5.(c)(2) shall be inspected at least once every 30 days to ensure that the valve is maintained in the closed position and the emission point gas stream is not diverted through the bypass line.

(6) If an inspection required by paragraphs (1) through (5) of this Condition identifies visible defects in ductwork, piping, enclosures or connections to covers required by Condition K.5., or if an instrument reading of 500 parts per million by volume or greater above background is measured, or if enclosure openings are not maintained at negative pressure, then the following corrective actions shall be taken as soon as practicable.

(i) A first effort to repair or correct the closed-vent system shall be made as soon as practicable but no later than 5 calendar days after the problem is identified.

(ii) The repair or corrective action shall be completed no later than 15 calendar days after the problem is identified. Delay of repair or corrective action is allowed if the repair or corrective action is technically infeasible without a process unit shutdown or if the owner or

operator determines that the emissions resulting from immediate repair would be greater than the emissions likely to result from delay of repair. Repair of such equipment shall be completed by the end of the next process unit shutdown.
[63.453(k)]

**K.23.** Wet Scrubber Operating Parameters. The wet scrubber shall be operated in a manner consistent with the minimum pH of the scrubbing medium effluent at 9.1 s.u., the minimum fan motor loading of 85% (15.3 amps), and the minimum scrubber recirculation flow rate of 1,229 gpm. Operation of the wet scrubber below these minimum operating parameter values or failure to perform procedures required by 40 CFR 63 Subpart S shall constitute a violation of Condition K.7. and be reported as a period of excess emissions.

{Permitting Note: Unless otherwise specified, the averaging time for this condition is based on the specified averaging time of the applicable test method.}
[63.453(o), Applicant Request dated 12/20/02]

## Recordkeeping Requirements

**K.24.** The permittee shall maintain daily records of the following information in order to document continuous compliance with Condition Nos. K.1., K.6.., K.7., and K.21.:

- Quantity of pulp processed through the No. 3 Bleach Plant in air-dried bleach tons.
- Scrubber parameters monitored per Condition K.21.

**K.25.** The permittee shall comply with the recordkeeping requirements of 40 CFR 63.10, as shown in Table 1 of 40 CFR Part 63 Subpart S.
[63.454(a)]

**K.26.** Enclosure Opening, Closed-Vent System and Closed Collection System. For each applicable enclosure opening, closed-vent system, and closed collection system, the owner or operator shall prepare and maintain a site-specific inspection plan including a drawing or schematic of the components of applicable affected equipment and shall record the following information for each inspection:

(1) Date of inspection;
(2) The equipment type and identification;
(3) Results of negative pressure tests for enclosures;
(4) Results of leak detection tests;
(5) The nature of the defect or leak and the method of detection (i.e., visual inspection or instrument detection);
(6) The date the defect or leak was detected and the date of each attempt to repair the defect or leak;
(7) Repair methods applied in each attempt to repair the defect or leak;
(8) The reason for the delay if the defect or leak is not repaired within 15 days after discovery;
(9) The expected date of successful repair of the defect or leak if the repair is not completed within 15 days;
(10) The date of successful repair of the defect or leak;

(11) The position and duration of opening of bypass line valves and the condition of any valve seals; and

(12) The duration of the use of bypass valves on computer controlled valves.
[63.454(b)]

**K.27.** New affected Process Equipment. The permittee shall record the CMS parameters specified in §63.453 and meet the requirements specified in Condition K.25., for any new affected process equipment that becomes subject to the standards of 40 CFR Part 63 Subpart S due to a process change or modification.
[63.454(d)]

## Reporting Requirements

**K.28.** The permittee shall comply with the reporting requirements of 40 CFR Part 63. Subpart A as specified in Table 1 of Subpart S.
[63.455(a)]

**Common Conditions - F.A.C. Test Requirements**

**K.29.** This emissions unit is also subject to applicable F.A.C. Test Requirements in Subsection N.

**Common Conditions - Periodic Monitoring**

**K.30.** This emissions unit is also subject to applicable Periodic Monitoring Requirements in Subsection P.

## Appendix CP- Compliance Plan

X.1. Compliance Schedule. The following dates shall be met to satisfy measurable progress milestones for the facility to come into compliance with Conditions A.10., K.6., and K.7.

| E.U. ID. No. | Milestone | Milestone Date |
|---|---|---|
| 036<br>014 | Responsible Official to enter into a consent order agreement with Department concerning the No. 3 ECF Bleach Plant, and initiate agreements concerning any other non-compliant conditions. | November 12, 2002 |
| 036 | Facility to submit a complete application, including completed responses to Department requests for additional information, for an air construction permit/PSD Determination. | February 1, 2003 |
| Facility | Responsible Official to submit "Certification of Compliance", addressing the entire facility, indicating what is not in compliance, when non-compliance started, the degree or amount of non-compliance, the duration of non-compliant operations, steps taken to identify and correct non-compliant conditions, and actions (with time table), to correct any current non-compliant conditions and achieve compliance. | March 1, 2003 |
| 036 | Initiation of on-site construction and/or installation of emission control equipment or process change authorized by air construction permit | No later than 3 months from the date of issuance of the resulting air construction permit/PSD Determination |
| 036 | Completion of on-site construction or installation of emission control equipment or process change authorized by air construction permit | No later than 9 months from the date of issuance of the resulting air construction permit/PSD Determination |
| 036 | Compliance Testing conducted and test reports submitted pursuant to requirements of air construction permit | Pursuant to the timeframes established in the air construction permit/PSD Determination |
| 014 | Compliance Testing conducted and test reports submitted for the No. 4 Power Boiler | April 1, 2003 |
| 036 | Submittal of Title V Operation Permit Revision for the incorporation of the air construction permit/PSD Determination for the No. 3 ECF Bleach Plant | At least 90 days prior to expiration of air construction permit, but no later than 180 days after commencement of operation |

| | | |
|---|---|---|
| 036 | Final Compliance | No later than 11 months from the date of issuance of the resulting air construction permit/PSD Determination |
| Facility | Responsible Official to submit "Certification of Compliance", addressing the entire facility, indicating what is not in compliance, when non-compliance started, the degree or amount of non-compliance, the duration of non-compliant operations, steps taken to identify and correct non-compliant conditions, and actions (with time table), to correct any current non-compliant conditions and achieve compliance. | No later than 12 months from the date of issuance of the resulting air construction permit/PSD Determination |

**X.2.** Permitted Capacity. Until compliance is demonstrated with the air construction permit issued pursuant to the PSD review identified in the Compliance Schedule of Condition X.1, above, the maximum throughput rate of this emissions unit shall not exceed 840 tons per day of air-dried bleached pulp (ADBP) as a maximum monthly average.
[Consent Order OGC File No. 02-1886]

**X.3.** Recordkeeping. The Permittee shall maintain material throughput logs that indicate the type and amount of material used daily.
[Consent Order OGC File No. 02-1886]

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

January 3, 2003

Mr. Syed Arif
State of Florida
Department of Environmental Protection
2600 Blair Stone Road
Twin Towers Office Building
Tallahassee, Florida 32399

RECEIVED
JAN 06 2003
BUREAU OF AIR REGULATION

Re: DEP File No. 1070005-019-AC (PSD-FL-264A)
Georgia-Pacific Palatka Operations
No. 3 Bleach Plant

Dear Mr. Arif,

The following is in response to your request for additional information dated November 26, 2002. Please note that the items are listed in the same order as in the letter mentioned above for convenience.

1. **Request**: *Please provide the total pulp production at the facility for the years 1999, 2000 and 2001. Also, give a breakdown of where this pulp was utilized in the facility (bleached and unbleached areas). Additionally, provide a detailed accounting of this pulp when utilized in the tissue-making mill. If additional pulp was bought during those years, please include that in the accounting. The Department is expecting a complete material balance of the pulp produced in the facility and the pulp bought by the facility when compared to the material shipped from the facility.*

   **Response**: Please see Table 1 (see Attachment A). Note that pulp produced is back calculated from actual paper machine production. The mill also purchases both pulp and finished tissue in "parent" rolls. The purchased pulp, along with the virgin pulp, is utilized in manufacturing product at the Palatka Mill. The tissue "parent" rolls are converted into finished goods at the Mill – these rolls are only processed in the converting area of the Mill and do not add additional production to the pulp mill, bleach plant, or machine areas.

2. **Request**: *Please give a detailed accounting of how much of softwood and hardwood was utilized in the total pulp production at the facility for the years 1999, 2000 and 2001. How are the two types of woods segregated when feeding*

*to the digesters? How is the pulp kept segregated and is there any blending of the pulp taking place prior to making final product.*

**Response**: Please see Table 1. Hardwood and softwood chips are segregated into different chip silos prior to use, and are cooked separately in the digesters. The subsequent pulp is also segregated by species in different high-density pulp storage towers and is blended just prior to the paper machines as needed for the various paper grades.

3. **Request**: *During the plant trip on November 12, the No. 3 Bleach Plant was operating at 30 tph. Please indicate if the production rate was 30 ADTBP per hour.*

   **Response**: The production rate was 30 unbleached oven-dry standard tons per hour as measured going into the pre-bleach washer.

4. **Request**: *During the plant trip on November 12, the facility personnel talked about a chart at the No. 3 Bleach Plant presentation, which indicated reduced usage of $ClO_2$ and increased usage of oxygen and hydrogen peroxide to get the same bleach ability. If testing was done to authenticate this fact, please provide the necessary documents. Also, provide a detailed written description as well as the chart showed to the Department.*

   **Response:** No lab simulated testing was done to authenticate the results of the work done in reducing $ClO_2$ by using more hydrogen peroxide. No permanent changes to oxygen application rates were made during this time period based on trial and error results. The results presented were based on lb/ton application rates as measured by the inline instrumentation, and were obtained by trial and error experimentation.

   Charts 1 and 2 below illustrate the trial and error work that was completed, demonstrating a shift of work from $ClO_2$ in the first stage to hydrogen peroxide in the second stage. The last six weeks of data that were in the original presentation have been omitted due to an instrumentation failure that was identified subsequent to DEP's visit. (note, this paragraph needs to be indented to match the prior paragraph)

5. **Request**: *Please indicate if 100% of softwood pulp or 100% of hardwood pulp is processed through the bleach plant at any given time. Are there occasions when a mix of the two types of wood pulp is processed at the same time? What indicators are available in the control room to help the operators know what type and how much of either hardwood or softwood pulp is being processed.*

   **Response:** Softwood and hardwood are almost always processed in the bleach plant separately and are never intentionally mixed. However, the grade mix required by the machines requires the bleach plant to make frequent species changes. Therefore, it is not uncommon for more than one species to be in different stages of bleaching within the bleach plant at a given point in time. The bleach plant was designed to minimize mixing; however, there is a small amount of inadvertent mixing (typically 10~20 ADTBP) that occurs with each transition. The operators are able to approximately monitor the location of each species volumetrically in the bleach plant by tracking the origin of the pulp flow since the pulp is segregated in different pulp storage towers. This allows the distributed control system (DCS) to display the current species in each sequence of bleaching, allowing the operator to make adjustments as required.

6. **Request**: *Please explain how the $ClO_2$ application rate to the pulp is monitored. If data is kept on the application rate, how often is it recorded?*

   **Response**: Both the $ClO_2$ flow rate and strength are measured continuously by inline instrumentation. The pulp tonnage rate is measured by inline flow and consistency measurement instrumentation as well. This information is then converted into a lb/ton application rate. Operators record $ClO_2$ application information on their log sheets on an hourly basis during normal operation.

7. **Request**: *Please provide a copy of the initial and annual compliance tests done for this plant. The report should include information on the production rate of the bleach plant during the compliance tests.*

   **Response**: The reports are attached (Attachment B).

8. **Request**: *The Department is in receipt of daily pulp production data covering a period from January 2000 until October 2002 (34 months). The daily bleached pulp production data indicates a highest daily production rate of 1197.9 tons on June 30, 2002, and a highest monthly average of 884 tons per day in September 2002. Please explain the reasons for not achieving the permitted production rates of 1702 tons daily maximum and 1350 tons per day monthly average for the No. 3 Bleach Plant.*

   **Response:** The Bleach Plant, as built, is capable of producing 1440 bleached air-dry standard tons per day rather than the initial design rate of 1702 tons per day. As such, this update has been reflected in the more recent application.

Current grade mix on the paper machines does not require us to produce at the "as built", maximum rate. However, market conditions change frequently based on customer preferences and economic conditions. Therefore, the bleach plant was designed and built to meet these changing market conditions, and G-P wishes to be permitted for such operations.

9. **Request**: *Please provide detail test reports of the series of tests conducted in October 2002 to measure actual CO emissions from the plant.*

   **Response**: See Attachment C.

10. **Request**: *Please provide the $ClO_2$ application rate for the series of tests conducted in October 2002.*

    **Response**: See Attachment C. (See yellow page).

11. **Request**: *Please list the pertinent information (% $ClO_2$ applied, kappa number, temperature etc.) that a compliance inspector should gather during an inspection of a bleach plant to ensure that the source is complying with the permitted CO emission limits. How will these parameters or others provide assurance that the limit is not exceeded?*

    **Response**: Emissions data for carbon monoxide emissions from bleach plant scrubbers first became available to the pulp and paper industry through the National Council for Air and Stream Improvement, Inc. (NCASI). NCASI Technical Bulletin 760 (TB 760) (July 1998) provides information on carbon monoxide emissions associated with oxygen delignification and chlorine dioxide bleaching of wood pulp. In numerous sections of the document, NCASI repeatedly states that the operating parameter correlations are not strong, and in many cases are non-existent (in the case of hardwood bleaching). For example, in the Introduction to TB 760, it is stated that, "Data from mill-conducted tests for CO emissions from 14 bleach plants at kraft pulp mills have already been reported in NCASI Technical Bulletin No. 701 (NCASI 1995). These data showed tremendous variability between mills, with CO emissions ranging from 0.003 to 1.73 lb per air dry ton of bleached pulp (lb/ADTBP). The causes for this variability were, however, unclear."

    Further, later in TB 760, when comparing CO emissions between two mills (Mills B and C),NCASI specifically states that, "The magnitude of CO emissions at Mill C appear comparable to those recorded at Mill B. This is in spite of $ClO_2$ application rates in this mill being less than half of those at Mill B." In the concluding paragraph of this same section, NCASI states that, "The available literature suggests that the lignin content of the brownstock entering the bleach plant and the $ClO_2$ charge would be the two main parameters controlling CO formation. However, since the $ClO_2$ charge for a desired pulp brightness is determined by the lignin content or kappa number of pulp entering the bleaching

sequence, the $ClO_2$ charge by itself would be expected to be the controlling parameter in CO formation...A general trend of increasing CO emissions with increasing percent $ClO_2$ applied is seen, but the correlation is not strong".

In recent conversations, NCASI staff have strongly discouraged Georgia-Pacific from using the NCASI data from TB 760 in establishing emission factors. In TB 760, NCASI has attempted to simply present data for varying operating configurations (*e.g.*, bleach plant stages/configurations, percent chlorine dioxide applied, wood species, presence/absence of oxygen delignification, etc.). While some trends appear, as they state clearly and repeatedly in TB 760, the correlations are not strong.

Given this information, and general lack of data, Georgia-Pacific feels strongly that it is not appropriate to establish parametric values to be used in demonstrating compliance. This is not only supported by testing at the Palatka Mill, but by the full array of mills that was tested by NCASI. Georgia-Pacific feels that the annual stack-testing requirement should be sufficient to demonstrate compliance with the emission limit. If additional information becomes available in the industry in the future, indicating that the correlations are stronger, it might be possible to revisit this possibility. However, at this time, the correlations are simply not developed.

For the same reasons stated above (*e.g.*, lack of correlation with operating parameters), Georgia-Pacific felt that it was necessary to incorporate a safety margin into the emission factors that were utilized in the permit application. TB 760 indicates that, for given testing scenarios and runs, the emission values can vary considerably - the standard deviations that are presented in TB 760 are often very high.

12. **Request**: *Please explain if there is a nexus between $ClO_2$ application rate and HAP emissions from a bleach plant. If a nexus exists, how is it being applied to keep HAP emissions to a minimum from the plant?*

**Response**: In attempting to answer this question, Georgia-Pacific has reviewed various literature that is readily available in the industry, primarily through NCASI. NCASI Technical Bulletin 701 (TB 701) states that, "Volatile organic and chlorinated compounds most prominent in bleach plant emissions included $Cl_2$, $ClO_2$, methanol ($CH_3OH$) and chloroform ($CHCl_3$)". Of these, only $ClO_2$ is not a regulated hazardous air pollutant (HAP) under Section 112(d) of the Clean Air Act.

For the most prominent of these, methanol, TB 701 states that, "Emissions of methanol from bleach plant vents are affected by various factors including (a) the type of wood pulped (hardwood vs softwood), (b) $O_2$ delignification preceding the bleach plant, (c) percent substitution by $ClO_2$, (d) amount of methanol in $ClO_2$ solution used in bleaching, and (e) degree of removal of methanol from pulp in

brownstock washing." NCASI does not identify $ClO_2$ application rate as a contributing factor to methanol formation. In Technical Bulletin 666 (TB 666), NCASI discusses some of these other factors in more detail. For example, with regard to $ClO_2$ substitution rate, TB 666 states that, "These data show, however, that when the impact of methanol entering with the pulp and the $ClO_2$ liquor was eliminated, the amount of methanol generated in the bleach plant decreased with increasing levels of $ClO_2$ substitution. This decrease in methanol formation was gradual up to 70 percent $ClO_2$ substitution but was very significant at 100 percent $ClO_2$ substitution". The Cluster Rule targets methanol emission reductions at the brownstock washers. Therefore, we expect that the quantity of methanol entering the bleach plant with the pulp will be reduced as the Cluster Rule is fully implemented at the Palatka Mill (by April 2006).

For chloroform, TB 701 states that, "The bleaching sequence (which influences the bleaching chemicals used) and level of bleaching (final brightness) are expected to affect emissions of $Cl_2$, $ClO_2$, and $CHCl_3$...The use of hypochlorite is perhaps the single largest factor influencing the formation and emission of $CHCl_3$ from bleach plant vents". The preamble to the Cluster Rule, which is targeted at reducing HAPs in the bleach plant and other mill areas, states that, "...the technology basis for MACT control of chloroform is complete chlorine dioxide substitution and elimination of hypochlorite as a bleaching agent. These process modifications were determined to reduce chloroform emissions significantly". Again, there is confirmation of the fact that the primary contributor to the formation of chloroform, a chlorinated HAP, is the use of hypochlorite in bleaching. In order to comply with the MACT/Cluster Rule requirements for reducing HAPs, the Palatka Mill practices 100 percent chlorine dioxide substitution. Hypochlorite bleaching is not utilized. Variation in $ClO_2$ application rate was not identified by NCASI or EPA (as part of the MACT development process) as a significant contributing factor to the formation or reduction of chloroform. It should also be noted that the Cluster Rule establishes a very tight control level for chlorinated HAPs of 0.002 pound per ton of oven-dried pulp (lb/ODTP). Based on recent testing, measured levels at the Palatka Mill were roughly an order of magnitude lower.

13. **Request**: *Please explain how the quantity of lignin in the pulp entering the bleach plant is being monitored and what role, if any, is that playing in the $ClO_2$ application rate.*

**Response**: Kappa number has been proven to be a good relative indicator of lignin content in pulp. An inline kappa analyzer measures the kappa number of the pulp entering the bleach plant. The DCS uses this kappa measurement as one of the criteria for determining $ClO_2$ application rate, but final pulp brightness is the principal parameter used to control the operation of the Bleach Plant. (question – do we want to say something about the fact that final pulp brightness

is something that is dictated by the customer and the specific product being manufactured.

14. **Request**: *The application pages under Section I, Page 20 proposes 3-hour average basis for monitoring pH of the gas scrubbing medium, fan amperage of the bleaching system vent gas fan and the scrubber recirculation flow. Please indicate if continuous monitoring of these parameters is required in 40 CFR 60, Subpart S. If so, EPA will have to approve this request.*

    **Response:** Continuous monitoring is required by 40 CFR 63.453 (c ). Paragraph (n) of this same section requires that the Administrator approve the rationale for the selected operating parameter value, and monitoring frequency, and averaging time. Attachment C includes information provided to both the Department and the Administrator relative to this provision. The Northeast District worked with EPA on specific language in the draft Title V Permit Revision recently provided to us incorporating the parameter values, monitoring frequency, and averaging time (see Attachment D).

The responses to the remaining items (Nos. 15-20) in your letter dated November 26, 2002 will be provided under separate cover. We have contracted with an outside engineering firm to finalize our BACT analysis and expect to have the final response to the Department by February 1, 2003.

With the "completed responses" provided above, and those regarding the BACT analysis to be provided by February 1, we believe we will have fulfilled our obligation to submit a "complete application" no later than February 1, as required by paragraph 17 of the November 8, 2002 Consent Order and consistent with Rules 62-212.400 and 62-4.055. Please let me know promptly if the Department disagrees, so that we can consider whether we need to seek an extension to the Consent Order deadline.

If you have any further questions, please do not hesitate to call me at (386) 329-0918.

Sincerely,

Myra J. Carpenter

Myra J. Carpenter
Environmental Superintendent

Cc: W.M. Jernigan
T. Wyles
M. Aguilar
S.Matchett

C. Kirts, NED
G. Bentley, EPA
G. Bunyak, NPS

# Attachment A

# Attachment B

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

**Best Available Copy**

November 13, 2002

VIA FAX (904) 448-4363

Mr Christopher L Kirts, P E.
State of Florida
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256-7590

RE: Georgia-Pacific Corporation
Facility 1070005

Dear Mr. Kirts:

As you know, the Palatka mill conducted an initial performance test on the bleach plant scrubber stack in May 2001 and submitted the throughput rates and stack test results to the Department on June 11, 2001. The mill's submittal did not include other detailed information about chemical application rates, Kappa number, or the specific production mix (in terms of hardwood/softwood) being run at the time.

Enclosed is a table that contains additional information about the three test runs from that event. Also enclosed is a stack test report from the first three stack tests that were conducted during the week of October 28, 2002. Georgia-Pacific considers information about its chemical application rates, Kappa number, and other detailed production parameters to be confidential business information, pursuant to Section 403.111, F.S. This data relates to secret processes or secret methods of manufacture or production and is exempted from the public records act. G-P respectfully requests that you not copy or distribute it except to others in DEP who need to see it.

I hereby certify, based on the information and belief formed after reasonable inquiry, that the statements made and data contained in this document are true, accurate, and complete.

Feel free to call Myra Carpenter if you have any questions about this information She can be reached at (386) 329-0918.

Sincerely,

Theodore D. Kennedy

Theodore D Kennedy
Vice President

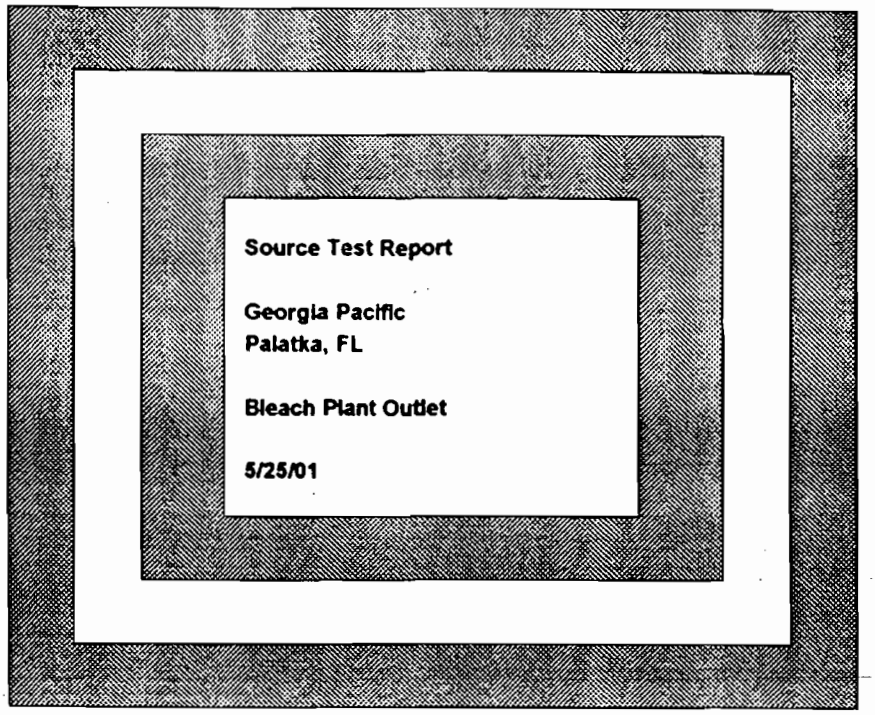
tk

cc W M Jernigan
S Matchett




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JAN 06 2003
BUREAU OF AIR REGULATION

**TECHNICAL SERVICES, INC.**
**(904) 353-5761**
**2901 Danese Street**
**Jacksonville, Florida 32206**




**Prepared By:**

**Technical Services, Inc.**
**2901 Danese Street**
**Post Office Box 52329**
**Jacksonville, Florida 32201**
**(904) 353 - 5761**

David Salter

**David Salter**

## USE OF THIS REPORT AND INFORMATION INCLUDED

This Report and the information contained is the property of the individual or organization named on the face hereof and may be freely distributed in its present form.

## REPORT CERTIFICATION

Technical Services, Inc. (TSI) has used its professional experience and best professional efforts in performing this compliance test. I have reviewed the results of these tests and to the best of my knowledge and belief they are true and correct.

**REPORT NO.** 0104A07

Harvey C. Gray, Jr.

HARVEY C. GRAY, JR.
DATE:

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| TABLE II | CARBON MONOXIDE EMISSIONS<br>Bleach Plant Outlet | 4 |
| TABLE III | SAMPLING POINT LOCATION<br>Bleach Plant Outlet | 8 |

# I. Introduction

Compliance testing for Chlorinated Haps emissions and Carbon Monoxide emissions from the Bleach Plant Scrubber, located at the Georgia Pacific Paper facility in Palatka, FL., was performed on May 25th, 2001. Three (3) test runs, each lasting one (1) hour, were completed on this source for both tests.

Testing and analytical procedures were in accordance with EPA's Methods ten (10), twenty-six (26A), and Florida DEP requirements.

We wish to express our appreciation to Mr. Joe Taylor and the operating staff at Georgia Pacific for their valuable assistance in the successful completion of this project.

# II. Summary and Discussion of Results

Results of the compliance tests are summarized in the following tables. Complete emissions data, along with supportive field and analytical data, are included in Appendices A, B, C, and G.

The Bleach Plant Scrubber was within compliance during the tests. The average emissions for Chlorinated Haps were 0.0089 lbs/hr, with an allowable emissions of 0.36 lbs/hr. The average emissions for Carbon Monoxide were 44.72 lbs/hr, with an allowable emissions of 46.0 lbs/hr.

T S I

## Volumetric Flow and Emission Output - Table I

**FACILITY:** Georgia Pacific
**LOCATION:** Palatka, FL

**SOURCE:** Bleach Plant Outlet

| Date | Run Number | Chlorinated Haps Emissions GR/SCF | LB/HR | ppm, vol. | Vol. Flow Rate ACFM | SCFMD | Adjusted Volume SCFD | Percent H20 | Percent Isokinetic |
|---|---|---|---|---|---|---|---|---|---|
| 5/25/01 | 1 | 0.00008 | 0.0098 | 0.13 | 15440.0 | 14275.0 | 35.391 | 4.6 | 96.4 |
| 5/25/01 | 2 | 0.00007 | 0.0083 | 0.11 | 15256.0 | 14178.0 | 36.388 | 5.1 | 99.8 |
| 5/25/01 | 3 | 0.00007 | 0.0084 | 0.11 | 15409.0 | 14413.0 | 36.716 | 5.4 | 99.0 |
| **Mean** | | 0.00007 | 0.0089 | 0.12 | 15368.3 | 14288.7 | 36.165 | 5.0 | 98.4 |

**Mean determined as arithmetic average of the results for each of the three runs.**

**REMARKS:** MACT requires <10 ppm chlorinated HAPs

# GEORGIA PACIFIC - PALATKA, FLORIDA BLEACH PLANT - SUMMARY OF CARBON MONOXIDE RESULTS - MAY 25 - 26, 2001

| | START TIME | END TIME | STACK FLOW scfm-d | CARBON MONOXIDE, ppm | CARBON MONOXIDE, lbs/hr |
|---|---|---|---|---|---|
| RUN 1 | 21:50 | 22:49 | 14183 | 670.4 | 41.5 |
| RUN 2 | 23:02 | 0:01 | 14406 | 766.3 | 48.2 |
| RUN 3A | 0:12 | 2:13 | 14331 | 712.0 | 44.5 |
| **TEST AVERAGE** | | | **14307** | **716.2** | **44.7** |

*NOTE - DURING TEST RUN NUMBER THREE THE Eop MIXER TRIPPED. THE BLEACH PLANT PRODUCTION DECREASED AND THE TEST WAS SUSPENDED. ONCE NORMAL PRODUCTION RESUMED THE TEST RESTARTED.*

## III. Process Description And Operation

## III. Process Description and Operation

The bleaching process is an elemental chlorine-free (ECF) process. The CLO2 is produced on site.

The bleaching process consists of the staged introduction of CLO2 to the pulp slurry followed by washing of the bleached pulp. The off gases from all stages of the process are collected and passed through a wet scrubber utilizing an alkaline scrubbing solution.

## IV. Sampling Point Location

T S I

# Table III
## Air Report - Sampling Point Locations

**Facility** Georgia Pacific
**Location** Palatka, FL
**Source Name** Bleach Plant Outlet

**Stack Interior Diameter = 42.00 inches**

| Sample Point Number | Inches Inside Stack Wall |
|---|---|
| 1 | 1.85 |
| 2 | 6.13 |
| 3 | 12.43 |
| 4 | 29.57 |
| 5 | 35.87 |
| 6 | 40.15 |

**Port Length** 7 inches

**Distances From Nearest Disturbance**

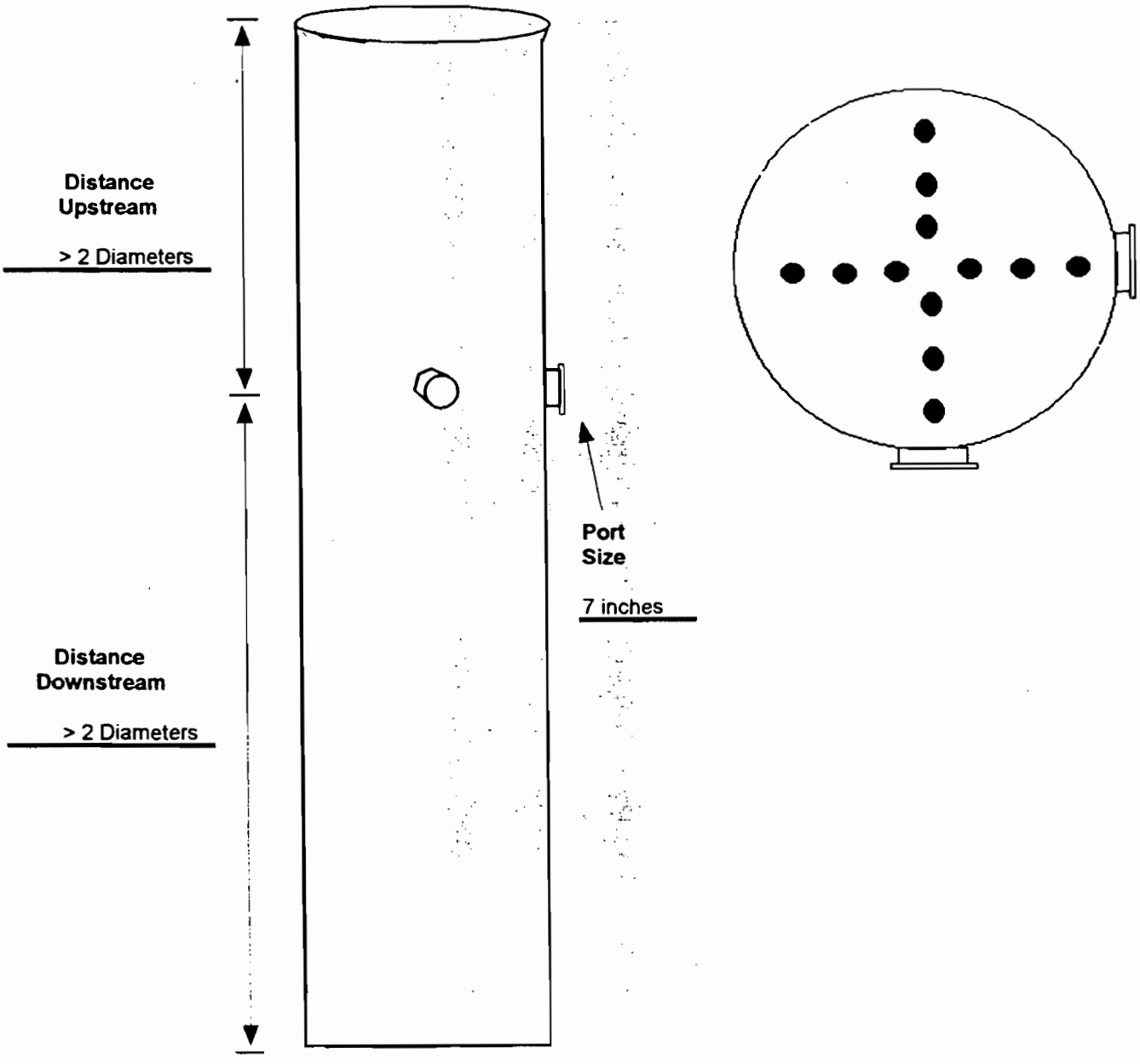
| Source | Stack Distance |
|---|---|
| Downstream | > 8 diameters |
| Upstream | > 2 Diameters |

**The above mentioned Downstream and Upstream distances are approximate distances.**

T S I

# Air Report - Sampling Port Location Diagram

| | | | |
|---|---|---|---|
| Facility | Georgia Pacific | Date | |
| Location | Palatka, FL | | |
| Source | Bleach Plant Outlet | | |



## V. Field And Analytical Procedures

# METHOD 10

## DETERMINATION OF CARBON MONOXIDE EMISSIONS FROM STATIONARY SOURCES

### 1. Principle and Applicability

1.1 Principle. An integrated or continuous gas sample is extracted from a sampling point and analyzed for carbon monoxide (CO) content using a Luft-type nondispersive infrared analyzer (NDIR) or equivalent.

1.2 Applicability. This method is applicable for the determination of carbon monoxide emissions from stationary sources only when specified by the test procedures contained in this text or otherwise specified by the Director. The test procedure will indicate whether a continuous or an integrated sample is to be used.

### 2. Range and Sensitivity

2.1 Range. 0 to 1,000 ppm.

2.2 Sensitivity. Minimum detectable concentration is 20 ppm for a 0 to 1,000 ppm span.

### 3. Interferences

Any substance having a strong absorption of infrared energy will interfere to some extent. For example, discrimination ratios for water ($H_2O$) and carbon dioxide ($CO_2$) are 3.5 percent $H_2O$ per 7 ppm CO and 10 percent $CO_2$ per 10 ppm CO, respectively, for devices measuring in the 1,500 to 3,000 ppm range. For devices measuring in the 0 to 100 ppm range, interference ratios can be as high as 3.5 percent H2O per 25 ppm CO and 10 percent CO2 per 50 ppm CO. The use of silica gel and ascarite traps will alleviate the major interference problems. The measured gas volume must be corrected if these traps are used.

### 4. Precision and Accuracy

4.1 Precision. The precision of most NDIR analyzers is approximately ± 2 percent of span.

4.2 Accuracy. The accuracy of most NDIR analyzers is approximately ± 5 percent of span after calibration.

### 5. Apparatus

5.1 Continuous sample (Figure 10-1).

5.1.1 Probe. Stainless steel or sheathed Pyrex glass, equipped with a filter to remove particulate matter.

5.1.2 Air-cooler condenser or equivalent. To remove any excess moisture.

5.2 Integrated sample (Figure 10.2).

5.2.1 Probe. Stainless steel or sheathed Pyrex glass, equipped with a filter to remove particulate matter.

5.2.2 Air-cooler condenser or equivalent. To remove any excess moisture.

5.2.3 Valve. Needle valve, or equivalent, to adjust flow rate.

5.2.4 Pump. Leak-free diaphragm type, or equivalent, to transport gas.

5.2.5 Rate meter. Rotameter, or equivalent, to measure a flow range from 0 to 1.0 liter per min. (0.035 cfm).

5.2.6 Flexible bag. Tedlar, or equivalent, with a capacity of 60 to 90 liters (2 to 3 $ft^3$). Leak-test the bag in the laboratory before using by evacuating bag with a pump followed by a dry gas meter. When evacuation is complete, there should be no flow through the meter.

5.2.7 Pitot tube. Type S, or equivalent, attached to the probe so that the sampling rate can be regulated proportional to the stack gas velocity when velocity is varying with the time or a sample traverse is conducted.

5.3 Analysis (Figure 10-3).

5.3.1 Carbon monoxide analyzer. Nondispersive infrared spectrometer, or equivalent. This instrument should be demonstrated, preferably by the manufacturer, to meet or exceed manufacturer's specifications and those described in this method.

5.3.2 Drying tube. To contain approximately 200 g of silica gel.

5.3.3 Calibration gas. Refer to Section 6.1.

5.3.4 Filter. As recommended by NDIR manufacturer.

5.3.5 $CO_2$ removal tube. To contain approximately 500 g of ascarite.

5.3.6 Ice water bath. For ascarite and silica gel tubes.

5.3.7 Valve. Needle valve, or equivalent, to adust flow rate.

5.3.8 Rate meter. Rotameter or equivalent to measure gas flow rate of 0 to 1.0 liter per minute (0.035 cfm) through NDIR.

5.3.9 Recorder (optional). To provide permanent record of NDIR readings.

## 6. Reagents

6.1 Calibration gases. Known concentration of CO in nitrogen ($N_2$) for instrument span, prepurified grade of $N_2$ for zero, and two additional concentrations corresponding approximately to 60 percent and 30 percent span. The span concentration shall not exceed 1.5 times the applicable source performance standard. The calibration gases shall be certified by the manufacturer to be within ± 2 percent of the specified concentration.

6.2 Silica gel. Indicating type, 6 to 16 mesh, dried at 175°C (347°F) for 2 hours.

6.3 Ascarite. Commercially available.

## 7. Procedure

7.1 Sampling

7.1.1 Continuous sampling. Set up the equipment as shown in Figure 10-1 making sure all connections are leak free. Place the probe in the stack at a sampling point and purge the sampling line. Connect the analyzer and begin drawing sample into the analyzer. Allow 5 minutes for the system to stabilize, then record the analyzer reading as required by the test procedure. (See Sections 7.2 and 8). $CO_2$ content of the gas may be determined by using the Method 3 integrated sample procedure, or by weighing the ascarite $CO_2$ removal tube and computing $CO_2$ concentration from the gas volume sampled and the weight gain of the tube.

7.1.2 Integrated sampling. Evacuate the flexible bag. Set up the equipment as shown in Figure 10-2 with the bag

disconnected. Place the probe in the stack and purge the sampling line. Connect the bag, making sure that all connections are leak free. Sample at a rate proportional to the stack velocity. $CO_2$ content of the gas may be determined by using the Method 3 integrated sample procedures, or by weighing the ascarite $CO_2$ removal tube and computing $CO_2$ concentration from the gas volume sampled and the weight gain of the tube.

7.2 CO Analysis. Assemble the apparatus as shown in Figure 10-3, calibrate the instrument, and perform other required operations as described in Section 8. Purge analyzer with $N_2$ prior to introduction of each sample. Direct the sample stream through the instrument for the test period, recording the readings. Check the zero and span again after the test to assure that any drift or malfunction is detected. Record the sample data on Table 10-1.

## 8. Calibration

Assemble the apparatus according to Figure 10-3. Generally an instrument requires a warm-up period before stability is obtained. Follow the manufacturer's instructions for specific procedure. Allow a minimum time of 1 hour for warm-up. During this time check the sample conditioning apparatus, i.e., filter, condenser, drying tube, and $CO_2$ removal tube, to ensure that each component is in good operating condition. Zero and calibrate the instrument according to the manufacturer's procedures using, respectively, nitrogen and the calibration gases.

**TABLE 10-1. FIELD DATA**

Location..... Comments:

Test.....

Date.....

Operator.....

| Clock Time | Rotameter setting, liters per minute (cubic feet per minute) |
|---|---|

## 9. Calculation

Calculate the concentration of carbon monoxide in the stack using Equation 10-1.

$$C_{CO_{stack}} = C_{CO_{NDIR}} (1-F_{CO_2})$$

where:

$C_{CO_{stack}}$ = concentration of CO in stack, ppm by volume (dry basis).

$C_{CO_{DNIR}}$ = concentration of CO measured by NDIR analyzer, ppm by volume (dry basis).

$F_{CO_2}$ = volume fraction of $CO_2$ in sample, i.e., percent $CO_2$ from Orsat analysis divided by 100.

## 10. Alternative Procedure

10.1 Interference Trap. The sample condition system described in Method 10A, Sections 2.1.2 and 4.2 may be used as an alternate to the silica gel and ascarite traps.

## 11. Bibliography

1. McElroy, Frank, The Intertech NDIR-CO Analyzer, Presented at 11th Methods Conference on Air Pollution, University of California, Berkeley, Calif., April 1, 1970.

2. Jacobs, M.B., et al., Continuous Determination of Carbon Monoxide and Hydrocarbons in Air by a Modified Infrared Analyzer, J. Air Pollution Control Association, 9(2):110-114, August 1959.

3. MSA LIRA Infrared Gas and Liquid Analyzer Instruction Book, Mine Safety Appliances Co., Technical Products Division, Pittsburgh, Pa.

4. Models 215A, 315A, and 415A Infrared Analyzers, Beckman Instruments Inc., Beckman Instructions 1635-B, Fullerton, Calif., October 1967.

5. Continuous CO Monitoring System, Model A5611, Intertech Corp., Princeton, N.J.

6. UNOR Infrared Gas Analayzers, Bendix Corp., Ronceverte, West Virginia.

## ADDENDA

A. Performance Specifications for NDIR Carbon Monoxide Analyzers.

| | |
|---|---|
| Range (minimum) | 0-1000 ppm. |
| Output (minimum) | 0-10mV. |
| Minimum detectable sensitivity | 20 ppm. |
| Rise time, 90 percent (maximum) | 30 seconds. |
| Fall time, 90 percent (maximum) | 30 seconds. |
| Zero drift (maximum) | 10% in 8 hours. |
| Span drift (maximum) | 10% in 8 hours. |
| Precision (minimum) | ±2% of full scale. |
| Noise (maximum) | ±1% of full scale. |
| Linearity (maximum deviation) | 2% of full scale. |
| Interference rejection ration | $CO_2$--1000 to 1, $H_2O$--500 to 1. |

B. Definitions of Performance Specifications.

Range -- The minimum and maximum measurement limits.

Output -- Electrical signal which is proportional to the measurement; intended for connection to readout or data processing devices. Usually expressed as millivolts or milliamps full scale at a given impedance.

Full scale -- The maximum measuring limit for a given range.

Minimum detectable sensitivity -- The smallest amount of input concentration that can be detected as the concentration approaches zero.

Accuracy -- The degree of agreement between a measured value and the true value; usually expressed as ± percent of full scale.

Time to 90 percent response -- The time interval from a step change in the input concentration at the instrument inlet to a reading of 90 percent of the ultimate recorded concentration.

Rise Time (90 percent) -- The interval between initial response time and time to 90 percent response after a step increase in the inlet concentration.

Fall Time (90 percent) -- The interval between initial response time and time to 90 percent response after a step decrease in the inlet concentration.

Zero Drift -- The change in instrument output over a stated time period, usually 24 hours, of unadjusted continuous operation when the input concentration is zero; usually expressed as percent full scale.

Span Drift -- The change in instrument output over a stated time period, usually 24 hours of unadjusted continuous operation when the input concentration is a stated upscale value; usually expressed as percent full scale.

Precision -- The degree of agreement between repeated measurements of the same concentration, expressed as the average deviation of the single results from the mean.

Noise -- Spontaneous deviations from a mean output not caused by input concentration changes.

Linearity -- The maximum deviation between an actual instrument reading and the reading predicted by a straight line drawn between upper and lower calibration points.

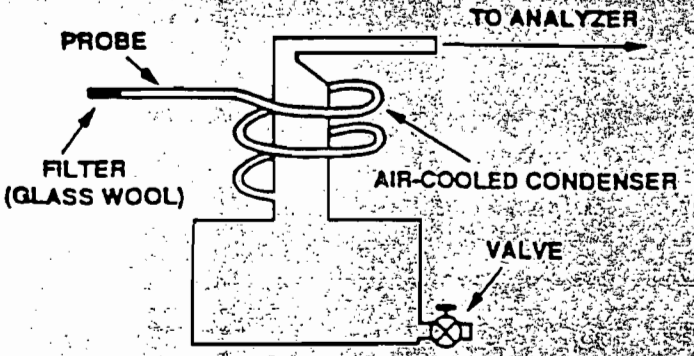



Figure 10-1. Continuous Sampling Train

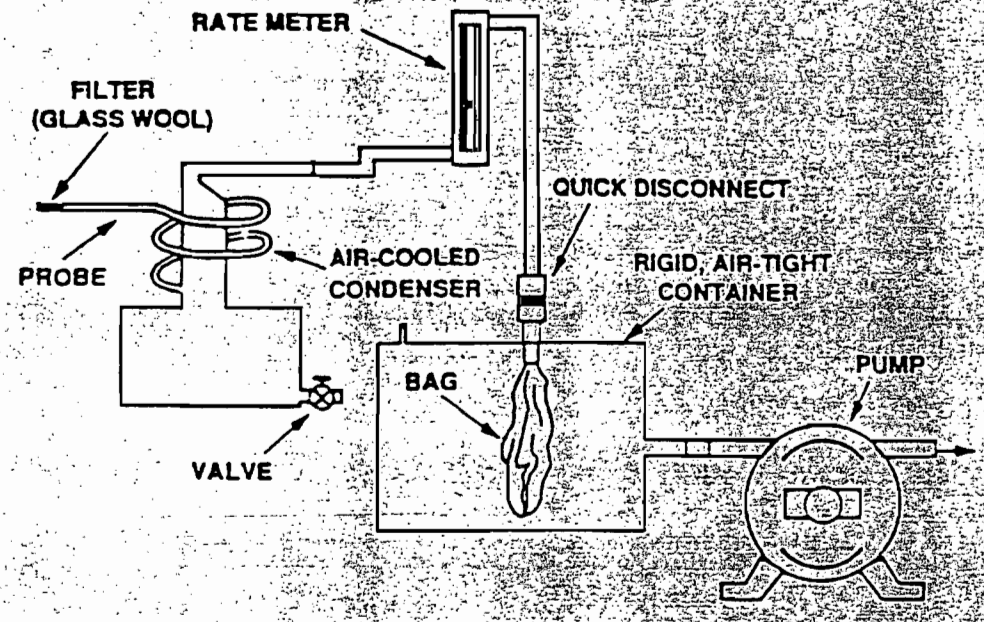



Figure 10-2. Integrated Gas--Sampling Train

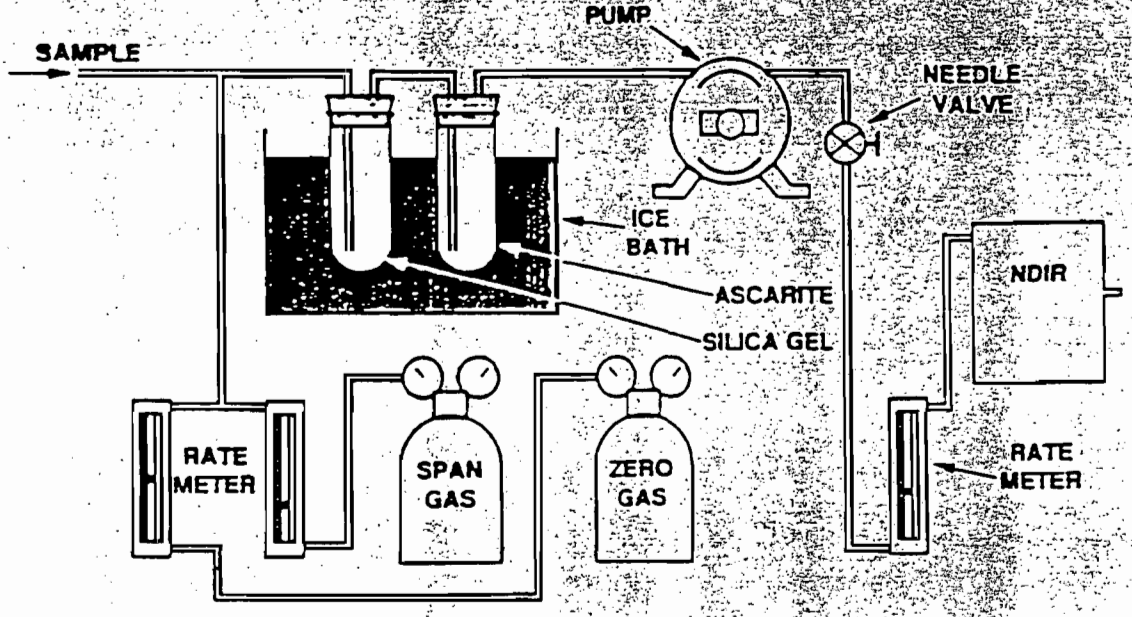



Figure 10-3. Analytical Equipment

# METHOD 26A

## DETERMINATION OF HYDROGEN HALIDE AND HALOGEN EMISSIONS FROM STATIONARY SOURCES - ISOKINETIC METHOD

### 1. Applicability, Principle, Interferences, Precision, Bias, and Stability

1.1 Applicability. This method is applicable for determining emissions of hydrogen halides (HX) [hydrogen chloride (HCL), hydrogen bromide (HBr), and hydrogen flouride (HF)] and halogens ($X_2$) [chlorine ($Cl_2$) and bromine ($Br_2$)] from stationary sources. This method collects the emission sample isokinetically and is therefore particulary suited for sampling at sources, such as those controlled by wet scrubbers, emitting acid particulate matter (e.g., hydrogen halides dissolved in water droplets). [NOTE: Mention of trade names or specific products does not constitute endorsement by the Enviromental Protection Agency.]

1.2 Principle. Gaseous and particulate pollutants are withdrawn isokinetically from the source and collected in an optional cyclone, on a filter, and in absorbing solutions. The cyclone collects any liquid droplets and is not necessary if the source emissions do not contain them; however, it is preferable to include the cyclone in the sampling train to protect the filter from any moisture present. The filter collects other particulate matter including halide salts. Acidic and alkaline absorbing solutions collect the gaseous hydrogen halides and halogens, respectively. Following sampling of emissions containing liquid droplets, any halides/halogens dissolved in the liquid in the cyclone and on the filter are vaporized to gas and corrected in the impingers by pulling conditioned ambient air throught the sampling train. The hydrogen halides are solubilized in the acidic solution and form chloride ($Cl^-$), bromide ($Br^-$), and fluoride ($F^-$) ions. The halogens have a very low solubility in the acidic solution and pass through to the alkaline solution where they are hydrolyzed to form a proton ($H^+$), the halide ion, and the hypohalous acid (HClO or HBrO). Sodium thiosulfate is added to the alkaline solution to assure reaction with the hypohalous acid to form a second halide ion such that 2 halide ions are formed for each molecule of halogen gas. The halide ions in the separate solutions are measured by ion chromatography (IC). If desired, the particulate matter recovered from the filter and the probe is analyzed following the procedures in Method 5. [NOTE: If the tester intendes to use this sampling arrangement to sample concurrently for particulate

matter, the alternative Teflon$^R$ probe liner, cyclone, and filter holder should not be used. The Teflon$^R$ filter support must be used. The tester must also meet the probe and filter temperature requriements of both sampling trains.]

1.3 Interferences. Volatile materials, such as chlorine dioxide ($ClO_2$) and ammonium chloride ($NH_4Cl$), which produce halide ions upon dissolution during sampling are potential interferents. Interferents for the halide measurements are the halogen gases which disproportionate to a hydrogen halide and an hypohalous acid upon dissolution in water. The use of acidic rather than neutral or basic solutions for collection of the hydrogen halides greatly reduces the dissolution of any halogens passing through this solution. The simultaneous presence of both HBr and $Cl_2$ may cause a positive bias in the HCl result with a corresponding negative bias in the $Cl_2$ result as well as affecting the $HBr/Br_2$ split. High concentrations of nitrogen oxides ($NO_x$) may produce sufficient nitrate ($NO_3$) to interfere with measurements of very low Br levels.

1.4 Precision and Bias. The method has a possible measurable negative bias below 20 ppm HCl perhaps due to reaction with small amounts of moisture in the probe and filter. Similiar bias for the other hydrogen halides is possible.

1.5 Sample Stability. The collected $Cl^-$ samples can be stored for up to 4 weeks for analysis for HCl and $Cl_2$.

1.6 Detection Limit. The in-stack detection limit for HCl is approximately 0.02 ug per liter of stack gas; the analytical detection limit for HCl is 0.1 ug/ml. Detection limits for the other analyses should be similiar.

## 2. Apparatus.

2.1 Sampling. The sampling train is shown in Figure 26A-1; the apparatus is similiar to the Method 5 train where noted as follows:

2.1.1 Probe Nozzle. Borosilicate or quartz glass; constructed and calibrated according to Method 5, Sections 2.1.1 and 5.1, and coupled to the probe liner using a Teflon$^R$ union; a stainless steel nut is recommended for this union. When the stack temperature exceeds 210$^o$C (410$^o$F), a one-piece glass nozzle/liner assembly must be used.

2.1.2 Probe Liner. Same as Method 5, Section 2.1.2, except metal liners shall not used. Water-cooling of the stainless steel sheath is recommended at temperatures exceeding 500$^o$C. Teflon$^R$ may be used in limited applications where the minimum

stack temperature exceeds 120°C (250°F) but never exceeds the temperature where Teflon® is estimated to become unstable (approximately 210°C).

2.1.3 Pitot Tube, Differential Pressure Gauge, Filter Heating System, Metering System, Barometer, Gas Density Determination Equipment. Same as Method 5, Sections 2.1.3, 2.1.4, 2.1.6, 2.1.8, 2.1.9, and 2.1.10.

2.1.4 Cyclone (Optional). Glass or Teflon®. Use of the cyclone is required only when the sample gas stream is saturated with moisture; however, the cyclone is recommended to protect the filter from any moisture droplets present.

2.1.5 Filter Holder. Borosilicate or quartz glass, or Teflon® filter holder, with a Teflon® filter support and a sealing gasket. The sealing gasket shall be constructed of Teflon® or equivalent materials. The holder design shall provide a positive seal against leakage at any point along the filter circumference. The holder shall be attached immediately to the outlet of the cyclone.

2.1.6 Impinger Train. The following system shall be used to determine the stack gas moisture content and to collect the hydrogen halides and halogens: five or six impingers connected in a series with leak-free ground glass fittings or any similar leak-free noncontaminating fittings. The first impinger shown in Figure 26A-1 (knockout or condensate impinger) is optional and is recommended as a water knockout trap for use under high moisture conditions. If used, this impinger should be constructed as described below for the alkaline impingers, but with a shortened stem, and should contain 50 ml of 0.1 N $H_2SO_4$. The following two impingers (acid impingers which each contain 100 ml of 0.1 $H_2SO_4$) shall be of the Greenburg-Smith design with the standard tip (Method 5, Section 2.1.7). The next two impingers (alkaline impingers which each contain 100 ml of 0.1 N NaOH) and the last impinger (containing silica gel) shall be of the modified Greenburg-Smith design (Method 5, Section 2.1.7). The condensate, acid, and alkaline impingers shall contain known quantities of the appropriate absorbing reagents. The last impinger shall contain a known weight of silica gel or equivalent desiccant. Teflon® impingers are an acceptable alternative.

2.1.7 Ambient Air Conditioning Tube (Optional). Tube tightly packed with approximately 150 g of fresh 8 to 20 mesh sodium hydroxide-coated silica, or equivalent, (AscariteII® has been found suitable) to dry and remove acid gases from the ambient air used to remove moisture from the filter and cyclone, when the cyclone is used. The inlet and outlet ends of the tube should be packed with at least 1-cm thickness of glass wool or

filter material suitable to prevent escape of fines. Fit one end with flexible tubing, etc. to allow connection to probe nozzle following the test run.

2.2 Sample Recovery. The following items are needed:

2.2.1 Probe-Liner and Probe-Nozzle Brushes, Wash Bottles, Glass Sample Storage Containers, Petri Dishes, Graduated Cylinder or Balance, and Rubber Policeman. Same as Method 5, Sections 2.2.1, 2.2.2, 2.2.3, 2.2.4, 2.2.5, and 2.2.7.

2.2.2 Plastic Storage Containers. Screw-cap polypropylene containers to store silica gel. High-density polyethylene bottles with Teflon screw cap liners to store impinger reagents, 1-liter.

2.2.3 Funnels. Glass or high-density polyethylene, to aid in sample recovery.

2.3 Analysis. For analysis, the following equipment is needed:

2.3.1 Volumetric Flasks. Class A, various sizes.

2.3.2 Volumetric Pipettes. Class A, assortment, to dilute samples to calibration range of the ion chromatograph (IC).

2.3.3 Ion Chromatograph. Suppressed or nonsuppressed, with a conductivity detector and electronic integrator operating in the peak area mode. Other detectors, a strip chart recorder, and peak heights may be used.

## 3. Reagents

Unless otherwise indicated, all reagents must conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society (ACS reagent grade). When such specifications are not available, the best available grade shall be used.

3.1 Sampling.

3.1.1 Water. Deionized, distilled water that conforms to American Society of Testing and Materials (ASTM) Specification D 1193-77, Type 3.

3.1.2 Acidic Absorbing Solution, 0.1 N Sulfuric Acid ($H_2SO_4$). To prepare 1 L, slowly add 2.80 ml of concentrated $H_2SO_4$ to about 900 ml of water while stirring, and adjust the

final volume to 1 L using additional water. Shake well to mix the solution.

3.1.3 Alkaline Absorbing Solution, 0.1 N Sodium Hydroxide (NaOH). To prepare 1 L, dissolve 4.00 g of solid NaOH in about 900 ml of water and adjust the final volume to 1 L using additional water. Shake well to mix the solution.

3.1.4 Filter. Teflon mat (e.g., Pallflex$^{R}$ TX40H145) filter. When the stack gas temperature exceeds 210$^{o}$C (410$^{o}$F) a quartz fiber filter may be used.

3.1.5 Silica Gel, Crushed Ice, and Stopcock Grease. Same as Method 5, Sections 3.1.2, 3.1.4, and 3.1.5, respectively.

3.1.6 Sodium Thiosulfate, ($Na_2S_2O_3 3 \cdot 5\ H_2O$).

3.2 Sample Recovery.

3.2.1 Water. Same as Section 3.1.1.

3.2.2 Acetone. Same as Method 5, Section 3.2.

3.3 Sample Analysis.

3.3.1 Water. Same as Section 3.1.1.

3.3.2 Reagent Blanks. A separate blank solution of each absorbing reagent should be prepared for analysis with the field samples. Dilute 200 ml of each absorbing solution (250 ml of the acidic absorbing solution, if a condensate impinger is used) to the same final volume as the field samples using the blank sample of rinse water. If a particulate determination is conducted, collect a blank sample of acetone.

3.3.3 Halide Salt Stock Standard Solutions. Prepare concentrated stock solutions from reagent grade sodium chloride (NaCl), sodium bromide (NaBr), and sodium fluoride (NaF). Each must be dried at 110$^{o}$C for 2 or more hours and then cooled to room temperature in a desiccator immediately before weighing. Accurately weigh 1.6 to 1.7 g of the dried NaCl to within 0.1 mg, dissolve in water, and dilute to 1 liter. Calculate the exact $Cl^-$ concentration using Equation 26A-1.

$$uCl^-/ml = g \text{ of NaCl} \times 10^3 \times 35.453/58.44 \qquad \text{(Equation 26A-1)}$$

In a similar manner, accurately weigh and solubilize 1.2 to 1.3 g of dried NaBr and 2.2 to 2.3 g of NaF to make 1 liter solutions.

Use Equations 26A-2 and 26A-3 to calculate the $Br^-$ and $F^-$ concentrations.

$ugBr^-/ml = g \text{ of } NaBr \times 10^3 \times 79.904/102.90$ (Equation 26A-2)

$ugF^-/ml = g \text{ of } NaF \times 10^3 \times 18.998/41.99$ (Equation 26A-3)

Alternately, solutions containing a nominal certified concentration of 1000 mg/L NaCl are commercially available as convenient stock solutions from which standards can be made by appropriate volumetric dilution. Refrigerate the stock standard solutions and store no longer than 1 month.

3.3.4 Chromatographic Eluent. Same as Method 26, Section 3.2.4.

## 4. Procedure

Because of the complexity of this method, testers and analysts should be trained and experienced with the procedures to ensure reliable results.

4.1 Sampling.

4.1.1 Pretest Preparation. Follow the general procedure given in Method 5, Section 4.1.1, except the filter need only be desiccated and weighed if a particulate determination will be conducted.

4.1.2 Preliminary Determinations. Same as Method 5, Section 4.1.2.

4.1.3 Preparation of Sampling Train. Follow the general procedure given in Method 5, Section 4.1.3, except for the following variations:

And 50 ml of 0.1 N $H_2SO_4$ to the condensate impinger, if used. Place 100 ml of 0.1 N $H_2SO_4$ in each of the next two impingers. Finally, transfer approximately 200-300 g of preweighed silica gel from its container to the last impinger. Set up the train as in Figure 26A-1. When used, the optional cyclone is inserted between the probe liner and filter holder and located in the heated filter box.

4.1.4 Leak-Check Procedures. Follow the leak-check procedures given in Method 5, Sections 4.4.1 (Pretest Leak-Check), 4.1.4.2 (Leak-Checks During the Sample Run), and 4.1.4.3 (Post-Test Leak-Check).

4.1.5 Train Operation. Follow the general procedure given in Method 5, Section 4.1.5. Maintain a temperature around the filter and (cyclone, if used) of greater than 120°C (248°F). For each run, record the data required on a data sheet such as the one shown in Method 5, Figure 5-2. If the condensate impinger becomes too full, it may be emptied, recharged with 50 ml of 0.1 N $H_2SO_4$, and replaced during the sample run. The condensate emptied must be saved and included in the measurement of the volume of moisture collected and included in the sample for analysis. The additional 50 ml of absorbing reagent must also be considered in calculating the moisture. After the impinger is reinstalled in the train, conduct a leak-check as described in Method 5, Section 4.1.4.2.

4.1.6 Post-Test Moisture Removal (Optional). When the optional cyclone is included in the sampling train or when moisture is visible on the filter at the end of a sample run even in the absence of a cyclone, perform the following procedure. Upon completion of the test run, connect the ambient air conditioning tube at the probe inlet and operate the train with the filter heating system at least 120°C (248°F) at a low flow rate (e.g., $\Delta H$ = 1 in. $H_2O$) to vaporize any liquid and hydrogen halides in the cyclone or on the filter and pull them through the train into the impingers. After 30 minutes, turn off the flow, remove the conditioning tube, and examine the cyclone and filter for any visible moisture. If moisture is visible, repeat this step for 15 minutes and observe again. Keep repeating until the cyclone is dry. [**NOTE**: It is critical that this is repeated until the cyclone is completely dry.]

4.2 Sample Recovery. Allow the probe to cool. When the probe can be handled safely, wipe off all the external surfaces of the tip of the probe nozzle and place a cap loosely over the tip. Do not cap the probe tip tightly while the sampling train is cooling down because this will create a vacuum in the filter holder, drawing water from the impingers into the holder. Before moving the sampling train to the cleanup site, remove the probe, wipe off any silicone grease, and cap the open outlet of the impinger train, being careful not to lose any condensate that might be present. Wipe off any silicone grease and cap the filter or cyclone inlet. Remove the umbilical cord from the last impinger and cap the impinger. If a flexible line is used between the first impinger and the filter holder, disconnect it at the filter holder and let any condensed water drain into the first impinger. Wipe off any silicone grease and cap the filter holder outlet and the impinger inlet. Ground glass stoppers, plastic caps, serum caps, Teflon tape, Parafilm, or aluminum foil may be used to close these openings. Transfer the probe and filter/impinger assembly to the cleanup area. This area should be clean and protectd from the weather to minimize sample

contamination or loss. Inspect the train prior to and during disassembly and note any abnormal conditions. Treat samples as follows:

4.2.1 Container No. 1 (Optional, Filter Catch for Particulate Determination). Same as Method 5, Section 4.2, Container No. 1.

4.2.2 Container No. 2 (Optional, Front-Half Rinse for Particulate Determination). Same as Method 5, Section 4.2, Container No. 2.

4.2.3 Container No. 3 (Knockout and Acid Impinger Catch for Moisture and Hydrogen Halide Determination). Disconnect the impingers. Measure the liquid in the acid and knockout impingers to ± 1 ml by using a graduated cylinder or by weighing it to ± 0.5 g by using a balance. Record the volume or weight of liquid present. This information is required to calculate the moisture content of the effluent gas. Quantitatively transfer this liquid to a leak-free sample storage container. Rinse these impingers and connecting glassware including the back portion of the filter holder (and flexible tubing, if used) with water and add these rinses to the storage container. Seal the container, shake to mix, and label. The fluid level should be marked so that if any sample is lost during transport, a correction proportional to the lost volume can be applied. Retain rinse water and acidic absorbing solution blanks and analyze with the samples.

4.2.4 Container No. 4 (Alkaline Impinger Catch for Halogen and Moisture Determination). Measure and record the liquid in the alkaline impingers as described in Section 4.2.3. Quantitatively transfer this liquid to a leak-free sample storage container. Rinse these two impingers and connecting glassware with water and add these rinses to the container. Add 25 mg of sodium thiosulfate per ppm halogen-dscm of stack gas sample. [**NOTE**: This amount of sodium thiosulfate includes a safety factor of approximately 5 to assure complete reaction with the hypohalous acid to form a second $Cl^-$ ion in the alkaline solution.] Seal the container, shake to mix, and label; mark the fluid level. Retain alkaline absorbing solution blank and analyze with the samples.

4.2.5 Container No. 5 (Silica Gel for Moisture Determination). Same as Method 5, Section 4.2, Container No. 3.

4.2.6 Container Nos. 6 through 9 (Reagent Blanks). Save portions of the absorbing reagents (0.1 N $H_2SO_4$ and 0.1 N NaOH) equivalent to the amount used in the sampling train; dilute to the approximate volume of the corresponding samples using rinse water directly from the wash bottle being used. Add the same

ratio of sodium thiosulfate solution used in container No. 4 to the 0.1 N NaOH absorbing reagent blank. Also, save a portion of the rinse water alone and a portion of the acetone equivalent to the amount used to rinse the front half of the sampling train. Place each in a separate, prelableled sample container.

4.2.7 Prior to shipment, recheck all sample containers to ensure that the caps are well-secured. Seal the lids of all containers around the circumference with Teflon tape. Ship all liquid samples upright and all particulate filters with the particulate catch facing upward.

4.3 Sample Preparation and Analysis. Note the liquid levels in the sample containers and confirm on the analysis sheet whether or not leakage occurred during transport. If a noticeable leakage has occurred, either void the sample or use methods, subject to the approval of the Administrator, to correct the final results.

4.3.1 Container Nos. 1 and 2 and Acetone Blank (Optional; Particulate Determination). Same as Method 5, Section 4.3.

4.3.2 Container No. 5. Same as Method 5, Section 4.3 for Silica gel.

4.3.3 Container Nos. 3 and 4 and Absorbing Solution and Water Blanks. Quantitatively transfer each sample to a volumetric flask or graduated cyclinder and dilute with water to a final volume within 50 ml of the largest sample.

4.3.3.1 The IC conditions will depend upon analytical column type and whether suppressed or nonsuppressed IC is used. Prior to calibration and sample analysis, establish a stable baseline. Next, inject a sample of water, and determine if any $Cl^-$, $Br^-$, or $F^-$ appears in the chromatogram. If any of these ions are present, repeat the load/injection procedure until they are no longer present. Analysis of the acid and alkaline absorbing solution samples requires separate standard calibration curves; prepare each according to Section 5.2. Ensure adequate baseline separation of the analyses.

4.3.3.2 Between injections of the appropriate series of calibration standards, inject in duplicate the reagent blanks and the field samples. Measure the areas or heights of the $Cl^-$, $Br^-$, and $F^-$ peaks. Use the average response to determine the concentrations of the field samples and reagent blanks using the linear calibration curve. If the values from duplicate injections are not within 5 percent of their mean, the duplicate injection shall be repaeated and all four values used to determine the average response. Dilute any sample and the blank

with equal volumes of water if the concentration exceeds that of the highest standard.

4.4 Audit Sample Analysis. Audit samples must be analyzed subject to availability.

## 5. Calibration

Maintain a laboratory log of all calibrations.

5.1 Probe Nozzle, Pitot Tube, Dry Gas Metering System, Probe Heater, Temperature Gauges, Leak-Check of Metering System, and Barometer. Same as Method 5, Sections 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, and 5.7, respectively.

5.2 Ion Chromatograph. To prepare the calibration standards, dilute given amounts (1.0 ml or greater) of the stock standard solutions to convenient volumes, using 0.1 N $H_2SO_4$ or 0.1 N NaOH, as appropriate. Prepare at least four calibration standards for each absorbing reagent containing the three stock solutions such that they are within the linear range of the field samples. Using one to the standards in each series, ensure adequate baseline separation for the peaks of interest. Inject the appropriate series of calibration standards, starting with the lowest concentration standard first both before and after injection of the quality control check sample, reagent blanks, and field samples. This allows compensation for any instrument drift occurring during sample analysis. Determine the peak areas, or height, of the standards and plot individual values versus halide ion concentrations in ug/ml. Draw a smooth curve through the points. Use linear regression to calculate a formula describing the resulting linear curve.

## 6. Quality Control

Same as Method 5, Section 4.4.

## 7. Quality Assurance

7.1 Applicability. When the method is used to demonstrate compliance with a regulation, a set of two audit samples shall be analyzed.

7.2 Audit Procedure. The currently available audit samples are chloride solutions. Concurrently analyze the two audit samples and a set of compliance samples in the same manner to evaluate the technique of the analyst and the standards preparation. The same analyst, analytical reagents, and analytical system shall be used both for compliance samples and the Environmental Protection Agency (EPA) audit samples.

7.3 Audit Sample Availability. Audit samples will be supplied only to enforcement agencies for compliance tests. Audit samples may be obtained by writing the Source Test Audit Coordinator (MD-77B), Quality Assurance Division, Atmospheric Research and Exposure Assessment Laboratory, U.S. Environmental Protection Laboratory, Research Triangle Park, NC 27711 or by calling the Source Test Audit Coordinator (STAC) at (919) 541-7834. The request for the audit samples should be made at least 30 days prior to the scheduled compliance sample analysis.

7.4 Audit Results. Calculate the concentrations in mg/dscm using the specified sample volume in the audit instructions. Include the results of both audit samples, their identification numbers, and the analyst's name with the results of the compliance determination samples in appropriate reports to the EPA regional office or the appropriate enforcement agency. (**NOTE:** Acceptability of results may be obtained immediately by reporting the audit results in mg/dscm and compliance results in total ug HCl/sample to the responsible enforcement agency.) The concentrations of the audit samples obtained by the analyst shall be agree within 10 percent of the actual concentrations. If the 10 percent specification is not met, reanalyze the compliance samples and audit samples, and include intitial and reanalysis values in the test report. Failure to meet the 10 percent specification may require retests until the audit problems are resolved.

## 8. Calculations

Retain at least one extra decimal figure beyond those contained in the available data in intermediate calculations, and round off only the final answer appropriately.

8.1 Nomenclature. Same as Method 5, Section 6.1. In Addition:

$B_x$ = Mass concentration of applicable absorbing solution blank, ug halide ion ($Cl^-$, $Br^-$, $F^-$)/ml, not exceed 1 ug/ml which is 10 times the published analytical detection limit of 0.1 ug/ml. (It is also approximately 5 percent of the mass concentration anticipated to result from a one hour sample at 10 ppmv HCl.)

C = Concentration of hydrogen halide (HX) or halogen ($X_2$), dry basis, mg/dscm.

$m_{HX}$ = Mass of HCl, HBr, or HF in sample , ug.

$m_{X2}$ = Mass of $Cl_2$ or $Br_2$ in sample, ug.

$S_x$- = Analysis of sample, ug halide ion ($Cl^-$, $Br^-$, $F^-$)/ml.

$V_s$ = Volume of filtered and diluted sample, ml.

8.2 Average Dry Gas Meter Temperature and Average Orifice Pressure Drop. See data sheet (Figure 5-2 of Method 5).

8.3 Dry Gas Volume. Calculate $V_{m(std)}$ and adjust for leakage, if necessary, using the equation in Section 6.3 of Method 5.

8.4 Volume of Water Vapor and Moisture Content. Calculate the volume of water vapor $V_{w(std)}$ and moisture content $B_{ws}$ from the data obtained in this method (Figure 5-2 of Method 5); use Equations 5-2 and 5-3 of Method 5.

8.5 Isokinetic Variation and Acceptable Results. Use Method 5, Sections 6.11 and 6.12.

8.6 Actone Blank Concentration, Acetone Wash Blank Residue Weight, Particulate Weight, and Particulate Concentration. For particulate determination.

8.7 Total ug HCl, HBr, or HF Per Sample.

$$m_{HX} = K\ V_s\ (S_{x-} - B_{x-}) \qquad \text{(Equation 26A-4)}$$

where:

$K_{HCl}$ = 1.028 (ug HCl/ug-mole)/(ug $Cl^-$/ug-mole).

$K_{HBr}$ = 1.013 (ug HBr/ug-mole)/(ug $Br^-$/ug-mole).

$K_{HF}$ = 1.053 (ug HF/ug-mole)/(ug $F^-$/ug-mole).

8.8 Total ug $Cl_2$ or $Br_2$ Per Sample.

$$m_{x2} = V_s\ (S_{x-} - B_{x-}) \qquad \text{(Equation 26A-5)}$$

8.9 Concentration of Hydrogen Halide or Halogen in Flue Gas.

$$C = K\ m_{HX,X2} / V_{m(std)} \qquad \text{(Equation 26A-6)}$$

where:

$K = 10^{-3}$ mg/ug

8.10 Stack Gas Velocity and Volumetric Flow Rate. Calculate the average stack gas velocity and volumetric flow

rate, if needed, in using data obtained in this method and the equations in Sections 5.2 and 5.3 of Method 2.

## 9. Bibliography

1. Steinsberger, S.C. and J.H. Margeson. Laboratory and Field Evaluation of a Methodology for Determination of Hydrogen Chloride Emissions from Municipal and Hzardous Waste Incinerators. U.S. Environmenta Protection Agency, Office of Research and Development. Publication No. 600/3-89/064. April 1989. Available from National Technical Information Service, Springfield, VA 22161 as PB89220586/AS.

2. State of California Air Resources Board. Method 421 - Determination of Hydrochloric Acid Emissions from Stationary Sources. March 18, 1987.

3. Cheney, J.L. and C.R. Fortune. Improvements in the Methodology for Measuring Hydrochloric Acid in Combustion Source Emissions. J. Environ.Sci Health. A19(3): 337-350. 1984.

4. Stern, D.A., B.M. Myatt, J.F. Lachowski, and K.T. McGregor. Speciation of Halogen and Hydrogen Halide Compounds in Gaseous Emissions. In: Incineration and Treatment of Hazardous Waste: Proceedings of the 9th Annual Research Symposium, Cincinnati, Ohio, May 2-4, 1983. Publication No. 600/9-84-015. July 1984. Available from National Technical Information Service, Springfield, VA 22161 as PB84-234525.

5. Holm, R.D. and S.A. Barksdale. Analysis of Anions in Combustion Products. In: Ion Chromatographic Analysis of Environmental Pollutants, E. Sawicki, J.D. Mulik, and E. Wittgenstein (eds). Ann Arbor, Michigan, Ann Arbor Science Publishers. 1978. pp. 99-110.

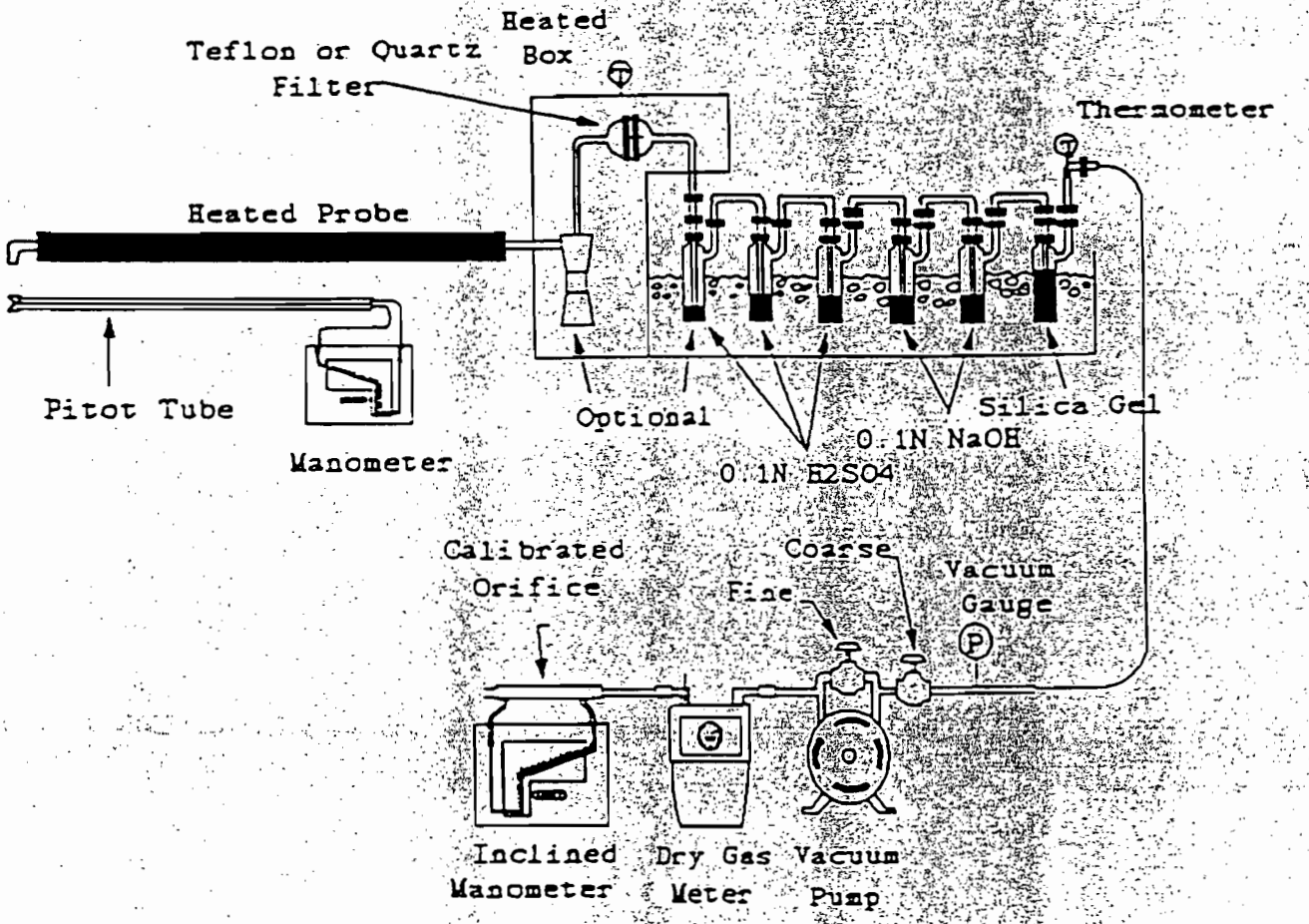



Figure 26A-1. Sampling train.

# APPENDIX A

# COMPLETE EMISSION DATA

## Source Sampling Nomenclature Sheet

**PB** - Barometric pressure, inches Hg.
**PS** - Stack pressure, inches Hg.
**AS** - Effective area of positive stack gas flow, sq. ft.
**As** - stack area, sq. ft.
**NPTS** - Number of traverse point where the pitot velocity head was greater than zero
**TS** - Stack temperature, degrees fahrenheit
**TM** - Meter temperature, degrees fahrenheit
**ASQH** - Average square root of velocity head, inches H2O
**DH** - Average meter orifice pressure differential, inches H2O
**AN** - Sampling nozzle area, square feet
**CP** - S-type pitot tube correction factor
**VM** - Recorded meter volume sample, cubic feet (meter conditions)
**VC** - Condensate and silica gel increase in impingers, milliliters
**PO** - Pressure at the dry test meter orifice, $PB + \frac{H}{13.6}$
**t** - Test time in minutes
**STP** - Standard conditions, dry, 68 degrees fahrenheit (Tstd), 29.92 inches Hg (Pstd)
**Y** - Average ratio of accuracy of wet test meter to dry gas meter, with a tolerance of plus or minus 0.02

---

**VWV** - Conversion of condensate in milliliters to water vapor in cubic feet (STP)
**VSTPD** - Volume sampled, cubic feet (STP)
**VT** - Total water vapor and dry gas volume sampled, cubic feet (STP)
**W** - Moisture fraction of stack gas
**FDA** - Dry gas fraction
**MD** - Molecular weight of stack gas, lbs/lb-mole (dry conditions)
**MS** - Molecular weight of stack gas, lbs/lb-mole (stack conditions)
**GS** - Specific gravity of stack gas, referred to air
**EA** - Excess air
**U** - Stack gas velocity, feet per minute
**QS** - Stack gas flow rate, cubic feet per minute (stack conditions)
**QD** - Stack gas flow rate, cubic feet per minute (dry conditions)
**QSTPD** - Stack gas flow rate, cubic feet per minute (STP)
**PISO** - Percent isokinetic volume sampled (method described in Federal Register)
**ESTP** - Particulate concentration at standard and dry conditions, grains/scf
**E12** - ESTP corrected to 12 % CO2, grains/scf
**E50** - ESTP corrected to 50 % excess air, grains/scf
**EM** - Mass emissions rate, lbs/hr
**Eh** - Mass emissions rate, lbs mmBTUs
**E** - ESTP corrected to % Excess Air.

## Equations For Calculating Particulate Emissions

$$VWV = (0.04707) \times (VC)$$

$$VSTPD = (17.65) \times (VM) \times \left(PB + \frac{DH}{13.6}\right) + (TM) \times (Y)$$

$$VT = (VWV) \times (VSTPD)$$

$$W = (VWV) + (VT)$$

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

$$MD = (0.44 \times \%\,CO2) + (0.32 \times \%\,O2) + (0.28 \times \%\,N2) + (0.28 \times \%\,CO)$$

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

$$CS = (MS) + (28.99)$$

$$EA = \left[(100) \times \left(\%\,O2 - \frac{\%\,CO}{2}\right)\right] \Big/ \left[(0.266 \times \%\,N2) - \left(O2 - \frac{\%\,CO}{2}\right)\right]$$

$$U = (174) \times (CP) \times (ASQH) \times \sqrt{(TS \times 29.92) + (CS \times PS)}$$

$$QS = (U) \times (AS)$$

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

$$QSTPD = (528) \times (QD) \times (PS) + (TS \times 29.9)$$

$$PISO = \frac{(100) \times Ts \times VSTPD \times Pstd}{Tstd \times U \times (t) \times An \times Ps \times (FDA)}$$

$$ESTP = \frac{(\text{SAMPLE WT. in mg.}) \times (0.01543)}{VSTPD}$$

$$E12 = \frac{(ESTP) \times (12)}{(CO2\,\%)}$$

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

$$EM = \frac{(ESTP) \times (QSTPD)\ (60\ min)}{7000}$$

$$Eh = \frac{(ESTP)}{7000} \times \text{FUEL FACTOR} \times \frac{20.9}{(20.9 - \%\,O2)}$$

$$E_{EA} = \frac{(ESTP) \times (100 + EA)}{\text{Desired EA}}$$

**Facility:** Georgia Pacific **Test Date:** 5/25/01

**Source:** Bleach Plant Outlet **Run Number:** 1

Example Calculations:

Page 1

1. Stack Pressure, (PS)

PS = PB + (PG/ 13.6)

Example. PB = 30.09 Therefore PS= 30.10 in. Hg.
PG = 0.07

2. Meter Pressure, (PM)

PM = (PB) + (*H / 13.6)

Example. *H = 1.508 Therefore PM= 30.20 in. Hg.

3. Volume Water Vapor, (VWV).

VWV = (0.04707) x (VC)

Example. VC = 37 Therefore VWV= 1.718 SCF

4. Meter Volume, corrected to Standard Conditions, (VSTD)

$$VSTPD = \frac{(17.65) \times (VM) \times (PM) \times (Y)}{TM}$$

Example. VM = 35.618 Therefore VSTPD = 35.391 SCF
PM = 30.20
TM = 553.1
Y = 1.031

5. Total Volume Of Sample, (VT).

VT = VWV + VSTPD

Example. VWV = 1.718 Therefore VT = 37.109 SCF
VSTPD = 35.391

PB = Barometric Pressure, inches of Hg.
PG = Static Pressure of stack, inches of H2O.
*H = Average meter orifice pressure differential inches of H2O.
VC = Volume condensate liquid volume + gain in silica gel wt., grams.
PM = See eq. 2.
TM = Temperature, meter, degrees Rankine.
Y = Meter Correction Factor
VWV = See eq. 3.
VSTPD = See eq. 4.

**Facility:** Georgia Pacific **Test Date:** 5/25/01

**Source:** Bleach Plant Outlet **Run Number:** 1

Example Calculations:
Page 2

6. Fraction Water Vapor in Gas Stream, (W)

W = (VWV / VT)

Example. VWV = 1.718 Therefore W = 0.046
VT = 37.109

7. Fraction Dry Air, (FDA).

FDA = 1.0 - W

Example. W = 0.046 Therefore FDA = 0.954

8. Molecular Weight of Stack Gas, Dry, (MD).

MD = (0.44 x %CO2) + (0.32 x %O2) + (0.28 x %N2) + (0.28 x %CO)

Example. CO2 = 0 Therefore MD = 28.84
O2 = 20.9
N2 = 79.1
CO = 0

9. Molecular Weight of Stack Gas, Stack Conditions, (MS).

MS = (MD x FDA) + (18 x W)

Example. MD = 28.84 Therefore MS = 28.34
FDA = 0.954
W = 0.046

10. Specific Gravity of Gas, Relative to Air, (GS)

GS = MS / 28.99

Example. MS = 28.34 Therefore GS = 0.978

VWV = See eq. 3 MS = See eq. 9
VT = See eq. 5
W = See eq. 6
MD = See eq. 8

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**Facility:** Georgia Pacific **Test Date:** 5/25/01

**Source:** Bleach Plant Outlet **Run Number:** 1

Example Calculations:
Page 3

11. Velocity of Stack Gas, as feet per minute, (U)

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

Example. CP = 0.84 Therefore U = 1604.8 FPM
H = 0.4652
TS = 548
PS = 30.10
GS = 0.978

12. Stack Gas Flow Rate, Stack Conditions, cubic feet per minute, (QS).

$QS = U \times AS$

Example. U = 1604.8 Therefore QS = 15440 ACFM
AS = 9.621

13. Stack Gas Flow Rate, Dry (QD)

$QD = QS \times FDA$

Example. QS = 15440 Therefore QD = 14730 CFMD
FDA = 0.954

14. Stack Gas Flow Rate, Standard Temperature and Pressure; Dry, (QSTPD)

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

Example QD = 14730 Therefore QSTPD = 14275 SCFMD
PS = 30.09
TS = 548

CP = Pitot Coefficient
H = Average of square roots of velocity heads, in H2O
TS = Temperature of stack, deg. R
PS = See eq. 1
GS = See eq. 10

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**Facility:** Georgia Pacific **Test Date:** 5/25/01

**Source:** Bleach Plant Outlet **Run Number:** 1

Example Calculations:
Page 4

15. Percent Isokinetic Volume Sampled, (PISO)

$$PISO = \frac{(100) \times Ts \times VSTPD \times Pstd}{Tstd \times U \times \Theta \times An \times Ps \times FDA}$$

Example. AN = 0.000413 Therefore PISO = 96.4
Θ = 60 Pstd = 29.92
VSTPD = 35.391 Tstd = 528
Ts = 548 Ps = 30.095147
U = 1604.8 FDA = 0.954

16. Particulate Concentration, grains per Standard Cubic Foot, (ESTP)

$$ESTP = (.01543 \times Mg.) / VSTPD$$

Example. Mg. = 0 Therefore ESTP = 0 Grs/ SCF
VSTPD = 35.391

17. Mass Emission Rate, Lbs / Hr, (EM)

$$EM = \frac{ESTP \times QSTPD \times 60 \text{ Min/ Hr}}{7000}$$

Example.
QSTPD = 14275 Therefore EM = 0 Lbs/ Hr

VSTPD = See eq. 4
AN = Area Nozzle, Sq Ft
Mg. = Weight of particulate catch in milligrams

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(904) 353 - 5761

| | | | |
|---|---|---|---|
| **Facility** | Georgia Pacific | | |
| **Location** | Palatka, FL | | |
| **Stack** | Bleach Plant Outlet | | |
| **Run Date** | 5/25/01 | **Impinger Condensate , Ml** | 32 |
| **Run Number** | 1 | **Silica Gel Condensate, Gm** | 4.5 |
| **Start Time** | 1850 | **Volume Metered** | 35.618 |
| **Finish Time** | 1952 | **Meter Temp (Deg R)** | 553.1 |
| **Weather** | Clear | **Orsat CO2 %** | 0.0 |
| **Total Time (min.)** | 60.00 | **Orsat O2 %** | 20.9 |
| **Barometric Pressure** | 30.09 | **Orsat CO %** | 0.0 |
| **Stack Diameter (in.)** | 42.000 | **Orsat N %** | 79.1 |
| **Stack Area sq. ft.** | 9.621 | **Condensate Volume, Ml** | 36.5 |
| **Nozzle Area sq. ft.** | 0.0004125 | **Delta H (Inches H2O)** | 1.5080 |
| **Number of Points** | 12 | **Stack Pressure** | 30.095 |
| **Avg of SQRT of V.H.** | 0.4652 | **Stack Temp (Deg R)** | 548.0 |
| **Meter Correction (Y)** | 1.031 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

| | |
|---|---|
| **Volume Water Vapor, SCF** | **1.718** |
| **Gas Volume Sampled, STPD** | **35.391** |
| **Total Volume, STP** | **37.109** |
| **Moisture in stack gas, volume fraction** | **0.046** |
| **Dry Stack Gas, volume fraction** | **0.954** |
| **Molecular Weight of Stack Gas (Dry Basis)** | **28.84** |
| **Molecular Weight of Stack Gas (Stack conditions)** | **28.34** |
| **Specific gravity of Stack Gas Relative to Air** | **0.978** |
| **Excess Air (%)** | **14864.9** |
| **Average Stack Velocity, FPM** | **1604.8** |
| **Actual Stack Gas Flow Rate, ACFM** | **15440** |
| **Actual Stack Gas Flow Rate, (Dry) ACFMD** | **14730** |
| **Stack Gas Flow Rate, SCFMD** | **14275** |
| **Percent Isokinetic** | **96.4** |

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**Facility:** Georgia Pacific
**Stack:** Bleach Plant Outlet
**Run Date:** 5/25/01
**Run No:** 1

**Field Data Points**

| Trav. Pt. | Vel. Head | Meter Orif. | Stack 'F | Meter 'F |
|---|---|---|---|---|
| 1 | 0.23 | 1.60 | 92 | 91 |
| 2 | 0.23 | 1.60 | 91 | 92 |
| 3 | 0.22 | 1.53 | 89 | 93 |
| 4 | 0.22 | 1.53 | 90 | 93 |
| 5 | 0.22 | 1.53 | 90 | 93 |
| 6 | 0.2 | 1.39 | 90 | 93 |
| 7 | 0.22 | 1.53 | 86 | 93 |
| 8 | 0.23 | 1.60 | 85 | 93 |
| 9 | 0.22 | 1.53 | 85 | 93 |
| 10 | 0.22 | 1.53 | 85 | 94 |
| 11 | 0.21 | 1.46 | 88 | 95 |
| 12 | 0.18 | 1.25 | 85 | 94 |
| 13 | 0 | | 0 | 0 |
| 14 | 0 | | 0 | 0 |
| 15 | 0 | | 0 | 0 |
| 16 | 0 | | 0 | 0 |
| 17 | 0 | | 0 | 0 |
| 18 | 0 | | 0 | 0 |
| 19 | 0 | | 0 | 0 |
| 20 | 0 | | 0 | 0 |
| 21 | 0 | | 0 | 0 |
| 22 | 0 | | 0 | 0 |
| 23 | 0 | | 0 | 0 |
| 24 | 0 | | 0 | 0 |
| 25 | 0 | | 0 | 0 |
| 26 | 0 | | 0 | 0 |
| 27 | 0 | | 0 | 0 |
| 28 | 0 | | 0 | 0 |
| 29 | 0 | | 0 | 0 |
| 30 | 0 | | 0 | 0 |

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| | | | |
|---|---|---|---|
| **Facility** | | | |
| **Location** | Palatka, FL | | |
| **Stack** | Bleach Plant Outlet | | |
| **Run Date** | 5/25/01 | **Impinger Condensate, Ml** | 36.0 |
| **Run Number** | 2 | **Silica Gel Condensate, Gm** | 5.2 |
| **Start Time** | 2130 | **Volume Metered** | 36.140 |
| **Finish Time** | 2234 | **Meter Temp (Deg R)** | 545.8 |
| **Weather** | Scattered Clouds | **Orsat CO2 %** | 0.0 |
| **Total Time (min.)** | 60.00 | **Orsat O2 %** | 20.9 |
| **Barometric Pressure** | 30.09 | **Orsat CO %** | 0.0 |
| **Stack Diameter (in.)** | 42.000 | **Orsat N %** | 79.1 |
| **Stack Area sq. ft.** | 9.621 | **Condensate Volume, Ml** | 41.2 |
| **Nozzle Area sq. ft.** | 0.0004125 | **Delta H (inches H2O)** | 1.4850 |
| **Number of Points** | 12 | **Stack Pressure** | 30.094 |
| **Avg of SQRT of V.H.** | 0.4616 | **Stack Temp (Deg R)** | 542.3 |
| **Meter Correction (Y)** | 1.031 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

| | |
|---|---|
| **Volume Water Vapor, SCF** | **1.939** |
| **Gas Volume Sampled, STPD** | **36.388** |
| **Total Volume, STP** | **38.327** |
| **Moisture in stack gas, volume fraction** | **0.051** |
| **Dry Stack Gas, volume fraction** | **0.949** |
| **Molecular Weight of Stack Gas (Dry Basis)** | **28.84** |
| **Molecular Weight of Stack Gas (Stack conditions)** | **28.29** |
| **Specific gravity of Stack Gas Relative to Air** | **0.976** |
| **Excess Air (%)** | **14864.9** |
| **Average Stack Velocity, FPM** | **1585.7** |
| **Actual Stack Gas Flow Rate, ACFM** | **15256** |
| **Actual Stack Gas Flow Rate, (Dry) ACFMD** | **14478** |
| **Stack Gas Flow Rate, SCFMD** | **14178** |
| **Percent Isokinetic** | **99.8** |

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**Technical Services, Inc.**
**Environmental Consultants**
**Analytical Chemists**

**2901 Danese Street**
**Jacksonville, Fl. 32206**
**(904) 353 - 5761**

**Facility:** Georgia Pacific
**Stack:** Bleach Plant Outlet
**Run Date:** 5/25/01
**Run No:** 2

**Field Data Points**

| Trav. Pt. | Vel. Head | Meter Orif. | Stack ' F | Meter ' F |
|---|---|---|---|---|
| 1 | 0.23 | 1.60 | 81 | 85 |
| 2 | 0.23 | 1.60 | 82 | 85 |
| 3 | 0.22 | 1.53 | 82 | 85 |
| 4 | 0.22 | 1.53 | 82 | 84 |
| 5 | 0.21 | 1.46 | 83 | 88 |
| 6 | 0.2 | 1.39 | 82 | 87 |
| 7 | 0.23 | 1.60 | 82 | 85 |
| 8 | 0.22 | 1.53 | 83 | 86 |
| 9 | 0.21 | 1.46 | 82 | 86 |
| 10 | 0.21 | 1.46 | 83 | 86 |
| 11 | 0.2 | 1.39 | 83 | 86 |
| 12 | 0.18 | 1.25 | 83 | 86 |
| 13 | 0 | | 0 | 0 |
| 14 | 0 | | 0 | 0 |
| 15 | 0 | | 0 | 0 |
| 16 | 0 | | 0 | 0 |
| 17 | 0 | | 0 | 0 |
| 18 | 0 | | 0 | 0 |
| 19 | 0 | | 0 | 0 |
| 20 | 0 | | 0 | 0 |
| 21 | 0 | | 0 | 0 |
| 22 | 0 | | 0 | 0 |
| 23 | 0 | | 0 | 0 |
| 24 | 0 | | 0 | 0 |
| 25 | 0 | | 0 | 0 |
| 26 | 0 | | 0 | 0 |
| 27 | 0 | | 0 | 0 |
| 28 | 0 | | 0 | 0 |
| 29 | 0 | | 0 | 0 |
| 30 | 0 | | 0 | 0 |

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**Technical Services, Inc.**
**Environmental Consultants**
**Analytical Chemists**

**2901 Danese Street**
**Jacksonville, Fl. 32206**
**(904) 353 - 5761**

| | | | |
|---|---|---|---|
| **Facility** | Georgia Pacific | | |
| **Location** | Palatka, FL | | |
| **Stack** | Bleach Plant Outlet | | |
| **Run Date** | 5/25/01 | **Impinger Condensate, Ml** | 40.0 |
| **Run Number** | 3 | **Silica Gel Condensate, Gm** | 4.9 |
| **Start Time** | 2300 | **Volume Metered** | 36.222 |
| **Finish Time** | 2402 | **Meter Temp (Deg R)** | 542.2 |
| **Weather** | Partly Cloudy | **Orsat CO2 %** | 0.0 |
| **Total Time (min.)** | 60 | **Orsat O2 %** | 20.9 |
| **Barometric Pressure** | 30.09 | **Orsat CO %** | 0.0 |
| **Stack Diameter (in.)** | 42.000 | **Orsat N %** | 79.1 |
| **Stack Area sq. ft.** | 9.621 | **Condensate Volume, Ml** | 44.9 |
| **Nozzle Area sq. ft.** | 0.0004125 | **Delta H (inches H2O)** | 1.5250 |
| **Number of Points** | 12 | **Stack Pressure** | 30.094 |
| **Avg of SQRT of V.H.** | 0.4680 | **Stack Temp (Deg R)** | 537.1 |
| **Meter Correction (Y)** | 1.031 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

| | |
|---|---|
| **Volume Water Vapor, SCF** | **2.113** |
| **Gas Volume Sampled, STPD** | **36.716** |
| **Total Volume, STP** | **38.829** |
| **Moisture in stack gas, volume fraction** | **0.054** |
| **Dry Stack Gas, volume fraction** | **0.946** |
| **Molecular Weight of Stack Gas (Dry Basis)** | **28.84** |
| **Molecular Weight of Stack Gas (Stack conditions)** | **28.25** |
| **Specific gravity of Stack Gas Relative to Air** | **0.974** |
| **Excess Air (%)** | **14864.9** |
| **Average Stack Velocity, FPM** | **1601.6** |
| **Actual Stack Gas Flow Rate, ACFM** | **15409** |
| **Actual Stack Gas Flow Rate, (Dry) ACFMD** | **14577** |
| **Stack Gas Flow Rate, SCFMD** | **14413** |
| **Percent Isokinetic** | **99.0** |

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**Technical Services, Inc.**
Environmental Consultants
Analytical Chemists

2901 Danese Street
Jacksonville, Fl. 32206
(904) 353 - 5761

**Facility:** Georgia Pacific
**Stack:** Bleach Plant Outlet
**Run Date:** 5/25/01
**Run No:** 3

| Field Data Points | | | | |
|---|---|---|---|---|
| Trav. Pt. | Vel. Head | Meter Orif. | Stack °F | Meter °F |
| 1 | 0.23 | 1.60 | 80 | 82 |
| 2 | 0.22 | 1.53 | 81 | 83 |
| 3 | 0.22 | 1.53 | 80 | 83 |
| 4 | 0.22 | 1.53 | 78 | 82 |
| 5 | 0.2 | 1.39 | 78 | 82 |
| 6 | 0.2 | 1.39 | 78 | 82 |
| 7 | 0.23 | 1.60 | 76 | 82 |
| 8 | 0.23 | 1.60 | 76 | 82 |
| 9 | 0.24 | 1.67 | 75 | 82 |
| 10 | 0.22 | 1.53 | 75 | 82 |
| 11 | 0.22 | 1.53 | 74 | 82 |
| 12 | 0.2 | 1.39 | 74 | 82 |
| 13 | 0 | | 0 | 0 |
| 14 | 0 | | 0 | 0 |
| 15 | 0 | | 0 | 0 |
| 16 | 0 | | 0 | 0 |
| 17 | 0 | | 0 | 0 |
| 18 | 0 | | 0 | 0 |
| 19 | 0 | | 0 | 0 |
| 20 | 0 | | 0 | 0 |
| 21 | 0 | | 0 | 0 |
| 22 | 0 | | 0 | 0 |
| 23 | 0 | | 0 | 0 |
| 24 | 0 | | 0 | 0 |
| 25 | 0 | | 0 | 0 |
| 26 | 0 | | 0 | 0 |
| 27 | 0 | | 0 | 0 |
| 28 | 0 | | 0 | 0 |
| 29 | 0 | | 0 | 0 |
| 30 | 0 | | 0 | 0 |

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**Ambient Air Services, Inc.**
**Environmental Consultants**

106 Ambient Air Way
Starke, Florida 32091

(904) 964 - 8440
(904) 964 - 6675 fax

## Volumetric Air-Flow Rates

| | | | |
|---|---|---|---|
| **Plant** | GEORGIA PACIFIC | | |
| **Location** | PALATKA, FL | | |
| **Stack** | BLEACH PLANT | | |
| **Run Date** | 5/26/01 | | |
| **Run Number** | 3 | **Volume Metered** | 0 |
| **Start Time** | 0 | **Meter Temp (Deg R)** | ERR |
| **Finish Time** | 0 | **Orsat CO2 %** | 0 |
| **Barometric Pressure** | 30.09 | **Orsat O2 %** | 21 |
| **Stack Diameter (in.)** | 42 | **Orsat CO %** | 0 |
| **Stack Area sq. ft.** | 9.621 | **Orsat N %** | 79 |
| **Number of Points** | 0 | **Condensate Volume** | 0 |
| **Avg of SQRT of V.H.** | 0.4641 | **Delta H (inches H2O)** | ERR |
| **Meter Correction (Y)** | 0 | **Stack Pressure** | 30.09 |
| **Pitot Correction Factor** | 0.84 | **Stack Temp (Deg R)** | 534.8 |

| | |
|---|---|
| Moisture in stack gas, volume fraction | 0.053 |
| Dry Stack Gas, volume fraction | 0.947 |
| Molecular Weight of Stack Gas (Dry Basis) | 28.84 |
| Molecular Weight of Stack Gas (Stack conditions) | 28.270 |
| Specific gravity of Stack Gas Relative to Air | 0.975 |
| Excess Air (%) | |
| Average Stack Velocity, FPM | 1584.2 |
| Actual Stack Gas Flow Rate, ACFM | 15242 |
| Actual Stack Gas Flow Rate, (Dry) ACFMD | 14434 |
| Stack Gas Flow Rate (Standard conditions), SCFMD | 14331 |
| Stack Gas Flow Rate (Standard conditions), SCFMW | 15133 |

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# APPENDIX B

# FIELD DATA SHEETS

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TECHNICAL SERVICES, INC.
JACKSONVILLE, FL
(904)353-5761

# SOURCE SAMPLING FIELD DATA SHEET

FACILITY: Georgia Pacific Palatka, GA RUN No. 1
SOURCE: Bleach Plant outlet DATE: 5-25-04
WEATHER: Clear
TYPE TEST: M26A
TESTERS: RH / BM
12 PTS @ 5 MIN/PT 60 MIN F.D.A. = 0.92
Y meter = 1.031 Filter No. =
COMMENTS: Dave / Gerald

BAROMETRIC PRESS 30.09
METER BOX ID 11
METER DELTA Ha 2.32
PROBE ID 5cs
PITOT CORR. FACTOR 0.84
NOZZLE DIA 0.275 in.
PROBE TEMP ~250
STACK ID (IN) 42
PORT LENGTH 7"

PRE-TEST. Ts = 558 Tm = 555

ORSAT: CO2 0 O2 20.5 CO 0

TIME START 1450 START VOLUME 212.658
TIME END 1952 END VOLUME 248.276
Factors: 6.559

Ea = 0.36 lbs/hr
Chlorinated hps

LEAK CHECK: PRE-TEST 0.016 CFM@15": POST: 0.006 @ 2 "Hg.
PITOT LEAK CHECK = OK AT 3"
VOL. WATER COLLECTED = 32 ML
WEIGHT MOIS. SILICA GEL = 45 GR
STAT. PRESS= +0.07

SCFMD = 17127

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS DROP | STACK GAS TEMP | METER TEMP (F) | FILTER TEMP (F) | LAST IMPINGER TEMP | VACUUM INCHES Hg | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 5 | 15.4 | 0.23 | 1.6 | 92 | 91 | 249 | 62 | 2 | |
| 2 | 10 | 18.2 | 0.23 | 1.6 | 91 | 92 | 252 | 60 | 2 | |
| 3 | 15 | 22.0 | 0.22 | 1.5 | 87 | 93 | 252 | 59 | 2 | |
| 4 | 20 | 25.2 | 0.22 | 1.5 | 90 | 93 | 250 | 60 | 2 | |
| 5 | 25 | 28.9 | 0.22 | 1.5 | 90 | 93 | 252 | 60 | 2 | |
| 6 | 30 | 31.1 | 0.20 | 1.4 | 90 | 93 | 251 | 61 | 2 | |
| | | | | | | | | | | |
| 2-1 | 35 | 34.6 | 0.22 | 1.5 | 86 | 93 | 252 | 62 | 2 | |
| 2 | 40 | 36.8 | 0.23 | 1.6 | 85 | 93 | 254 | 62 | 2 | |
| 3 | 45 | 39.1 | 0.22 | 1.5 | 88 | 93 | 261 | 62 | 2 | |
| 4 | 50 | 42.2 | 0.22 | 1.5 | 86 | 94 | 260 | 63 | 2 | |
| 5 | 55 | 45.5 | 0.21 | 1.5 | 87 | 95 | 261 | 63 | 2 | |
| 6 | 60 | | 0.18 | 1.3 | 85 | 94 | 262 | 63 | 2 | |

TECHNICAL SERVICES, INC.
JACKSONVILLE, FL
(904)353-5761

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SOURCE SAMPLING FIELD DATA SHEET

FACILITY: Georgia Pacific Palatka
SOURCE: Bleach Plant outlet
WEATHER: Scattered Clouds
TYPE TEST: M26A
TESTERS: LH/BM
12 PTS @ 5 MIN/PT, 60 MIN F D A =

RUN No. 2
DATE 5-21-04

PRE-TEST
Ts =
Tm =
Y meter = 1.031 Filter No. =

ORSAT
CO2 0
O2 20.5
CO 0
Computer
Directory and file name

BAROMETRIC PRESS 30.57
METER BOX ID 11
METER DELTA Ha 2.32
PROBE ID 509
PITOT CORR. FACTOR 0.84
NOZZLE DIA 0.275 in
PROBE TEMP 250
STACK ID (IN) 46.42
PORT LENGTH 7"

TIME START 2130 START VOLUME [redacted] 248.351
TIME END 2234 END VOLUME 254.491
Factors 6.959

LEAK CHECK
PRE TEST 0.006 CFM@15" POST 0.004 "Hg.
PITOT LEAK CHECK = OK AT 3"
VOL. WATER COLLECTED = 36 ML
WEIGHT MOIS. SILICA GEL = 52 GR
STAT PRESS= +0.05

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS DROP | STACK GAS TEMP | METER TEMP (F) | FILTER TEMP (F) | LAST IMPINGER TEMP | VACUUM INCHES Hg | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 5 | 52.4 | 0.23 | 1.6 | 81 | 85 | 246 | 64 | 3 | Stopped at 25 |
| 2 | 10 | 53.8 | 0.23 | 1.6 | 82 | 85 | 244 | 60 | 3 | |
| 3 | 15 | 58.2 | 0.22 | 1.5 | 82 | 85 | 254 | 60 | 3 | |
| 4 | 20 | 60.5 | 0.22 | 1.5 | 82 | 85 | 251 | 61 | 3 | |
| 5 | 25 | 63.4 | 0.21 | 1.5 | 83 | 85 | 247 | 61 | 3 | |
| 6 | 30 | 66.1 | 0.20 | 1.4 | 82 | 87 | 247 | 61 | 3 | |
| 2-1 | 35 | 68.4 | 0.23 | 1.4 | 82 | 85 | 242 | 61 | 3 | |
| 2 | 40 | 71.2 | 0.22 | 1.5 | 83 | 86 | 245 | 60 | 3 | |
| 3 | 45 | 74.2 | 0.21 | 1.5 | 82 | 86 | 250 | 61 | 3 | |
| 4 | 50 | 77.8 | 0.21 | 1.5 | 83 | 86 | 249 | 61 | 3 | |
| 5 | 55 | 79.9 | 0.20 | 1.4 | 83 | 86 | 242 | 61 | 3 | |
| 6 | 60 | | 0.18 | 1.3 | 83 | 86 | 230 | 62 | 3 | |

TECHNICAL SERVICES, INC.
JACKSONVILLE, FL
(904)353-5761

**Best Available Copy**

# SOURCE SAMPLING FIELD DATA SHEET

FACILITY: Georg. Pacific Palatka, FL — RUN No: 3
SOURCE: Bleach Plant Outlet — DATE: 5-25-01
WEATHER: Partly Cloudy — PRE-TEST
TYPE TEST: M26A — Ts =
TESTERS: KBH/BM — Tm =
½ PTS @ 5 MIN/PT 60 MIN F DA =
Y meter = 1.031 Filter No =
Computer:
Directory and file name:

ORSAT
CO2 0
O2 20.5
CO 0

BAROMETRIC PRESS: 30.07
METER BOX ID: 11
METER DELTA Ha: 2.32
PROBE ID: SS
PITOT CORR FACTOR: 0.84
NOZZLE DIA: 0.275 in
PROBE TEMP: 320
STACK ID (IN): 46 42
PORT LENGTH: 7"

TIME START 2300 START VOLUME 285.513
TIME END 2402 END VOLUME 320.215
Factors: 6.959

LEAK CHECK:
PRE TEST: 0.00 CFM@15" POST: 0.001@3 "Hg.
PITOT LEAK CHECK = OK AT 3"
VOL. WATER COLLECTED = 40 ML
WEIGHT MOIS. SILICA GEL = 4.9 GR
STAT PRESS= +0.06

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | FILTER TEMP (F) | LAST IMPINGER TEMP | VACUUM INCHES Hg | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 5 | 88.7 | 0.23 | 1.6 | 80 | 82 | 249 | 62 | 3 | |
| 2 | 10 | 90.8 | 0.22 | 1.5 | 81 | 83 | 245 | 60 | 3 | |
| 3 | 15 | 94.1 | 0.22 | 1.5 | 82 | 83 | 246 | 55 | 3 | |
| 4 | 20 | 98.2 | 0.22 | 1.4 | 78 | 82 | 242 | 66 | 3 | |
| 5 | 25 | 00.3 | 0.20 | 1.4 | 78 | 82 | 247 | 59 | 3 | |
| 6 | 30 | 03.1 | 0.20 | 1.4 | 78 | 82 | 239 | 59 | 3 | |
| | | | | | | | | | | |
| 2-1 | 35 | 05.6 | 0.23 | 1.6 | 76 | 82 | 242 | 60 | 3 | |
| 2 | 40 | 7.9 | 0.23 | 1.6 | 76 | 82 | 240 | 60 | 3 | |
| 3 | 45 | 10.5 | 0.24 | 1.7 | 75 | 82 | 241 | 60 | 3 | |
| 4 | 50 | 13.1 | 0.22 | 1.4 | 75 | 82 | 242 | 61 | 3 | |
| 5 | 55 | 17.2 | 0.22 | 1.4 | 74 | 82 | 245 | 60 | 3 | |
| 6 | 60 | | 0.20 | 1.4 | 74 | 82 | 236 | 61 | 3 | |

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**Velocity Traverse**

Technical Services, Inc.
Jacksonville, FL (904)353-5761

Plant: Georgia Pacific Date: 5-25-01

Source: Barometric Pressure: 30.09

Stack Diameter: 46

Run No. (4) Run No. Run No.

Start: 0030 Stop: 0035 Start: Stop Start: Stop

Static Press.(in.H2O) +0.05 Static Press.(in.H2O) Static Press.(in.H2O)

| Traverse Point No. | Velocity Head | Stack Temp. (Ts) Deg. F |
|---|---|---|
| 1-1 | 0.24 | 74 |
| 2 | 0.24 | 75 |
| 3 | 0.23 | 75 |
| 4 | 0.22 | 75 |
| 5 | 0.20 | 76 |
| 6 | 0.19 | 75 |
| | | |
| 2-1 | 0.23 | 74 |
| 2 | 0.23 | 75 |
| 3 | 0.22 | 75 |
| 4 | 0.22 | 75 |
| 5 | 0.19 | 75 |
| 6 | 0.18 | 74 |

| Traverse Point No. | Velocity Head | Stack Temp. (Ts) Deg. F |
|---|---|---|
| | | |

| Traverse Point No. | Velocity Head | Stack Temp. (Ts) Deg. F |
|---|---|---|
| | | |

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# APPENDIX C

# LABORATORY ANALYSIS

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# TECHNICAL SERVICES, INC.
## ENVIRONMENTAL CONSULTANTS

For: Georgia Pacific (Palatka)
P O Box 919
Palatka, FL 32178-0919
Contact: Joe Taylor

*Report Date* 30-May-01
Date Received 05/26/2001 @ 10:20
Purchase Order #

## CERTIFICATE OF ANALYSIS

| LAB | MATRIX | SAMPLE DATE | SAMPLE TIME | SAMPLED BY |
|---|---|---|---|---|
| SAMPLE DESCRIPTION | | | | |
| 01050850 | IMPINGER | 05/25/2001 | NA | TSI D S G H |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 1/ COMPOSITE | | | | |
| 01050851 | IMPINGER | 05/25/2001 | NA | TSI D S G H |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 2/ COMPOSITE | | | | |
| 01050852 | IMPINGER | 05/25/2001 | NA | TSI D S G H |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 3/ COMPOSITE | | | | |
| 01050853 | IMPINGER | 05/25/2001 | NA | TSI D S G H |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 1/ COMPOSITE | | | | |
| 01050854 | IMPINGER | 05/25/2001 | NA | TSI D S G H |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 2/ COMPOSITE | | | | |
| 01050855 | IMPINGER | 05/25/2001 | NA | TSI D S G H |
| BLEACH PLANT INLET AND OUTLET, OUTLET RUN 3/ COMPOSITE | | | | |

Respectfully submitted,
Technical Services, Inc

Walter Mock

Georgia Pacific (Palatka)

| Lab No. | Parameter | Result | | Code | Method | Detection Limit |
|---|---|---|---|---|---|---|
| 01050850 | Default | Not analyzed | | | | |
| 01050851 | Default | Not analyzed | | | | |
| 01050852 | Default | Not analyzed | | | | |
| 01050853 | Chloride | 0.971 | ug/ml Cl- | | Method 26A | 0.02 |
| 01050853 | Sample Volume | 196 | mls | | | 1 |
| | | 190.3 µg | | | | |
| 01050854 | Chloride | 0.808 | ug/ml Cl- | | Method 26A | 0.02 |
| 01050854 | Sample Volume | 200 | mls | | | 1 |
| | | 161.6 µg | | | | |
| 01050855 | Chloride | 0.838 | ug/ml Cl- | | Method 26A | 0.02 |
| 01050855 | Sample Volume | 194 | mls | | | 1 |
| | | 162.6 µg | | | | |

R-1

R-2

R-3

Georgia Pacific (Palatka)

| Lab No. | Parameter | Date of Analysis | Analysis Time | Analyst | Prep Date |
|---|---|---|---|---|---|
| 01050850 | Default | | | none | |
| 01050851 | Default | | | none | |
| 01050852 | Default | | | none | |
| 01050853 | Chloride | 05/26/2001 | | WEM | |
| 01050853 | Sample Volume | 05/26/2001 | | WEM | |
| 01050854 | Chloride | 05/26/2001 | | WEM | |
| 01050854 | Sample Volume | 05/26/2001 | | WEM | |
| 01050855 | Chloride | 05/26/2001 | | WEM | |
| 01050855 | Sample Volume | 05/26/2001 | | WEM | |

# APPENDIX D

# SCRUBBER DATA AND PROCESS CERTIFICATION

# BLEACH PLANT PRODUCTION DATA

| DATE | TIME | ADTUP | FAN LOAD, % |
|---|---|---|---|
| 05/25/01 | 1850-1952 | 55 | 85.1 |
| | 2133-2300 | 50 | 85.6 |
| | 2300-2330 | 55 | 85.9 |
| | 2330-0042 | 50 | 85.8 |
| | 0145-0230 | 50 | 85.2 |

ADTUP is air-dried tons of unbleached pulp across the bleach plant.
Fan load is the % of full load (amperage) of the fan used as the surrogate flow measure.
The scrubber recirculation flow ranged from 1500 gpm to 1740 gpm during the testing.
The scrubber pH was 9.5 during the testing.

DATA CERTIFICATION BY OWNER OR HIS AUTHORIZED AGENT

I, Myra Carpenter,
(print name)

certify that to my knowledge all data

submitted in this compliance test report

for the ECF Bleach Plant unit

on May 25, 2001
(date)

are true and correct.

Myra Carpenter
(signature and title)

# APPENDIX E

# CHAIN OF CUSTODY

0105085C -
0105085S

**Technical Services, Inc.**
**2901 Danese St., Jacksonville, FL 32206**
**(904) 353-5761 / fax (904) 358-2908**

# CHAIN of CUSTODY RECORD

CLIENT NAME & ADDRESS (REPORT TO BE SENT TO:) c/o Air Dept
Georgia Pacific
Palatka, FL

REMARKS:
Bleach Plant inlet & Outlet
Method 26A

PROJ. NO.

PROJECT NAME/ ADDRESS:

SAMPLERS: (SIGNATURE)
D Jarrett G Hawkins

TOTAL NO. of Containers

BOTTLE MAKEUP
1 Poly

| Sample Location ID | DATE | TIME | COMP | GRAB | TOTAL NO. of Containers | BOTTLE MAKEUP | PARAMETERS |
|---|---|---|---|---|---|---|---|
| Outlet R-1 | 5-25-01 | N/A | ✓ | | 1 | 0.1N $H_2SO_4$ | M 26A |
| 2 | | | | | 1 | | |
| 3 | | | | | 1 | | |
| R-1 | | | | | 1 | 0.1N NaOH | |
| 2 | | | | | 1 | | |
| 3 | ↓ | ↓ | ↓ | | 1 | | |

| | | | |
|---|---|---|---|
| RELINQUISHED BY: D Jarrett | DATE/TIME | RECEIVED BY 5/26/01 1100 | DATE/TIME |
| RELINQUISHED BY | DATE/TIME | RECEIVED BY | DATE/TIME |
| RELINQUISHED BY | DATE/TIME | RECEIVED BY | DATE/TIME |
| | | RECEIVED FOR LABORATORY BY: | DATE/TIME 5/26/01 1100 |

J

# APPENDIX F

# CALIBRATION DATA

T S I

# Annual Dry Gas Meter Calibration Data By TSI Reference Meter

**REFERENCE METER** R-275 **TSI Reference Dry Meter Calibration Date:** 8/09/00

**Yi of reference meter:** 1.012

**Date** 1/4/01 **Calibrated by** R Garza

**Barometric Pressure** 30.12 **Meter Box** 11

| Orifice Manometer Setting (DH) In. H2O | Reference Dry Gas Meter Cu.ft. | Gas Volume Reference Meter (Vw) Std.Cu. Ft. | Gas Volume Dry Gas Meter (VD) Cu. Ft. | Temperature Reference Meter (Tw) Deg ^F | Temperature Dry Gas Meter Temperature (Td) Deg ^F | | Time (t), min | Delta H In. H2O | Yi |
|---|---|---|---|---|---|---|---|---|---|
| 0.5 | 10.015 | 10.099 | 9.715 | 73.2 | X | 66.40 | 29.34 | 2.39 | 1.025 |
| 1 | 10.002 | 10.082 | 9.761 | 73.4 | X | 70.90 | 20.46 | 2.31 | 1.026 |
| 1.5 | 10.005 | 10.044 | 9.642 | 75.6 | X | 73.30 | 17.00 | 2.42 | 1.033 |
| 2 | 10.013 | 10.075 | 9.691 | 74.4 | X | 74.50 | 14.50 | 2.32 | 1.035 |
| 3 | 10.012 | 10.057 | 9.645 | 75.3 | X | 75.40 | 11.39 | 2.16 | 1.035 |
| | | | | | **Average Delta H and Y** | | | 2.32 | 1.031 |
| | | | | | Yi Allowance = | | 1.011 | To | 1.051 |
| | | | | | DH Allowance = | | 2.12 | To | 2.52 |

* If there is only one thermometer on the dry gas meter, record the temperature under Td

Vw = Gas volume passing through the Reference test meter, (cu. ft.)

Vd = Gas volume passing through the dry gas meter, (cu. ft.)

Tw = Temperature of the gas in the Reference test meter, Deg F

Td = Temperature of the gas in the dry gas meter, Deg F

DH = Pressure differential across orifice, in H2O = pretest DH + or - 0.20

Yi = Ratio of accuracy of the Reference test meter to dry gas meter for each run

Y = Average ratio of the Reference test meter to dry gas meter for all three test runs; tolerance = pretest Y + or - 0.02Y

Pb = Barometric pressure, in. Hg.

t = Time of calibration run, min.

Quality Assurance Handbook M5-2.4A

Quality Assurance Handbook M5-2.4A

T
S
I

# Post-Test Dry Gas Meter Calibration Data Form (English Units)

N/A

**Test numbers** All **Date** 5/31/01 **Meter Box No.** 11 **Facility** GP

**Barometric Pressure, Pb** 30.05 **Reference Meter** R-275 **Pretest Y Value** 1.024

| Orifice Manometer Setting (DH) In. H2O | Gas Volume: Reference Meter (Vw) Cu. Ft. | Gas Volume: Dry Gas Meter (VD) Cu. Ft. | Temperature: Reference Meter (Tw) Deg ^F | Temperature: Dry Gas Meter | | Temperature: Dry Gas Meter Average (Td) Deg ^F | Time (), min | Vacuum Setting In. Hg. | Yi |
|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 10.003 | 9.831 | 75 | X | X | 75 | 16.87 | < 2 | 1.014 |
| 1.5 | 10.001 | 9.823 | 75 | X | X | 76 | 16.56 | <2 | 1.016 |
| 1.5 | 10.000 | 9.820 | 80 | X | X | 81 | 16.92 | <2 | 1.016 |
| | | | | | | | | Yi = | 1.016 |

* If there is only one thermometer on the dry gas meter, record the temperature under Td

$$Yi = \frac{Vw * Pb * (Td + 460)}{Vd\,(Pb + (Delta\ H/13.6)) \times (Tw + 460)}$$

Vw = Gas volume passing through the reference test meter, (cu. ft.)
Vd = Gas volume passing through the dry gas meter, (cu. ft.)
Tw = Temperature of the gas in the reference test meter, Deg F
(Td)i = Temperature of the inlet gas of the dry gas meter, Deg F
(Td) = Temperature of the outlet gas of the dry gas meter, Deg F
Td = Average temperature of the gas in the dry gas meter, obtained by the average of (Td)i & (Td)o, Deg F
DH = Pressure differential across orifice, in H2O
Yi = Ratio of accuracy of the reference test meter to dry gas meter for each run
Y = Average ratio of the reference test meter to dry gas meter for all three test runs;
tolerance = pretest Y + or - 0.02Y
Pb = Barometric pressure, in. Hg.
= Time of calibration run, min.

T S I

## Air Report - Method Five Equipment Calibrations

### THERMOCOUPLE CALIBRATIONS

**Facility:** Georgia Pacific | **Date:** 5/31/01

**Location:** Palatka, FL | **Analyst:** [signature]

**Source Name:** Bleach Plant Outlet Inlet

**Calibration Data**

**Ambient Temperature** 75 | **Reference: Mercury in glass** X

**Thermocouple Number** 5cg | **Other** ___

**Barometric Pressure** 29.97

| Reference Point Number | Source(a) (specify) | Reference Thermometer Temperature | Thermocouple Temperature | Temperature Difference(b) |
|---|---|---|---|---|
| 1 | Ice Bath | 34 | 33 | 0.20 |
| 2 | Inter-mediate | 75 | 73 | 0.37 |
| 3 | Boiling Water | 212 | 212 | 0.00 |
| 4 | Hot Oil | 347 | 345 | 0.25 |

a Type of calibration system used

b $\left[\frac{\text{(REF. TEMP. +460)-(THERMOCOUPLE TEMP. +460)}}{\text{ref. temp + 460}}\right] \times 100 <= 1.5\%$

# GEORGIA PACIFIC

## PALATKA, FLORIDA

## SUMMARY OF CO CALIBRATIONS - BLEACH PLANT

## 5/25/01 - 5/26/01

| INSTRUMENT RANGE, PPM | 1200 | | | |
|---|---|---|---|---|
| CALIBRATION GAS PPM | INITIAL CALIBRATION | END RUN 1 | END RUN 2 | END RUN 3 |
| 0.0 | 12.0 | 12.0 | 11.3 | 10.8 |
| 1015.0 | 1016.4 | 1020.0 | 1032.5 | 1031.6 |
| 594.7 | 575.1 | N/A | N/A | N/A |
| 301.9 | 293.5 | N/A | N/A | N/A |
| CALIBRATION ERROR | | ((INSTRUMENT RESPONSE-CALIBRATION GAS VALUE)/INSTRUMENT RANGE)X100 | | |
| 0.0 | 1.0 | 1.0 | 0.9 | 0.9 |
| 1015.0 | 0.1 | 0.4 | 1.5 | 1.4 |
| 594.7 | -1.6 | N/A | N/A | N/A |
| 301.9 | -0.7 | N/A | N/A | N/A |
| CALIBRATION DRIFT | | ((FINAL CALIBRATION - INITIAL CALIBRATION)/INSTRUMENT RANGE)X100 | | |
| 0.0 | N/A | 0.0 | -0.1 | -0.1 |
| 1015.0 | N/A | 0.3 | 1.3 | 1.3 |
| 594.7 | N/A | N/A | N/A | N/A |

| ZERO BIAS CHECKS | | (SAMPLE SYSTEM-DIRECT)/RANGEX100 | | |
|---|---|---|---|---|
| SAMPLE ZERO | DIRECT ZERO | BIAS | | |
| N/A | N/A | #VALUE! | INITIAL | |
| N/A | N/A | #VALUE! | FINAL | ALL CAL |
| CALIBRATION BIAS CHECKS | | | | GASES INJECTED |
| CALIBRATION GAS, PPM | N/A | | | TO PROBE TIP ONLY |
| SAMPLE | DIRECT | BIAS | | |
| N/A | N/A | #VALUE! | INITIAL | |
| N/A | N/A | #VALUE! | FINAL | |

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PRAXAIR

**Praxair Distribution, Inc.**
145 Shimersville Road
Bethlehem, PA 18015
Tel. (610) 691-2474
Fax (610) 758-8384

# *CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS*

**CUSTOMER** PRAXAIR SOUTHEAST **P.O NUMBER** 333045-00

## *REFERENCE STANDARD*

| COMPONENT | NIST SRM NO. | CYLINDER NO. | CONCENTRATION |
|---|---|---|---|
| CARBON MONOXIDE 503.2PPM GMIS VS | 1680B | CLM-009396 | 490.4 PPM |

## *ANALYZER READINGS*

***R=REFERENCE STANDARD*** ***Z=ZERO GAS*** ***C=GAS CANDIDATE***

1. **COMPONENT** CARBON MONOXIDE 503.2PPM GMIS **ANALYZER MAKE-MODEL-S/N** Siemens Ultramat 5E S/N B8-900

**ANALYTICAL PRINCIPLE** NON-DISPERSIVE INFRARED **LAST CALIBRATION DATE** 12/31/00

**FIRST ANALYSIS DATE** 12/27/00 **SECOND ANALYSIS DATE** 01/03/01

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Z 0 | R 503 | C 301 | CONC. 301.3 | Z 0 | R 504 | C 302 | CONC. 301.5 | | |
| R 502 | Z 0 | C 302 | CONC. 302.3 | R 504 | Z 0 | C 302 | CONC. 301.5 | | |
| Z 0 | C 302 | R 503 | CONC. 302.3 | Z 0 | C 303 | R 504 | CONC. 302.3 | | |
| U/M ppm | | MEAN TEST ASSAY 302.0 | | U/M ppm | | MEAN TEST ASSAY 301.9 | | | |

VALUES NOT VALID BELOW 150 PSIG

UNCERTAINTIY OF CARBON MONOXIDE: ±1.9PPM

THIS CYLINDER NO. CC114912
HAS BEEN CERTIFIED ACCORDING TO SECTION 2.2
OF TRACEABILITY PROTOCOL NO. EPA-600/R97/121
PROCEDURE G1
CERTIFIED ACCURACY ± 1 % NIST TRACEABLE
CYLINDER PRESSURE 2000 PSIG
CERTIFICATION DATE 01/03/01
EXPIRATION DATE 01/03/04 TERM

**CERTIFIED CONCENTRATION**

| | |
|---|---|
| CARBON MONOXIDE | 301.9PPM |
| AIR | BALANCE |

*ANALYZED BY* JOHN PRIBISH

*CERTIFIED BY* KEVIN BRADY

Best Available Copy

PRAXAIR

**Praxair Distribution, Inc.**
145 Shimersville Road
Bethlehem, PA 18015
Tel. (610) 691-2474
Fax (610) 758-8384

# *CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS*

**CUSTOMER** PRAXAIR SOUTHEAST **P.O NUMBER** 333045-00

## *REFERENCE STANDARD*

| COMPONENT | NIST SRM NO. | CYLINDER NO. | CONCENTRATION |
|---|---|---|---|
| CARBON MONOXIDE 503.2PPM GMIS VS | 1680B | CLM-009396 | 490.4 PPM |

## *ANALYZER READINGS*

***R=REFERENCE STANDARD*** ***Z=ZERO GAS*** ***C=GAS CANDIDATE***

1. **COMPONENT** CARBON MONOXIDE 503.2PPM GMIS **ANALYZER MAKE-MODEL-S/N** Siemens Ultramat 5E S/N B8-900

**ANALYTICAL PRINCIPLE** NON-DISPERSIVE INFRARED **LAST CALIBRATION DATE** 12/31/00

**FIRST ANALYSIS DATE** 12/27/00 **SECOND ANALYSIS DATE** 01/03/01

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Z 0 | R 503 | C 595 | CONC. 595.6 | Z 0 | R 504 | C 595 | CONC. 594.1 |
| R 502 | Z 0 | C 595 | CONC. 595.6 | R 504 | Z 0 | C 595 | CONC. 594.1 |
| Z 0 | C 594 | R 503 | CONC. 594.6 | Z 0 | C 595 | R 504 | CONC. 594.1 |
| U/M ppm | | MEAN TEST ASSAY 595.3 | | U/M ppm | | MEAN TEST ASSAY 594.1 | |

VALUES NOT VALID BELOW 150 PSIG

UNCERTAINTIY OF CARBON MONOXIDE: ±4.2PPM

THIS CYLINDER NO. SA12251

HAS BEEN CERTIFIED ACCORDING TO SECTION 2.3

OF TRACEABILITY PROTOCOL NO. EPA-600/R97/121

PROCEDURE G1

CERTIFIED ACCURACY ± 1 % NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE 01/03/01

EXPIRATION DATE 01/03/04 TERM

CERTIFIED CONCENTRATION

CARBON MONOXIDE 594.1PPM

AIR BALANCE

*ANALYZED BY* JOHN PRIBISH

*CERTIFIED BY*

**SPECTRA GASES**
277 Coit St. • Irvington, NJ 07111 USA Tel.: (973) 372-2060 • (800) 932-0624 • Fax (973) 372-8551
Shipped From: 80 Industrial Drive • Alpha, N.J. 08865

## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE
**PROCEDURE # : G2**

**CUSTOMER:** Ambient Air Service
**SGI ORDER # :** 134478
**ITEM# :** 1
**P.O.# :** 07079802

**CYLINDER # :** CC88617
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 350

**CERTIFICATION DATE:** 7/8/98
**EXPIRATION DATE:** 7/8/2001

**CERTIFICATION HISTORY**

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 2/24/98<br>7/8/98 | 1014 ppm<br>1017 ppm | 1015 ppm | +/- 1% |
| | | | | |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**REFERENCE STANDARDS**

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | NTRM-81681 | CC55775 | 994 ppm |
| | | | |
| | | | |
| | | | |

**INSTRUMENTATION**

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 6/29/98 |
| | | | | |
| | | | | |
| | | | | |

**THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

ANALYST: _____ DATE: 7/8/98
FRED PIKULA

# APPENDIX G

# CARBON MONOXIDE EMISSIONS

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1015 ppm cal | CORRECTED PPM | FLOW, actm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 18:46 | 1030.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:46 | 1026.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:46 | 1022.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:46 | 1026.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:47 | 1030.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:47 | 1024.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:47 | 1022.0 | 1015 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:47 | 1016.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:48 | 923.8 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:48 | 456.9 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:48 | 144.2 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:48 | 24.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:49 | 14.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:49 | 24.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:49 | 56.1 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:49 | 44.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:50 | 18.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:50 | 12.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:50 | 12.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:50 | 10.0 | 0 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:51 | 10.0 | 0 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:51 | 10.0 | 0 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:51 | 12.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:51 | 16.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:52 | 60.1 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:52 | 154.3 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:52 | 214.4 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:52 | 270.5 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:53 | 288.5 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:53 | 292.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:53 | 294.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:53 | 294.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:54 | 292.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:54 | 292.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:54 | 294.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:54 | 294.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:55 | 292.5 | 301.9 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:55 | 286.5 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:55 | 298.5 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:55 | 440.8 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:56 | 545.0 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:56 | 575.1 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:56 | 579.1 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:56 | 581.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:57 | 583.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:57 | 583.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:57 | 581.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:57 | 581.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:58 | 581.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:58 | 581.1 | 594.7 ppm cal | 10.98 | 1026.4 | | | |
| 5/25/01 18:58 | 643.2 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:58 | 939.8 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:59 | 1070.1 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 18:59 | 1118.2 | wait | 10.98 | 1026.4 | | | |
| 5/25/01 21:37 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:37 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:38 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:38 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:38 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:38 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:39 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm: dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 21:39 | 12.0 | 0 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:39 | 14.0 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:39 | 212.4 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:40 | 649.2 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:40 | 959.9 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:40 | 1010.0 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:40 | 1014.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:41 | 1018.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:41 | 1016.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:41 | 1012.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:41 | 1018.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:42 | 1020.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:42 | 1014.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:42 | 1018.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:42 | 1018.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:43 | 1014.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:43 | 1020.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:43 | 1016.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:43 | 1014.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:44 | 1018.0 | 1015 ppm cal | 11.982 | 1021.8 | | | |
| 5/25/01 21:44 | 1008.0 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:44 | 933.8 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:44 | 729.4 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:45 | 611.2 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:45 | 581.1 | wait | 11.982 | 1021.8 | | | |
| 5/25/01 21:45 | 575.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:45 | 575.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:46 | 577.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:46 | 575.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:46 | 577.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:46 | 573.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:47 | 573.1 | 594.7 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 21:47 | 561.1 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:47 | 601.1 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:47 | 675.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:48 | 701.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:48 | 713.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:48 | 721.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:48 | 723.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:49 | 717.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:49 | 717.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:49 | 719.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:49 | 719.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 21:50 | 715.4 | run 1 | 11.982 | 1018.2 | 709.5 | 14183 | 43.9 |
| 5/25/01 21:50 | 713.4 | run 1 | 11.982 | 1018.2 | 707.5 | 14183 | 43.8 |
| 5/25/01 21:50 | 711.4 | run 1 | 11.982 | 1018.2 | 705.5 | 14183 | 43.7 |
| 5/25/01 21:50 | 709.4 | run 1 | 11.982 | 1018.2 | 703.5 | 14183 | 43.5 |
| 5/25/01 21:51 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 21:51 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 21:51 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 21:51 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 21:52 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 21:52 | 679.3 | run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 21:52 | 683.3 | run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 21:52 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 21:53 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 21:53 | 691.3 | run 1 | 11.982 | 1018.2 | 685.3 | 14183 | 42.4 |
| 5/25/01 21:53 | 691.3 | run 1 | 11.982 | 1018.2 | 685.3 | 14183 | 42.4 |
| 5/25/01 21:53 | 685.3 | run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 21:54 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 21:54 | 683.3 | run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 21:54 | 675.3 | run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 21:54 | 669.3 | run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 21:55 | 669.3 | run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 21:55 | 675.3 | run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 21:55 | 673.3 | run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 21:55 | 665.3 | run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |
| 5/25/01 21:56 | 669.3 | run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 21:56 | 679.3 | run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 21:56 | 675.3 | run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 21:56 | 675.3 | run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 21:57 | 679.3 | run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 21:57 | 673.3 | run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 21:57 | 667.3 | run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 21:57 | 663.3 | run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 21:58 | 667.3 | run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 21:58 | 663.3 | run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 21:58 | 655.3 | run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 21:58 | 655.3 | run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 21:59 | 661.3 | run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 21:59 | 649.2 | run 1 | 11.982 | 1018.2 | 642.8 | 14183 | 39.8 |
| 5/25/01 21:59 | 633.2 | run 1 | 11.982 | 1018.2 | 626.7 | 14183 | 38.8 |
| 5/25/01 21:59 | 639.2 | run 1 | 11.982 | 1018.2 | 632.7 | 14183 | 39.1 |
| 5/25/01 22:00 | 647.2 | run 1 | 11.982 | 1018.2 | 640.8 | 14183 | 39.6 |
| 5/25/01 22:00 | 641.2 | run 1 | 11.982 | 1018.2 | 634.7 | 14183 | 39.3 |
| 5/25/01 22:00 | 639.2 | run 1 | 11.982 | 1018.2 | 632.7 | 14183 | 39.1 |
| 5/25/01 22:00 | 651.2 | run 1 | 11.982 | 1018.2 | 644.9 | 14183 | 39.9 |
| 5/25/01 22:01 | 655.3 | run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:01 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:01 | 665.3 | run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |
| 5/25/01 22:01 | 675.3 | run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:02 | 685.3 | run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:02 | 693.3 | run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:02 | 693.3 | run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:02 | 691.3 | run 1 | 11.982 | 1018.2 | 685.3 | 14183 | 42.4 |
| 5/25/01 22:03 | 693.3 | run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:03 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:03 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:03 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:04 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:04 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:04 | 685.3 | run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:04 | 677.3 | run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:05 | 669.3 | run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:05 | 667.3 | run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:05 | 667.3 | run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:05 | 663.3 | run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:06 | 659.3 | run 1 | 11.982 | 1018.2 | 652.9 | 14183 | 40.4 |
| 5/25/01 22:06 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:06 | 651.2 | run 1 | 11.982 | 1018.2 | 644.9 | 14183 | 39.9 |
| 5/25/01 22:06 | 643.2 | run 1 | 11.982 | 1018.2 | 636.8 | 14183 | 39.4 |
| 5/25/01 22:07 | 647.2 | run 1 | 11.982 | 1018.2 | 640.8 | 14183 | 39.6 |
| 5/25/01 22:07 | 655.3 | run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:07 | 653.2 | run 1 | 11.982 | 1018.2 | 646.9 | 14183 | 40.0 |
| 5/25/01 22:07 | 651.2 | run 1 | 11.982 | 1018.2 | 644.9 | 14183 | 39.9 |
| 5/25/01 22:08 | 655.3 | run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:08 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:08 | 653.2 | run 1 | 11.982 | 1018.2 | 646.9 | 14183 | 40.0 |
| 5/25/01 22:08 | 655.3 | run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:09 | 663.3 | run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:09 | 669.3 | run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:09 | 665.3 | run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1015 ppm cal | CORRECTED PPM | FLOW, acfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 22:09 | 663.3 | Run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:10 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:10 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:10 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:10 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:11 | 683.3 | Run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:11 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:11 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:11 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:12 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:12 | 681.3 | Run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 22:12 | 665.3 | Run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |
| 5/25/01 22:12 | 665.3 | Run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |
| 5/25/01 22:13 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:13 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:13 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:13 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:14 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:14 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:14 | 673.3 | Run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:14 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:15 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:15 | 683.3 | Run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:15 | 683.3 | Run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:15 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:16 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:16 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:16 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:16 | 667.3 | Run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:17 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:17 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:17 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:17 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:18 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:18 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:18 | 673.3 | Run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:18 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:19 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:19 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:19 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:19 | 685.3 | Run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:20 | 685.3 | Run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:20 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:20 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:20 | 673.3 | Run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:21 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:21 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:21 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:21 | 669.3 | Run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:22 | 671.3 | Run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:22 | 675.3 | Run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:22 | 677.3 | Run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:22 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:23 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:23 | 681.3 | Run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:23 | 679.3 | Run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:23 | 683.3 | Run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:24 | 689.3 | Run 1 | 11.982 | 1018.2 | 683.3 | 14183 | 42.3 |
| 5/25/01 22:24 | 693.3 | Run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:24 | 687.3 | Run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 22:24 | 689.3 | Run 1 | 11.982 | 1018.2 | 683.3 | 14183 | 42.3 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 22:25 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 22:25 | 681.3 | run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:25 | 685.3 | run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:25 | 683.3 | run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:26 | 679.3 | run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:26 | 679.3 | run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:26 | 679.3 | run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:26 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 22:27 | 693.3 | run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:27 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:27 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:27 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:28 | 699.3 | run 1 | 11.982 | 1018.2 | 693.4 | 14183 | 42.9 |
| 5/25/01 22:28 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:28 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:28 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:29 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:29 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:29 | 699.3 | run 1 | 11.982 | 1018.2 | 693.4 | 14183 | 42.9 |
| 5/25/01 22:29 | 709.4 | run 1 | 11.982 | 1018.2 | 703.5 | 14183 | 43.5 |
| 5/25/01 22:30 | 717.4 | run 1 | 11.982 | 1018.2 | 711.6 | 14183 | 44.0 |
| 5/25/01 22:30 | 711.4 | run 1 | 11.982 | 1018.2 | 705.5 | 14183 | 43.7 |
| 5/25/01 22:30 | 703.3 | run 1 | 11.982 | 1018.2 | 697.4 | 14183 | 43.2 |
| 5/25/01 22:30 | 701.3 | run 1 | 11.982 | 1018.2 | 695.4 | 14183 | 43.0 |
| 5/25/01 22:31 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:31 | 693.3 | run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:31 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:31 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:32 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:32 | 693.3 | run 1 | 11.982 | 1018.2 | 687.3 | 14183 | 42.5 |
| 5/25/01 22:32 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 22:32 | 681.3 | run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:33 | 673.3 | run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:33 | 671.3 | run 1 | 11.982 | 1018.2 | 665.1 | 14183 | 41.2 |
| 5/25/01 22:33 | 669.3 | run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:33 | 655.3 | run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:34 | 647.2 | run 1 | 11.982 | 1018.2 | 640.8 | 14183 | 39.6 |
| 5/25/01 22:34 | 647.2 | run 1 | 11.982 | 1018.2 | 640.8 | 14183 | 39.6 |
| 5/25/01 22:34 | 641.2 | run 1 | 11.982 | 1018.2 | 634.7 | 14183 | 39.3 |
| 5/25/01 22:34 | 639.2 | run 1 | 11.982 | 1018.2 | 632.7 | 14183 | 39.1 |
| 5/25/01 22:35 | 639.2 | run 1 | 11.982 | 1018.2 | 632.7 | 14183 | 39.1 |
| 5/25/01 22:35 | 639.2 | run 1 | 11.982 | 1018.2 | 632.7 | 14183 | 39.1 |
| 5/25/01 22:35 | 641.2 | run 1 | 11.982 | 1018.2 | 634.7 | 14183 | 39.3 |
| 5/25/01 22:35 | 641.2 | run 1 | 11.982 | 1018.2 | 634.7 | 14183 | 39.3 |
| 5/25/01 22:36 | 647.2 | run 1 | 11.982 | 1018.2 | 640.8 | 14183 | 39.6 |
| 5/25/01 22:36 | 655.3 | run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:36 | 661.3 | run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 22:36 | 665.3 | run 1 | 11.982 | 1018.2 | 659.0 | 14183 | 40.8 |
| 5/25/01 22:37 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:37 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:37 | 663.3 | run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:37 | 659.3 | run 1 | 11.982 | 1018.2 | 652.9 | 14183 | 40.4 |
| 5/25/01 22:38 | 655.3 | run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:38 | 663.3 | run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:38 | 667.3 | run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:38 | 667.3 | run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:39 | 661.3 | run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 22:39 | 655.3 | run 1 | 11.982 | 1018.2 | 648.9 | 14183 | 40.1 |
| 5/25/01 22:39 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:39 | 661.3 | run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 22:40 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, acfm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 22:40 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:40 | 657.3 | run 1 | 11.982 | 1018.2 | 650.9 | 14183 | 40.3 |
| 5/25/01 22:40 | 661.3 | run 1 | 11.982 | 1018.2 | 655.0 | 14183 | 40.5 |
| 5/25/01 22:41 | 669.3 | run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:41 | 673.3 | run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:41 | 673.3 | run 1 | 11.982 | 1018.2 | 667.1 | 14183 | 41.3 |
| 5/25/01 22:41 | 675.3 | run 1 | 11.982 | 1018.2 | 669.1 | 14183 | 41.4 |
| 5/25/01 22:42 | 679.3 | run 1 | 11.982 | 1018.2 | 673.2 | 14183 | 41.7 |
| 5/25/01 22:42 | 677.3 | run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:42 | 669.3 | run 1 | 11.982 | 1018.2 | 663.0 | 14183 | 41.0 |
| 5/25/01 22:42 | 663.3 | run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:43 | 659.3 | run 1 | 11.982 | 1018.2 | 652.9 | 14183 | 40.4 |
| 5/25/01 22:43 | 659.3 | run 1 | 11.982 | 1018.2 | 652.9 | 14183 | 40.4 |
| 5/25/01 22:43 | 663.3 | run 1 | 11.982 | 1018.2 | 657.0 | 14183 | 40.6 |
| 5/25/01 22:43 | 667.3 | run 1 | 11.982 | 1018.2 | 661.0 | 14183 | 40.9 |
| 5/25/01 22:44 | 677.3 | run 1 | 11.982 | 1018.2 | 671.1 | 14183 | 41.5 |
| 5/25/01 22:44 | 683.3 | run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:44 | 683.3 | run 1 | 11.982 | 1018.2 | 677.2 | 14183 | 41.9 |
| 5/25/01 22:44 | 681.3 | run 1 | 11.982 | 1018.2 | 675.2 | 14183 | 41.8 |
| 5/25/01 22:45 | 685.3 | run 1 | 11.982 | 1018.2 | 679.2 | 14183 | 42.0 |
| 5/25/01 22:45 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:45 | 699.3 | run 1 | 11.982 | 1018.2 | 693.4 | 14183 | 42.9 |
| 5/25/01 22:45 | 691.3 | run 1 | 11.982 | 1018.2 | 685.3 | 14183 | 42.4 |
| 5/25/01 22:46 | 687.3 | run 1 | 11.982 | 1018.2 | 681.2 | 14183 | 42.2 |
| 5/25/01 22:46 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:46 | 703.3 | run 1 | 11.982 | 1018.2 | 697.4 | 14183 | 43.2 |
| 5/25/01 22:46 | 701.3 | run 1 | 11.982 | 1018.2 | 695.4 | 14183 | 43.0 |
| 5/25/01 22:47 | 699.3 | run 1 | 11.982 | 1018.2 | 693.4 | 14183 | 42.9 |
| 5/25/01 22:47 | 701.3 | run 1 | 11.982 | 1018.2 | 695.4 | 14183 | 43.0 |
| 5/25/01 22:47 | 703.3 | run 1 | 11.982 | 1018.2 | 697.4 | 14183 | 43.2 |
| 5/25/01 22:47 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:48 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:48 | 701.3 | run 1 | 11.982 | 1018.2 | 695.4 | 14183 | 43.0 |
| 5/25/01 22:48 | 695.3 | run 1 | 11.982 | 1018.2 | 689.3 | 14183 | 42.7 |
| 5/25/01 22:48 | 697.3 | run 1 | 11.982 | 1018.2 | 691.3 | 14183 | 42.8 |
| 5/25/01 22:49 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:49 | 703.3 | run 1 | 11.982 | 1018.2 | 697.4 | 14183 | 43.2 |
| 5/25/01 22:49 | 699.3 | run 1 | 11.982 | 1018.2 | 693.4 | 14183 | 42.9 |
| 5/25/01 22:49 | 705.4 | run 1 | 11.982 | 1018.2 | 699.4 | 14183 | 43.3 |
| 5/25/01 22:50 | 711.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:50 | 711.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:50 | 711.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:50 | 713.4 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:51 | 701.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:51 | 703.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:51 | 701.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:51 | 689.3 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:52 | 757.5 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:52 | 909.8 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:52 | 993.9 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:52 | 1014.0 | wait | 11.982 | 1018.2 | | | |
| 5/25/01 22:53 | 1016.0 | 1015 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 22:53 | 1016.0 | 1015 ppm cal | 11.982 | 1018.2 | | | |
| 5/25/01 22:53 | 1016.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:53 | 1016.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:54 | 1016.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:54 | 1014.0 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:54 | 1010.0 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:54 | 1012.0 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:55 | 995.9 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:55 | 863.7 | wait | 11.65 | 1026.2 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1016 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 22:55 | 679.3 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:55 | 593.1 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:56 | 581.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:56 | 581.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:56 | 579.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:56 | 577.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:57 | 577.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:57 | 577.1 | 594.7 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:57 | 490.9 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:57 | 232.4 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:58 | 60.1 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:58 | 16.0 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 22:58 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:58 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:59 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:59 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:59 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 22:59 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 23:00 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 23:00 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 23:00 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/25/01 23:00 | 82.1 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 23:01 | 362.7 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 23:01 | 613.2 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 23:01 | 671.3 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 23:01 | 671.3 | wait | 11.65 | 1026.2 | | | |
| 5/25/01 23:02 | 677.3 | run 2 | 11.65 | 1026.2 | 665.9 | 14406 | 41.9 |
| 5/25/01 23:02 | 677.3 | run 2 | 11.65 | 1026.2 | 665.9 | 14406 | 41.9 |
| 5/25/01 23:02 | 677.3 | run 2 | 11.65 | 1026.2 | 665.9 | 14406 | 41.9 |
| 5/25/01 23:02 | 681.3 | run 2 | 11.65 | 1026.2 | 669.9 | 14406 | 42.1 |
| 5/25/01 23:03 | 683.3 | run 2 | 11.65 | 1026.2 | 671.9 | 14406 | 42.2 |
| 5/25/01 23:03 | 683.3 | run 2 | 11.65 | 1026.2 | 671.9 | 14406 | 42.2 |
| 5/25/01 23:03 | 687.3 | run 2 | 11.65 | 1026.2 | 675.9 | 14406 | 42.5 |
| 5/25/01 23:03 | 693.3 | run 2 | 11.65 | 1026.2 | 682.0 | 14406 | 42.9 |
| 5/25/01 23:04 | 693.3 | run 2 | 11.65 | 1026.2 | 682.0 | 14406 | 42.9 |
| 5/25/01 23:04 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:04 | 709.4 | run 2 | 11.65 | 1026.2 | 698.0 | 14406 | 43.9 |
| 5/25/01 23:04 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:05 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:05 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:05 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:05 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:06 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:06 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:06 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:06 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:07 | 695.3 | run 2 | 11.65 | 1026.2 | 684.0 | 14406 | 43.0 |
| 5/25/01 23:07 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:07 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:07 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:08 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:08 | 711.4 | run 2 | 11.65 | 1026.2 | 700.0 | 14406 | 44.0 |
| 5/25/01 23:08 | 715.4 | run 2 | 11.65 | 1026.2 | 704.0 | 14406 | 44.2 |
| 5/25/01 23:08 | 711.4 | run 2 | 11.65 | 1026.2 | 700.0 | 14406 | 44.0 |
| 5/25/01 23:09 | 713.4 | run 2 | 11.65 | 1026.2 | 702.0 | 14406 | 44.1 |
| 5/25/01 23:09 | 719.4 | run 2 | 11.65 | 1026.2 | 708.0 | 14406 | 44.5 |
| 5/25/01 23:09 | 713.4 | run 2 | 11.65 | 1026.2 | 702.0 | 14406 | 44.1 |
| 5/25/01 23:09 | 713.4 | run 2 | 11.65 | 1026.2 | 702.0 | 14406 | 44.1 |
| 5/25/01 23:10 | 711.4 | run 2 | 11.65 | 1026.2 | 700.0 | 14406 | 44.0 |
| 5/25/01 23:10 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:10 | 709.4 | run 2 | 11.65 | 1026.2 | 698.0 | 14406 | 43.9 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1016 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 23:10 | 707.4 | run 2 | 11.65 | 1026.2 | 696.0 | 14406 | 43.7 |
| 5/25/01 23:11 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:11 | 707.4 | run 2 | 11.65 | 1026.2 | 696.0 | 14406 | 43.7 |
| 5/25/01 23:11 | 707.4 | run 2 | 11.65 | 1026.2 | 696.0 | 14406 | 43.7 |
| 5/25/01 23:11 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:12 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:12 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:12 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:12 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:13 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:13 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:13 | 697.3 | run 2 | 11.65 | 1026.2 | 686.0 | 14406 | 43.1 |
| 5/25/01 23:13 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:14 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:14 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:14 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:14 | 701.3 | run 2 | 11.65 | 1026.2 | 690.0 | 14406 | 43.4 |
| 5/25/01 23:15 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:15 | 699.3 | run 2 | 11.65 | 1026.2 | 688.0 | 14406 | 43.2 |
| 5/25/01 23:15 | 695.3 | run 2 | 11.65 | 1026.2 | 684.0 | 14406 | 43.0 |
| 5/25/01 23:15 | 695.3 | run 2 | 11.65 | 1026.2 | 684.0 | 14406 | 43.0 |
| 5/25/01 23:16 | 703.3 | run 2 | 11.65 | 1026.2 | 692.0 | 14406 | 43.5 |
| 5/25/01 23:16 | 705.4 | run 2 | 11.65 | 1026.2 | 694.0 | 14406 | 43.6 |
| 5/25/01 23:16 | 713.4 | run 2 | 11.65 | 1026.2 | 702.0 | 14406 | 44.1 |
| 5/25/01 23:16 | 723.4 | run 2 | 11.65 | 1026.2 | 712.0 | 14406 | 44.7 |
| 5/25/01 23:17 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:17 | 729.4 | run 2 | 11.65 | 1026.2 | 718.0 | 14406 | 45.1 |
| 5/25/01 23:17 | 731.4 | run 2 | 11.65 | 1026.2 | 720.1 | 14406 | 45.3 |
| 5/25/01 23:17 | 737.4 | run 2 | 11.65 | 1026.2 | 726.1 | 14406 | 45.6 |
| 5/25/01 23:18 | 737.4 | run 2 | 11.65 | 1026.2 | 726.1 | 14406 | 45.6 |
| 5/25/01 23:18 | 737.4 | run 2 | 11.65 | 1026.2 | 726.1 | 14406 | 45.6 |
| 5/25/01 23:18 | 733.4 | run 2 | 11.65 | 1026.2 | 722.1 | 14406 | 45.4 |
| 5/25/01 23:18 | 737.4 | run 2 | 11.65 | 1026.2 | 726.1 | 14406 | 45.6 |
| 5/25/01 23:19 | 733.4 | run 2 | 11.65 | 1026.2 | 722.1 | 14406 | 45.4 |
| 5/25/01 23:19 | 727.4 | run 2 | 11.65 | 1026.2 | 716.0 | 14406 | 45.0 |
| 5/25/01 23:19 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:19 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:20 | 731.4 | run 2 | 11.65 | 1026.2 | 720.1 | 14406 | 45.3 |
| 5/25/01 23:20 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:20 | 719.4 | run 2 | 11.65 | 1026.2 | 708.0 | 14406 | 44.5 |
| 5/25/01 23:20 | 721.4 | run 2 | 11.65 | 1026.2 | 710.0 | 14406 | 44.6 |
| 5/25/01 23:21 | 723.4 | run 2 | 11.65 | 1026.2 | 712.0 | 14406 | 44.7 |
| 5/25/01 23:21 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:21 | 727.4 | run 2 | 11.65 | 1026.2 | 716.0 | 14406 | 45.0 |
| 5/25/01 23:21 | 723.4 | run 2 | 11.65 | 1026.2 | 712.0 | 14406 | 44.7 |
| 5/25/01 23:22 | 721.4 | run 2 | 11.65 | 1026.2 | 710.0 | 14406 | 44.6 |
| 5/25/01 23:22 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:22 | 721.4 | run 2 | 11.65 | 1026.2 | 710.0 | 14406 | 44.6 |
| 5/25/01 23:22 | 717.4 | run 2 | 11.65 | 1026.2 | 706.0 | 14406 | 44.4 |
| 5/25/01 23:23 | 719.4 | run 2 | 11.65 | 1026.2 | 708.0 | 14406 | 44.5 |
| 5/25/01 23:23 | 723.4 | run 2 | 11.65 | 1026.2 | 712.0 | 14406 | 44.7 |
| 5/25/01 23:23 | 725.4 | run 2 | 11.65 | 1026.2 | 714.0 | 14406 | 44.9 |
| 5/25/01 23:23 | 731.4 | run 2 | 11.65 | 1026.2 | 720.1 | 14406 | 45.3 |
| 5/25/01 23:24 | 727.4 | run 2 | 11.65 | 1026.2 | 716.0 | 14406 | 45.0 |
| 5/25/01 23:24 | 735.4 | run 2 | 11.65 | 1026.2 | 724.1 | 14406 | 45.5 |
| 5/25/01 23:24 | 759.5 | run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:24 | 757.5 | run 2 | 11.65 | 1026.2 | 756.1 | 14406 | 47.5 |
| 5/25/01 23:25 | 757.5 | run 2 | 11.65 | 1026.2 | 756.1 | 14406 | 47.5 |
| 5/25/01 23:25 | 761.5 | run 2 | 11.65 | 1026.2 | 750.1 | 14406 | 47.1 |
| 5/25/01 23:25 | 759.5 | run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:25 | 761.5 | run 2 | 11.65 | 1026.2 | 750.1 | 14406 | 47.1 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, actm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 23:26 | 763.5 | run 2 | 11.65 | 1026.2 | 752.1 | 14406 | 47.3 |
| 5/25/01 23:26 | 763.5 | run 2 | 11.65 | 1026.2 | 752.1 | 14406 | 47.3 |
| 5/25/01 23:26 | 759.5 | run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:26 | 753.4 | run 2 | 11.65 | 1026.2 | 742.1 | 14406 | 46.6 |
| 5/25/01 23:27 | 753.4 | run 2 | 11.65 | 1026.2 | 742.1 | 14406 | 46.6 |
| 5/25/01 23:27 | 759.5 | run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:27 | 763.5 | run 2 | 11.65 | 1026.2 | 752.1 | 14406 | 47.3 |
| 5/25/01 23:27 | 759.5 | run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:28 | 759.5 | run 2 | 11.65 | 1026.2 | 748.1 | 14406 | 47.0 |
| 5/25/01 23:28 | 761.5 | run 2 | 11.65 | 1026.2 | 750.1 | 14406 | 47.1 |
| 5/25/01 23:28 | 761.5 | run 2 | 11.65 | 1026.2 | 750.1 | 14406 | 47.1 |
| 5/25/01 23:28 | 763.5 | run 2 | 11.65 | 1026.2 | 752.1 | 14406 | 47.3 |
| 5/25/01 23:29 | 767.5 | run 2 | 11.65 | 1026.2 | 756.1 | 14406 | 47.5 |
| 5/25/01 23:29 | 777.5 | run 2 | 11.65 | 1026.2 | 766.2 | 14406 | 48.2 |
| 5/25/01 23:29 | 783.5 | run 2 | 11.65 | 1026.2 | 772.2 | 14406 | 48.5 |
| 5/25/01 23:29 | 775.5 | run 2 | 11.65 | 1026.2 | 764.2 | 14406 | 48.0 |
| 5/25/01 23:30 | 767.5 | run 2 | 11.65 | 1026.2 | 756.1 | 14406 | 47.5 |
| 5/25/01 23:30 | 767.5 | run 2 | 11.65 | 1026.2 | 756.1 | 14406 | 47.5 |
| 5/25/01 23:30 | 769.5 | run 2 | 11.65 | 1026.2 | 758.1 | 14406 | 47.6 |
| 5/25/01 23:30 | 775.5 | run 2 | 11.65 | 1026.2 | 764.2 | 14406 | 48.0 |
| 5/25/01 23:31 | 793.5 | run 2 | 11.65 | 1026.2 | 782.2 | 14406 | 49.2 |
| 5/25/01 23:31 | 801.5 | run 2 | 11.65 | 1026.2 | 790.2 | 14406 | 49.7 |
| 5/25/01 23:31 | 797.5 | run 2 | 11.65 | 1026.2 | 786.2 | 14406 | 49.4 |
| 5/25/01 23:31 | 793.5 | run 2 | 11.65 | 1026.2 | 782.2 | 14406 | 49.2 |
| 5/25/01 23:32 | 787.5 | run 2 | 11.65 | 1026.2 | 776.2 | 14406 | 48.8 |
| 5/25/01 23:32 | 785.5 | run 2 | 11.65 | 1026.2 | 774.2 | 14406 | 48.7 |
| 5/25/01 23:32 | 783.5 | run 2 | 11.65 | 1026.2 | 772.2 | 14406 | 48.5 |
| 5/25/01 23:32 | 779.5 | run 2 | 11.65 | 1026.2 | 768.2 | 14406 | 48.3 |
| 5/25/01 23:33 | 781.5 | run 2 | 11.65 | 1026.2 | 770.2 | 14406 | 48.4 |
| 5/25/01 23:33 | 785.5 | run 2 | 11.65 | 1026.2 | 774.2 | 14406 | 48.7 |
| 5/25/01 23:33 | 781.5 | run 2 | 11.65 | 1026.2 | 770.2 | 14406 | 48.4 |
| 5/25/01 23:33 | 781.5 | run 2 | 11.65 | 1026.2 | 770.2 | 14406 | 48.4 |
| 5/25/01 23:34 | 787.5 | run 2 | 11.65 | 1026.2 | 776.2 | 14406 | 48.8 |
| 5/25/01 23:34 | 791.5 | run 2 | 11.65 | 1026.2 | 780.2 | 14406 | 49.0 |
| 5/25/01 23:34 | 795.5 | run 2 | 11.65 | 1026.2 | 784.2 | 14406 | 49.3 |
| 5/25/01 23:34 | 799.5 | run 2 | 11.65 | 1026.2 | 788.2 | 14406 | 49.5 |
| 5/25/01 23:35 | 803.5 | run 2 | 11.65 | 1026.2 | 792.2 | 14406 | 49.8 |
| 5/25/01 23:35 | 803.5 | run 2 | 11.65 | 1026.2 | 792.2 | 14406 | 49.8 |
| 5/25/01 23:35 | 809.6 | run 2 | 11.65 | 1026.2 | 798.2 | 14406 | 50.2 |
| 5/25/01 23:35 | 811.6 | run 2 | 11.65 | 1026.2 | 800.2 | 14406 | 50.3 |
| 5/25/01 23:36 | 795.5 | run 2 | 11.65 | 1026.2 | 784.2 | 14406 | 49.3 |
| 5/25/01 23:36 | 789.5 | run 2 | 11.65 | 1026.2 | 778.2 | 14406 | 48.9 |
| 5/25/01 23:36 | 811.6 | run 2 | 11.65 | 1026.2 | 800.2 | 14406 | 50.3 |
| 5/25/01 23:36 | 831.6 | run 2 | 11.65 | 1026.2 | 820.3 | 14406 | 51.5 |
| 5/25/01 23:37 | 847.6 | run 2 | 11.65 | 1026.2 | 836.3 | 14406 | 52.6 |
| 5/25/01 23:37 | 851.6 | run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |
| 5/25/01 23:37 | 847.6 | run 2 | 11.65 | 1026.2 | 836.3 | 14406 | 52.6 |
| 5/25/01 23:37 | 847.6 | run 2 | 11.65 | 1026.2 | 836.3 | 14406 | 52.6 |
| 5/25/01 23:38 | 853.6 | run 2 | 11.65 | 1026.2 | 842.3 | 14406 | 52.9 |
| 5/25/01 23:38 | 871.7 | run 2 | 11.65 | 1026.2 | 860.4 | 14406 | 54.1 |
| 5/25/01 23:38 | 883.7 | run 2 | 11.65 | 1026.2 | 872.4 | 14406 | 54.8 |
| 5/25/01 23:38 | 879.7 | run 2 | 11.65 | 1026.2 | 868.4 | 14406 | 54.6 |
| 5/25/01 23:39 | 869.7 | run 2 | 11.65 | 1026.2 | 858.4 | 14406 | 53.9 |
| 5/25/01 23:39 | 869.7 | run 2 | 11.65 | 1026.2 | 858.4 | 14406 | 53.9 |
| 5/25/01 23:39 | 875.7 | run 2 | 11.65 | 1026.2 | 864.4 | 14406 | 54.3 |
| 5/25/01 23:39 | 869.7 | run 2 | 11.65 | 1026.2 | 858.4 | 14406 | 53.9 |
| 5/25/01 23:40 | 859.7 | run 2 | 11.65 | 1026.2 | 848.4 | 14406 | 53.3 |
| 5/25/01 23:40 | 859.7 | run 2 | 11.65 | 1026.2 | 848.4 | 14406 | 53.3 |
| 5/25/01 23:40 | 855.6 | run 2 | 11.65 | 1026.2 | 844.3 | 14406 | 53.1 |
| 5/25/01 23:40 | 855.6 | run 2 | 11.65 | 1026.2 | 844.3 | 14406 | 53.1 |
| 5/25/01 23:41 | 851.6 | run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 23:41 | 847.6 | run 2 | 11.65 | 1026.2 | 836.3 | 14406 | 52.5 |
| 5/25/01 23:41 | 851.6 | run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |
| 5/25/01 23:41 | 851.6 | run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |
| 5/25/01 23:42 | 849.6 | run 2 | 11.65 | 1026.2 | 838.3 | 14406 | 52.7 |
| 5/25/01 23:42 | 853.6 | run 2 | 11.65 | 1026.2 | 842.3 | 14406 | 52.9 |
| 5/25/01 23:42 | 859.7 | run 2 | 11.55 | 1026.2 | 848.4 | 14406 | 53.3 |
| 5/25/01 23:42 | 857.7 | run 2 | 11.65 | 1026.2 | 846.4 | 14406 | 53.2 |
| 5/25/01 23:43 | 851.6 | run 2 | 11.55 | 1026.2 | 840.3 | 14406 | 52.8 |
| 5/25/01 23:43 | 853.6 | run 2 | 11.55 | 1026.2 | 842.3 | 14406 | 52.9 |
| 5/25/01 23:43 | 853.6 | run 2 | 11.65 | 1026.2 | 842.3 | 14406 | 52.9 |
| 5/25/01 23:43 | 849.6 | run 2 | 11.65 | 1026.2 | 838.3 | 14406 | 52.7 |
| 5/25/01 23:44 | 851.6 | run 2 | 11.65 | 1026.2 | 840.3 | 14406 | 52.8 |
| 5/25/01 23:44 | 857.7 | run 2 | 11.65 | 1026.2 | 846.4 | 14406 | 53.2 |
| 5/25/01 23:44 | 869.7 | run 2 | 11.65 | 1026.2 | 858.4 | 14406 | 53.9 |
| 5/25/01 23:44 | 885.7 | run 2 | 11.55 | 1026.2 | 874.4 | 14406 | 55.0 |
| 5/25/01 23:45 | 895.7 | run 2 | 11.55 | 1026.2 | 884.4 | 14406 | 55.6 |
| 5/25/01 23:45 | 889.7 | run 2 | 11.65 | 1026.2 | 878.4 | 14406 | 55.2 |
| 5/25/01 23:45 | 885.7 | run 2 | 11.65 | 1026.2 | 874.4 | 14406 | 55.0 |
| 5/25/01 23:45 | 889.7 | run 2 | 11.65 | 1026.2 | 878.4 | 14406 | 55.2 |
| 5/25/01 23:46 | 879.7 | run 2 | 11.65 | 1026.2 | 868.4 | 14406 | 54.6 |
| 5/25/01 23:46 | 857.7 | run 2 | 11.65 | 1026.2 | 846.4 | 14406 | 53.2 |
| 5/25/01 23:46 | 839.6 | run 2 | 11.65 | 1026.2 | 828.3 | 14406 | 52.1 |
| 5/25/01 23:46 | 837.6 | run 2 | 11.65 | 1026.2 | 826.3 | 14406 | 51.9 |
| 5/25/01 23:47 | 835.6 | run 2 | 11.65 | 1026.2 | 824.3 | 14406 | 51.8 |
| 5/25/01 23:47 | 835.6 | run 2 | 11.65 | 1026.2 | 824.3 | 14406 | 51.8 |
| 5/25/01 23:47 | 831.6 | run 2 | 11.65 | 1026.2 | 820.3 | 14406 | 51.6 |
| 5/25/01 23:47 | 825.6 | run 2 | 11.65 | 1026.2 | 814.3 | 14406 | 51.2 |
| 5/25/01 23:48 | 825.6 | run 2 | 11.65 | 1026.2 | 814.3 | 14406 | 51.2 |
| 5/25/01 23:48 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:48 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:48 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:49 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:49 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:49 | 833.6 | run 2 | 11.65 | 1026.2 | 822.3 | 14406 | 51.7 |
| 5/25/01 23:49 | 839.6 | run 2 | 11.65 | 1026.2 | 828.3 | 14406 | 52.1 |
| 5/25/01 23:50 | 833.6 | run 2 | 11.65 | 1026.2 | 822.3 | 14406 | 51.7 |
| 5/25/01 23:50 | 823.6 | run 2 | 11.65 | 1026.2 | 812.3 | 14406 | 51.0 |
| 5/25/01 23:50 | 823.6 | run 2 | 11.65 | 1026.2 | 812.3 | 14406 | 51.0 |
| 5/25/01 23:50 | 827.6 | run 2 | 11.65 | 1026.2 | 816.3 | 14406 | 51.3 |
| 5/25/01 23:51 | 825.6 | run 2 | 11.65 | 1026.2 | 814.3 | 14406 | 51.2 |
| 5/25/01 23:51 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:51 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:51 | 827.6 | run 2 | 11.65 | 1026.2 | 816.3 | 14406 | 51.3 |
| 5/25/01 23:52 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:52 | 831.6 | run 2 | 11.65 | 1026.2 | 820.3 | 14406 | 51.6 |
| 5/25/01 23:52 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:52 | 823.6 | run 2 | 11.65 | 1026.2 | 812.3 | 14406 | 51.0 |
| 5/25/01 23:53 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/25/01 23:53 | 813.6 | run 2 | 11.65 | 1026.2 | 802.2 | 14406 | 50.4 |
| 5/25/01 23:53 | 813.6 | run 2 | 11.65 | 1026.2 | 802.2 | 14406 | 50.4 |
| 5/25/01 23:53 | 811.6 | run 2 | 11.65 | 1026.2 | 800.2 | 14406 | 50.3 |
| 5/25/01 23:54 | 809.6 | run 2 | 11.55 | 1026.2 | 798.2 | 14406 | 50.2 |
| 5/25/01 23:54 | 811.6 | run 2 | 11.55 | 1026.2 | 800.2 | 14406 | 50.3 |
| 5/25/01 23:54 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/25/01 23:54 | 817.6 | run 2 | 11.55 | 1026.2 | 806.3 | 14406 | 50.7 |
| 5/25/01 23:55 | 813.6 | run 2 | 11.55 | 1026.2 | 802.2 | 14406 | 50.4 |
| 5/25/01 23:55 | 809.6 | run 2 | 11.65 | 1026.2 | 798.2 | 14406 | 50.2 |
| 5/25/01 23:55 | 805.6 | run 2 | 11.55 | 1026.2 | 794.2 | 14406 | 49.9 |
| 5/25/01 23:55 | 803.5 | run 2 | 11.55 | 1026.2 | 792.2 | 14406 | 49.8 |
| 5/25/01 23:56 | 809.6 | run 2 | 11.65 | 1026.2 | 798.2 | 14406 | 50.2 |
| 5/25/01 23:56 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1015 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/25/01 23:56 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/25/01 23:56 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/25/01 23:57 | 821.6 | run 2 | 11.65 | 1026.2 | 810.3 | 14406 | 50.9 |
| 5/25/01 23:57 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:57 | 835.6 | run 2 | 11.65 | 1026.2 | 824.3 | 14406 | 51.8 |
| 5/25/01 23:57 | 837.6 | run 2 | 11.65 | 1026.2 | 826.3 | 14406 | 51.9 |
| 5/25/01 23:58 | 833.6 | run 2 | 11.65 | 1026.2 | 822.3 | 14406 | 51.7 |
| 5/25/01 23:58 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:58 | 827.6 | run 2 | 11.65 | 1026.2 | 816.3 | 14406 | 51.3 |
| 5/25/01 23:58 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/25/01 23:59 | 825.6 | run 2 | 11.65 | 1026.2 | 814.3 | 14406 | 51.2 |
| 5/25/01 23:59 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/25/01 23:59 | 805.6 | run 2 | 11.65 | 1026.2 | 794.2 | 14406 | 49.9 |
| 5/25/01 23:59 | 801.5 | run 2 | 11.65 | 1026.2 | 790.2 | 14406 | 49.7 |
| 5/26/01 0:00 | 799.5 | run 2 | 11.65 | 1026.2 | 788.2 | 14406 | 49.5 |
| 5/26/01 0:00 | 803.5 | run 2 | 11.65 | 1026.2 | 792.2 | 14406 | 49.8 |
| 5/26/01 0:00 | 803.5 | run 2 | 11.65 | 1026.2 | 792.2 | 14406 | 49.8 |
| 5/26/01 0:00 | 805.6 | run 2 | 11.65 | 1026.2 | 794.2 | 14406 | 49.9 |
| 5/26/01 0:01 | 805.6 | run 2 | 11.65 | 1026.2 | 794.2 | 14406 | 49.9 |
| 5/26/01 0:01 | 805.6 | run 2 | 11.65 | 1026.2 | 794.2 | 14406 | 49.9 |
| 5/26/01 0:01 | 815.6 | run 2 | 11.65 | 1026.2 | 804.3 | 14406 | 50.5 |
| 5/26/01 0:01 | 829.6 | run 2 | 11.65 | 1026.2 | 818.3 | 14406 | 51.4 |
| 5/26/01 0:02 | 823.6 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:02 | 815.6 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:02 | 789.5 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:02 | 739.4 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:03 | 887.7 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:03 | 1597.1 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:03 | 1959.8 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:03 | 1959.8 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:04 | 1362.7 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:04 | 478.9 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:04 | 66.1 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:04 | 18.0 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:05 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:05 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:05 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:05 | 10.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:06 | 10.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:06 | 12.0 | 0 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:06 | 16.0 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:06 | 128.2 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:07 | 595.1 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:07 | 909.8 | wait | 11.65 | 1026.2 | | | |
| 5/26/01 0:07 | 1030.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:07 | 1038.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:08 | 1036.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:08 | 1026.0 | 1015 ppm cal | 11.65 | 1026.2 | | | |
| 5/26/01 0:08 | 935.8 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:08 | 765.5 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:09 | 635.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:09 | 607.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:09 | 603.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:09 | 601.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:10 | 601.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:10 | 595.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:10 | 657.3 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:10 | 725.4 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:11 | 805.6 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:11 | 835.6 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:11 | 845.6 | wait | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm, dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 0:11 | 847.6 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 0:12 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:12 | 841.6 | run 3a | 11.047 | 1032.0 | 825.7 | 14331 | 51.6 |
| 5/26/01 0:12 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:12 | 851.6 | run 3a | 11.047 | 1032.0 | 835.7 | 14331 | 52.2 |
| 5/26/01 0:13 | 857.7 | run 3a | 11.047 | 1032.0 | 841.6 | 14331 | 52.6 |
| 5/26/01 0:13 | 853.6 | run 3a | 11.047 | 1032.0 | 837.6 | 14331 | 52.4 |
| 5/26/01 0:13 | 847.6 | run 3a | 11.047 | 1032.0 | 831.7 | 14331 | 52.0 |
| 5/26/01 0:13 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:14 | 843.6 | run 3a | 11.047 | 1032.0 | 827.7 | 14331 | 51.7 |
| 5/26/01 0:14 | 843.6 | run 3a | 11.047 | 1032.0 | 827.7 | 14331 | 51.7 |
| 5/26/01 0:14 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:14 | 849.6 | run 3a | 11.047 | 1032.0 | 833.7 | 14331 | 52.1 |
| 5/26/01 0:15 | 851.6 | run 3a | 11.047 | 1032.0 | 835.7 | 14331 | 52.2 |
| 5/26/01 0:15 | 849.6 | run 3a | 11.047 | 1032.0 | 833.7 | 14331 | 52.1 |
| 5/26/01 0:15 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:15 | 847.6 | run 3a | 11.047 | 1032.0 | 831.7 | 14331 | 52.0 |
| 5/26/01 0:16 | 853.6 | run 3a | 11.047 | 1032.0 | 837.6 | 14331 | 52.4 |
| 5/26/01 0:16 | 855.6 | run 3a | 11.047 | 1032.0 | 839.6 | 14331 | 52.5 |
| 5/26/01 0:16 | 849.6 | run 3a | 11.047 | 1032.0 | 833.7 | 14331 | 52.1 |
| 5/26/01 0:16 | 853.6 | run 3a | 11.047 | 1032.0 | 837.6 | 14331 | 52.4 |
| 5/26/01 0:17 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:17 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:17 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:17 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:18 | 865.7 | run 3a | 11.047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:18 | 867.7 | run 3a | 11.047 | 1032.0 | 851.6 | 14331 | 53.2 |
| 5/26/01 0:18 | 875.7 | run 3a | 11.047 | 1032.0 | 859.6 | 14331 | 53.7 |
| 5/26/01 0:18 | 873.7 | run 3a | 11.047 | 1032.0 | 857.6 | 14331 | 53.6 |
| 5/26/01 0:19 | 861.7 | run 3a | 11.047 | 1032.0 | 845.6 | 14331 | 52.9 |
| 5/26/01 0:19 | 857.7 | run 3a | 11.047 | 1032.0 | 841.6 | 14331 | 52.6 |
| 5/26/01 0:19 | 861.7 | run 3a | 11.047 | 1032.0 | 845.6 | 14331 | 52.9 |
| 5/26/01 0:19 | 861.7 | run 3a | 11.047 | 1032.0 | 845.6 | 14331 | 52.9 |
| 5/26/01 0:20 | 863.7 | run 3a | 11.047 | 1032.0 | 847.6 | 14331 | 53.0 |
| 5/26/01 0:20 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:20 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:20 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:21 | 865.7 | run 3a | 11.047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:21 | 863.7 | run 3a | 11.047 | 1032.0 | 847.6 | 14331 | 53.0 |
| 5/26/01 0:21 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:21 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:22 | 879.7 | run 3a | 11.047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:22 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:22 | 883.7 | run 3a | 11.047 | 1032.0 | 867.5 | 14331 | 54.2 |
| 5/26/01 0:22 | 887.7 | run 3a | 11.047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:23 | 881.7 | run 3a | 11.047 | 1032.0 | 865.5 | 14331 | 54.1 |
| 5/26/01 0:23 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:23 | 879.7 | run 3a | 11.047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:23 | 881.7 | run 3a | 11.047 | 1032.0 | 865.5 | 14331 | 54.1 |
| 5/26/01 0:24 | 887.7 | run 3a | 11.047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:24 | 891.7 | run 3a | 11.047 | 1032.0 | 875.5 | 14331 | 54.7 |
| 5/26/01 0:24 | 891.7 | run 3a | 11.047 | 1032.0 | 875.5 | 14331 | 54.7 |
| 5/26/01 0:24 | 895.7 | run 3a | 11.047 | 1032.0 | 879.5 | 14331 | 55.0 |
| 5/26/01 0:25 | 917.8 | run 3a | 11.047 | 1032.0 | 901.4 | 14331 | 56.4 |
| 5/26/01 0:25 | 913.8 | run 3a | 11.047 | 1032.0 | 897.4 | 14331 | 56.1 |
| 5/26/01 0:25 | 901.7 | run 3a | 11.047 | 1032.0 | 885.5 | 14331 | 55.4 |
| 5/26/01 0:25 | 893.7 | run 3a | 11.047 | 1032.0 | 877.5 | 14331 | 54.9 |
| 5/26/01 0:26 | 899.7 | run 3a | 11.047 | 1032.0 | 883.5 | 14331 | 55.2 |
| 5/26/01 0:26 | 905.7 | run 3a | 11.047 | 1032.0 | 889.4 | 14331 | 55.6 |
| 5/26/01 0:26 | 899.7 | run 3a | 11.047 | 1032.0 | 883.5 | 14331 | 55.2 |
| 5/26/01 0:26 | 899.7 | run 3a | 11.047 | 1032.0 | 883.5 | 14331 | 55.2 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1015 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 0:27 | 893.7 | run 3a | 11.047 | 1032.0 | 877.5 | 14331 | 54.9 |
| 5/26/01 0:27 | 887.7 | run 3a | 11.047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:27 | 891.7 | run 3a | 11.047 | 1032.0 | 875.5 | 14331 | 54.7 |
| 5/26/01 0:27 | 895.7 | run 3a | 11.047 | 1032.0 | 879.5 | 14331 | 55.0 |
| 5/26/01 0:28 | 893.7 | run 3a | 11.047 | 1032.0 | 877.5 | 14331 | 54.9 |
| 5/26/01 0:28 | 889.7 | run 3a | 11.047 | 1032.0 | 873.5 | 14331 | 54.6 |
| 5/26/01 0:28 | 887.7 | run 3a | 11.047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:28 | 889.7 | run 3a | 11.047 | 1032.0 | 873.5 | 14331 | 54.6 |
| 5/26/01 0:29 | 889.7 | run 3a | 11.047 | 1032.0 | 873.5 | 14331 | 54.6 |
| 5/26/01 0:29 | 891.7 | run 3a | 11.047 | 1032.0 | 875.5 | 14331 | 54.7 |
| 5/26/01 0:29 | 887.7 | run 3a | 11.047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:29 | 881.7 | run 3a | 11.047 | 1032.0 | 865.5 | 14331 | 54.1 |
| 5/26/01 0:30 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:30 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:30 | 885.7 | run 3a | 11.047 | 1032.0 | 869.5 | 14331 | 54.4 |
| 5/26/01 0:30 | 891.7 | run 3a | 11.047 | 1032.0 | 875.5 | 14331 | 54.7 |
| 5/26/01 0:31 | 885.7 | run 3a | 11.047 | 1032.0 | 869.5 | 14331 | 54.4 |
| 5/26/01 0:31 | 887.7 | run 3a | 11.047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:31 | 887.7 | run 3a | 11.047 | 1032.0 | 871.5 | 14331 | 54.5 |
| 5/26/01 0:31 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:32 | 883.7 | run 3a | 11.047 | 1032.0 | 867.5 | 14331 | 54.2 |
| 5/26/01 0:32 | 889.7 | run 3a | 11.047 | 1032.0 | 873.5 | 14331 | 54.6 |
| 5/26/01 0:32 | 883.7 | run 3a | 11.047 | 1032.0 | 867.5 | 14331 | 54.2 |
| 5/26/01 0:32 | 875.7 | run 3a | 11.047 | 1032.0 | 859.6 | 14331 | 53.7 |
| 5/26/01 0:33 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:33 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:33 | 867.7 | run 3a | 11.047 | 1032.0 | 851.6 | 14331 | 53.2 |
| 5/26/01 0:33 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:34 | 873.7 | run 3a | 11.047 | 1032.0 | 857.6 | 14331 | 53.6 |
| 5/26/01 0:34 | 879.7 | run 3a | 11.047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:34 | 883.7 | run 3a | 11.047 | 1032.0 | 867.5 | 14331 | 54.2 |
| 5/26/01 0:34 | 879.7 | run 3a | 11.047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:35 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:35 | 879.7 | run 3a | 11.047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:35 | 879.7 | run 3a | 11.047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:35 | 873.7 | run 3a | 11.047 | 1032.0 | 857.6 | 14331 | 53.6 |
| 5/26/01 0:36 | 867.7 | run 3a | 11.047 | 1032.0 | 851.6 | 14331 | 53.2 |
| 5/26/01 0:36 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:36 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:36 | 865.7 | run 3a | 11.047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:37 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:37 | 879.7 | run 3a | 11.047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:37 | 885.7 | run 3a | 11.047 | 1032.0 | 869.5 | 14331 | 54.4 |
| 5/26/01 0:37 | 885.7 | run 3a | 11.047 | 1032.0 | 869.5 | 14331 | 54.4 |
| 5/26/01 0:38 | 881.7 | run 3a | 11.047 | 1032.0 | 865.5 | 14331 | 54.1 |
| 5/26/01 0:38 | 877.7 | run 3a | 11.047 | 1032.0 | 861.6 | 14331 | 53.9 |
| 5/26/01 0:38 | 879.7 | run 3a | 11.047 | 1032.0 | 863.5 | 14331 | 54.0 |
| 5/26/01 0:38 | 875.7 | run 3a | 11.047 | 1032.0 | 859.6 | 14331 | 53.7 |
| 5/26/01 0:39 | 867.7 | run 3a | 11.047 | 1032.0 | 851.6 | 14331 | 53.2 |
| 5/26/01 0:39 | 865.7 | run 3a | 11.047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:39 | 867.7 | run 3a | 11.047 | 1032.0 | 851.6 | 14331 | 53.2 |
| 5/26/01 0:39 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:40 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:40 | 865.7 | run 3a | 11.047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:40 | 871.7 | run 3a | 11.047 | 1032.0 | 855.6 | 14331 | 53.5 |
| 5/26/01 0:40 | 869.7 | run 3a | 11.047 | 1032.0 | 853.6 | 14331 | 53.4 |
| 5/26/01 0:41 | 861.7 | run 3a | 11.047 | 1032.0 | 845.6 | 14331 | 52.9 |
| 5/26/01 0:41 | 855.6 | run 3a | 11.047 | 1032.0 | 839.6 | 14331 | 52.5 |
| 5/26/01 0:41 | 855.6 | run 3a | 11.047 | 1032.0 | 839.6 | 14331 | 52.5 |
| 5/26/01 0:41 | 851.6 | run 3a | 11.047 | 1032.0 | 835.7 | 14331 | 52.2 |
| 5/26/01 0:42 | 857.7 | run 3a | 11.047 | 1032.0 | 841.6 | 14331 | 52.6 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1016 ppm cal | CORRECTED PPM | FLOW, acfm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 0:42 | 865.7 | run 3a | 11.047 | 1032.0 | 849.6 | 14331 | 53.1 |
| 5/26/01 0:42 | 845.6 | run 3a | 11.047 | 1032.0 | 829.7 | 14331 | 51.9 |
| 5/26/01 0:42 | 823.6 | run 3a | 11.047 | 1032.0 | 907.8 | 14331 | 50.5 |
| | | **run 3a Average** | | | 856.9 | | 53.6 |
| 5/26/01 0:43 | 813.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:43 | 823.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:43 | 831.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:43 | 823.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:44 | 817.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:44 | 815.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:44 | 813.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:44 | 807.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:45 | 811.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:45 | 825.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:45 | 833.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:45 | 829.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:46 | 825.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:46 | 823.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:46 | 813.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:46 | 799.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:47 | 793.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:47 | 791.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:47 | 789.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:47 | 781.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:48 | 777.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:48 | 781.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:48 | 783.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:48 | 777.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:49 | 781.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:49 | 787.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:49 | 783.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:49 | 777.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:50 | 781.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:50 | 785.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:50 | 785.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:50 | 785.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:51 | 785.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:51 | 791.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:51 | 803.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:51 | 813.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:52 | 817.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:52 | 819.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:52 | 827.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:52 | 833.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:53 | 829.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:53 | 819.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:53 | 807.6 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:53 | 791.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:54 | 773.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:54 | 759.5 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:54 | 741.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:54 | 723.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:55 | 711.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:55 | 709.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:55 | 701.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:55 | 585.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:56 | 583.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:56 | 589.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:56 | 593.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:56 | 593.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:57 | 589.3 | plant upset/delay | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, acfm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 0:57 | 677.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:57 | 663.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:57 | 655.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:58 | 657.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:58 | 663.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:58 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:58 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:59 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:59 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:59 | 655.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 0:59 | 649.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:00 | 635.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:00 | 621.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:00 | 621.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:00 | 621.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:01 | 617.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:01 | 609.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:01 | 603.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:01 | 601.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:02 | 597.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:02 | 595.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:02 | 593.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:02 | 595.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:03 | 593.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:03 | 589.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:03 | 583.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:03 | 579.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:04 | 581.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:04 | 585.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:04 | 591.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:04 | 589.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:05 | 587.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:05 | 593.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:05 | 603.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:05 | 615.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:06 | 621.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:06 | 615.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:06 | 607.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:06 | 609.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:07 | 613.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:07 | 617.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:07 | 621.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:07 | 623.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:08 | 627.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:08 | 631.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:08 | 627.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:08 | 619.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:09 | 613.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:09 | 613.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:09 | 615.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:09 | 617.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:10 | 613.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:10 | 609.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:10 | 609.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:10 | 617.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:11 | 621.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:11 | 633.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:11 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:11 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:12 | 677.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:12 | 677.3 | plant upset/delay | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, acfm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 1:12 | 685.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:12 | 697.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:13 | 697.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:13 | 693.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:13 | 687.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:13 | 683.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:14 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:14 | 681.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:14 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:14 | 675.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:15 | 683.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:15 | 685.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:15 | 685.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:15 | 685.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:16 | 681.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:16 | 677.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:16 | 673.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:16 | 675.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:17 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:17 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:17 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:17 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:18 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:18 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:18 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:18 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:19 | 667.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:19 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:19 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:19 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:20 | 673.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:20 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:20 | 673.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:20 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:21 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:21 | 675.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:21 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:21 | 673.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:22 | 677.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:22 | 681.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:22 | 683.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:22 | 697.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:23 | 707.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:23 | 711.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:23 | 705.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:23 | 705.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:24 | 709.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:24 | 711.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:24 | 709.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:24 | 707.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:25 | 705.4 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:25 | 701.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:25 | 697.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:25 | 683.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:26 | 671.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:26 | 675.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:26 | 679.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:26 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:27 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:27 | 663.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:27 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1016 ppm cal | CORRECTED PPM | FLOW, scfm dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 1:27 | 667.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:28 | 667.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:28 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:28 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:28 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:29 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:29 | 653.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:29 | 655.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:29 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:30 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:30 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:30 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:30 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:31 | 665.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:31 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:31 | 653.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:31 | 653.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:32 | 659.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:32 | 667.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:32 | 669.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:32 | 661.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:33 | 657.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:33 | 657.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:33 | 655.3 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:33 | 653.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:34 | 645.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:34 | 639.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:34 | 643.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:34 | 635.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:35 | 627.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:35 | 629.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:35 | 633.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:35 | 629.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:36 | 627.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:36 | 623.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:36 | 623.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:36 | 627.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:37 | 623.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:37 | 613.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:37 | 615.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:37 | 617.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:38 | 615.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:38 | 609.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:38 | 611.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:38 | 621.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:39 | 625.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:39 | 625.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:39 | 621.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:39 | 617.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:40 | 617.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:40 | 615.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:40 | 613.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:40 | 605.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:41 | 601.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:41 | 605.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:41 | 603.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:41 | 599.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:42 | 607.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:42 | 611.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:42 | 607.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:42 | 609.2 | plant upset/delay | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 1:43 | 609.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:43 | 605.2 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:43 | 601.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:43 | 601.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:44 | 597.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:44 | 595.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:44 | 595.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:44 | 595.1 | plant upset/delay | 11.047 | 1032.0 | | | |
| 5/26/01 1:45 | 595.1 | run 3b | 11.047 | 1032.0 | 580.7 | 14331 | 36.3 |
| 5/26/01 1:45 | 599.1 | run 3b | 11.047 | 1032.0 | 584.6 | 14331 | 36.6 |
| 5/26/01 1:45 | 603.2 | run 3b | 11.047 | 1032.0 | 588.6 | 14331 | 36.8 |
| 5/26/01 1:45 | 605.2 | run 3b | 11.047 | 1032.0 | 590.6 | 14331 | 36.9 |
| 5/26/01 1:46 | 611.2 | run 3b | 11.047 | 1032.0 | 596.6 | 14331 | 37.3 |
| 5/26/01 1:46 | 609.2 | run 3b | 11.047 | 1032.0 | 594.6 | 14331 | 37.2 |
| 5/26/01 1:46 | 595.1 | run 3b | 11.047 | 1032.0 | 580.7 | 14331 | 36.3 |
| 5/26/01 1:46 | 579.1 | run 3b | 11.047 | 1032.0 | 564.7 | 14331 | 35.3 |
| 5/26/01 1:47 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 1:47 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:47 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:47 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:48 | 557.1 | run 3b | 11.047 | 1032.0 | 542.8 | 14331 | 33.9 |
| 5/26/01 1:48 | 551.0 | run 3b | 11.047 | 1032.0 | 536.8 | 14331 | 33.6 |
| 5/26/01 1:48 | 557.1 | run 3b | 11.047 | 1032.0 | 542.8 | 14331 | 33.9 |
| 5/26/01 1:48 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:49 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:49 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:49 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:49 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 1:50 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:50 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:50 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:50 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:51 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:51 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:51 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:51 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 1:52 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 1:52 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 1:52 | 575.1 | run 3b | 11.047 | 1032.0 | 560.7 | 14331 | 35.1 |
| 5/26/01 1:52 | 573.1 | run 3b | 11.047 | 1032.0 | 558.7 | 14331 | 34.9 |
| 5/26/01 1:53 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 1:53 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 1:53 | 581.1 | run 3b | 11.047 | 1032.0 | 566.7 | 14331 | 35.4 |
| 5/26/01 1:53 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 1:54 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 1:54 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:54 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:54 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:55 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:55 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:55 | 559.1 | run 3b | 11.047 | 1032.0 | 544.8 | 14331 | 34.1 |
| 5/26/01 1:55 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:56 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:56 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:56 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 1:56 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:57 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 1:57 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:57 | 559.1 | run 3b | 11.047 | 1032.0 | 544.8 | 14331 | 34.1 |
| 5/26/01 1:57 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 1:58 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1016 ppm cal | CORRECTED PPM | FLOW, acfm-dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 1:58 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 1:58 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 1:58 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 1:59 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 1:59 | 579.1 | run 3b | 11.047 | 1032.0 | 564.7 | 14331 | 35.3 |
| 5/26/01 1:59 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 1:59 | 581.1 | run 3b | 11.047 | 1032.0 | 566.7 | 14331 | 35.4 |
| 5/26/01 2:00 | 587.1 | run 3b | 11.047 | 1032.0 | 572.7 | 14331 | 35.8 |
| 5/26/01 2:00 | 591.1 | run 3b | 11.047 | 1032.0 | 576.7 | 14331 | 36.1 |
| 5/26/01 2:00 | 593.1 | run 3b | 11.047 | 1032.0 | 578.7 | 14331 | 36.2 |
| 5/26/01 2:00 | 595.1 | run 3b | 11.047 | 1032.0 | 580.7 | 14331 | 36.3 |
| 5/26/01 2:01 | 591.1 | run 3b | 11.047 | 1032.0 | 576.7 | 14331 | 36.1 |
| 5/26/01 2:01 | 581.1 | run 3b | 11.047 | 1032.0 | 566.7 | 14331 | 35.4 |
| 5/26/01 2:01 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 2:01 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 2:02 | 575.1 | run 3b | 11.047 | 1032.0 | 560.7 | 14331 | 35.1 |
| 5/26/01 2:02 | 573.1 | run 3b | 11.047 | 1032.0 | 558.7 | 14331 | 34.9 |
| 5/26/01 2:02 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| 5/26/01 2:02 | 575.1 | run 3b | 11.047 | 1032.0 | 560.7 | 14331 | 35.1 |
| 5/26/01 2:03 | 573.1 | run 3b | 11.047 | 1032.0 | 558.7 | 14331 | 34.9 |
| 5/26/01 2:03 | 573.1 | run 3b | 11.047 | 1032.0 | 558.7 | 14331 | 34.9 |
| 5/26/01 2:03 | 575.1 | run 3b | 11.047 | 1032.0 | 560.7 | 14331 | 35.1 |
| 5/26/01 2:03 | 573.1 | run 3b | 11.047 | 1032.0 | 558.7 | 14331 | 34.9 |
| 5/26/01 2:04 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:04 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:04 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:04 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:05 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:05 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:05 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:05 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:06 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:06 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:06 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 2:06 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:07 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 2:07 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 2:07 | 559.1 | run 3b | 11.047 | 1032.0 | 544.8 | 14331 | 34.1 |
| 5/26/01 2:07 | 559.1 | run 3b | 11.047 | 1032.0 | 544.8 | 14331 | 34.1 |
| 5/26/01 2:08 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 2:08 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:08 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:08 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:09 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 2:09 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:09 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:09 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:10 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 2:10 | 571.1 | run 3b | 11.047 | 1032.0 | 556.7 | 14331 | 34.8 |
| 5/26/01 2:10 | 567.1 | run 3b | 11.047 | 1032.0 | 552.8 | 14331 | 34.6 |
| 5/26/01 2:10 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 2:11 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 2:11 | 561.1 | run 3b | 11.047 | 1032.0 | 546.8 | 14331 | 34.2 |
| 5/26/01 2:11 | 563.1 | run 3b | 11.047 | 1032.0 | 548.8 | 14331 | 34.3 |
| 5/26/01 2:11 | 565.1 | run 3b | 11.047 | 1032.0 | 550.8 | 14331 | 34.4 |
| 5/26/01 2:12 | 569.1 | run 3b | 11.047 | 1032.0 | 554.8 | 14331 | 34.7 |
| 5/26/01 2:12 | 575.1 | run 3b | 11.047 | 1032.0 | 560.7 | 14331 | 35.1 |
| 5/26/01 2:12 | 583.1 | run 3b | 11.047 | 1032.0 | 568.7 | 14331 | 35.6 |
| 5/26/01 2:12 | 585.1 | run 3b | 11.047 | 1032.0 | 570.7 | 14331 | 35.7 |
| 5/26/01 2:13 | 581.1 | run 3b | 11.047 | 1032.0 | 566.7 | 14331 | 35.4 |
| 5/26/01 2:13 | 583.1 | run 3b | 11.047 | 1032.0 | 568.7 | 14331 | 35.6 |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1015 ppm cal | CORRECTED PPM | FLOW, acfm, dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 2:13 | 583.1 | run 3b | 11.047 | 1032.0 | 568.7 | 14331 | 35.6 |
| 5/26/01 2:13 | 577.1 | run 3b | 11.047 | 1032.0 | 562.7 | 14331 | 35.2 |
| | | run 3b Average | | | 557.1 | | 34.8 |
| 5/26/01 2:14 | 573.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:14 | 571.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:14 | 577.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:14 | 579.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:15 | 579.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:15 | 575.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:15 | 577.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:15 | 587.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:16 | 589.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:16 | 585.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:16 | 593.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:16 | 603.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:17 | 607.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:17 | 607.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:17 | 613.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:17 | 613.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:18 | 609.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:18 | 613.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:18 | 615.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:18 | 611.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:19 | 611.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:19 | 615.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:19 | 611.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:19 | 611.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:20 | 615.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:20 | 611.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:20 | 605.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:20 | 605.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:21 | 605.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:21 | 599.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:21 | 589.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:21 | 587.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:22 | 585.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:22 | 573.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:22 | 567.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:22 | 569.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:23 | 561.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:23 | 557.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:23 | 561.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:23 | 559.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:24 | 549.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:24 | 450.8 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:24 | 204.4 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:24 | 48.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:25 | 16.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:25 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:25 | 12.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:25 | 12.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:26 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:26 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:26 | 128.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:26 | 567.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:27 | 917.8 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:27 | 1026.0 | 1015 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:27 | 1032.0 | 1015 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:27 | 1032.0 | 1015 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:28 | 1036.0 | 1015 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:28 | 1032.0 | 1015 ppm cal | 11.047 | 1032.0 | | | |

# Georgia Pacific Bleach Plant - Carbon Monoxide Test

| DATE / TIME | PPM | COMMENTS | ZERO CAL | 1018 ppm cal | CORRECTED PPM | FLOW, scfm, dry | POUNDS OF CO PER HOUR |
|---|---|---|---|---|---|---|---|
| 5/26/01 2:28 | 989.9 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:28 | 813.6 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:29 | 663.3 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:29 | 607.2 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:29 | 599.1 | 594.7 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:29 | 599.1 | 594.7 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:30 | 601.1 | 594.7 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:30 | 591.1 | 594.7 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:30 | 436.8 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:30 | 176.3 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:31 | 50.1 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:31 | 18.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:31 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:31 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:32 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:32 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:32 | 10.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:32 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:33 | 12.0 | wait | 11.047 | 1032.0 | | | |
| 5/26/01 2:33 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:33 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:33 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:34 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:34 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:34 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:34 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:35 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:35 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:35 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:35 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:36 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:36 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:36 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:36 | 10.0 | 0 ppm cal | 11.047 | 1032.0 | | | |
| 5/26/01 2:37 | -4.1 | end test | 11.047 | 1032.0 | | | |
| | | **Grand Average** | | | 716.2 | | 44.71764667 |
| | | **TEST AVERAGE** | | | 716.24 | 14307 | 44.72 |

# APPENDIX H

# PROJECT PARTICIPANTS

## Project Participants

| | |
|---|---|
| DAVID SALTER | FIELD TESTING<br>CALIBRATIONS<br>CALCULATIONS<br>REPORT PREPARATION |
| WALTER MOCK | LAB ANALYSIS |
| BEN MOORE | FIELD TESTING |
| JOE COOKSEY | CO TESTING |
| CRAIG COHEN | CO TESTING |
| GEORGE HAWKINS | FIELD TESTING |
| HARVEY C. GRAY | REPORT REVIEW |

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# TEST REPORT
# On
# STACK EMISSIONS

From the
## BLEACH PLANT WET SCRUBBER OUTLET

In service at
## GEORGIA-PACIFIC PALATKA OPERATIONS

Located in
PALATKA, PUTNAM COUNTY, FLORIDA

Prepared for
# GEORGIA-PACIFIC CORPORATION

Test Completion Date: October 28th, 2002
Report Submittal Date: November 8th, 2002

Cubix Project No. 7382-FL1

Prepared by

Cubix Corporation
CORPORATE HEADQUARTERS
9225 US Hwy. 183 South, Austin, TX 78747

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C. Operational Data
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## INTRODUCTION

Emission testing was conducted on a Bleach Plant wet scrubber at the Georgia-Pacific Corporation (GaPac) Palatka Operations facility located on County Road 216 in Palatka, Putnam County, Florida. Carbon monoxide (CO) and other combustion products were measured in the outlet of the scrubber stack. Cubix Corporation, Southeast Regional Office conducted these tests on October 28th, 2002.

The purpose of this testing was to determine the CO emission rates of the scrubber while bleaching softwood in lieu of hardwood as an engineering study. Three one-hour test runs were conducted on the unit documenting process operating data, emission concentrations, and mass emission rates.

The tests followed the principles of the procedures set forth in the Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 1, 2, 3a, 4, and 10. Table 1 summarizes the background information pertinent to these tests.

This report has been reviewed and is approved for submittal by the following representative:

Cubix Corporation

**TABLE 1**
**Background Data**

| | |
|---|---|
| Source Owner: | **Georgia-Pacific Corporation**<br>County Road 216<br>Palatka, Florida 32177<br>Attention: Joe E. Taylor<br>(386) 329-0027 Phone<br>(386) 328-0014 Facsimile<br>Email: JETAYLOR@GAPAC.com |
| Test Contractor: | **Cubix Corporation, SE Regional Office**<br>3709 SW 42nd Avenue, Suite 2<br>Gainesville, Florida 32608<br>Attention: Roger Osier, Project Foreman<br>(352) 378-0332 Phone<br>(352) 378-0354 Facsimile<br>Email: rosier@cubixcorp.com |
| Process Description: | This pulp and paper mill produces both natural and bleached Kraft paper grades. Wood pulp is processed at the Bleach Plant in the manufacture of bleached paper products. The process utilizes chlorine dioxide ($ClO_2$) for the bleaching of pulp. Emissions from all stages of the bleaching process are sent to an alkaline wet scrubber. |
| Test Date(s): | October 28th, 2002. |
| Location: | Georgia-Pacific Palatka Operations is located on County Road 216 in Palatka, Putnam County, Florida. |
| Emission Sampling Point: | The Bleach Plant scrubber (outlet) stack has two 3" diameter flanged NPT sample ports located 90° to each other in the vertical stack before venting to atmosphere, see Appendix A for stack diagram. |
| Test Participants: | **Georgia-Pacific Corporation**<br>Joe Taylor, Test Coordinator |

Test Participants (continued):

**Cubix Corporation**
Roger Paul Osier, Project Foreman
James Hastings, Field Technician

Test Methods:

Environmental Protection Agency (EPA) Method 1 was used for selection of velocity traverse point locations.

EPA Method 2 was used for conducting stack gas pitot tube measurements used in determination of stack gas velocity.

EPA Method 3a was used for determination of oxygen ($O_2$) and carbon dioxide ($CO_2$) concentrations.

EPA Method 4 was used for determination of stack gas moisture content.

EPA Method 10 was used for determination of carbon monoxide (CO) concentrations.

## SUMMARY OF RESULTS

GaPac owns and operates Georgia-Pacific Palatka Operations facility in Palatka, Putnam County, Florida. At this facility a wet scrubber is used to collect and control emissions from the Bleach Plant in the bleaching process of wood pulp. The emissions from this scrubber are the subject of this report.

Table 2 is a summary of the testing results for the emissions from the wet scrubber. The summary table contains data recorded during the test from the process feed rate and scrubber operation as supplied by GaPac personnel, ambient conditions, and the measured emissions. The emission rates for CO are reported in terms of parts per million by volume (ppmv) on a dry basis and pounds per hour (lbs/hr).

# TABLE 2: Summary of Results
# Bleach Plant Scrubber - Softwood Testing

| Test Run No. | Run 1 | Run 2 | Run 3 | |
|---|---|---|---|---|
| Date | 10/28/02 | 10/28/02 | 10/28/02 | |
| Start Time | 09:34 | 11:27 | 13:17 | |
| Stop Time | 10:34 | 12:27 | 14:17 | |
| **Unit Operation** | | | | **Averages** |
| Wood Type | Softwood | Softwood | Softwood | - |
| Production Rate (adtbph) | 49.7 | 49.7 | 35.0 | **44.8** |
| #$ClO_2$ (adtbp) | 45.8 | 46.8 | 49.9 | **47.5** |
| **Ambient Conditions** | | | | |
| Atmospheric Pressure ( "Hg) | 29.98 | 29.96 | 29.91 | **29.95** |
| Temperature (°F) : Dry bulb | 80.5 | 84.2 | 87.6 | **84.1** |
| (°F): Wet bulb | 75.5 | 74.3 | 74.8 | **74.8** |
| Humidity (lbs moisture/lb air) | 0.0174 | 0.0155 | 0.0151 | **0.0160** |
| **Measured Emissions** | | | | |
| CO (ppmv, dry basis) | 955.3 | 1083.6 | 951.3 | **996.7** |
| $O_2$ (% volume, dry basis) | 20.76 | 20.67 | 20.69 | **20.71** |
| $CO_2$ (% volume, dry basis) | 1.04 | 1.22 | 1.03 | **1.10** |
| **Stack Volumetric Flow Rates** | | | | |
| via Pitot Tube (SCFH, dry basis) | 7.70E+05 | 8.06E+05 | 8.19E+05 | **7.98E+05** |
| **Mass Emission Rates** | | | | |
| CO (lbs/hr) | 53.5 | 63.5 | 56.7 | **57.9** |

Please note that ClO2 Application Rate is considered Confidential Business Information

Three one-hour test runs were conducted for each required EPA test method on the wet scrubber outlet. CO, $O_2$, and $CO_2$ emissions were continuously monitored during each of these runs. Moisture content was determined gravimetrically during each test run using a chilled water impingement system. Stack velocity measurements were performed during each test run.

Pollutant mass emission rates were calculated using the volumetric flow rates determined by EPA Methods 1-4. Examples of mass emission rate calculations and other calculations necessary for the presentation of the results of this section are contained in Appendix B.

Appendix A contains all field data sheets used during these tests. Appendix B contains examples of all calculations necessary for the reduction of the data presented in this report. Operational data obtained during the testing is presented in Appendix C. Records of quality assurance activities are in Appendix D. Certifications of calibration gases and equipment used to conduct tests at this facility are in Appendix E. Appendix F contains a copy of the logged data records of the analyzer monitored emission concentrations.

## PROCESS DESCRIPTION

Georgia-Pacific Corporation owns and operates the Georgia-Pacific Palatka Operations facility. In operation since 1947, this pulp and paper mill produces natural and bleached Kraft paper grades. The emissions from the outlet of the wet scrubber located at the Bleach Plant, a stage of the manufacture of bleached Kraft paper products, were measured as an engineering study to determine the effects of bleaching softwood pulp in lieu of hardwood pulp in the system. This section of the report provides a brief description of the process and the wet scrubber outlet.

The bleaching process is an elemental chlorine-free (ECF) process. The process utilizes $ClO_2$ for the pulp bleaching process. No elemental chlorine or hypochlorite salts are used in the process. The $ClO_2$ is produced on site.

The bleaching process consists of the staged introduction of $ClO_2$ to the pulp slurry followed by washing of the bleached pulp. G-P Palatka utilizes a 3-stage bleach plant for this process. The pulp comes across a pre-washer, followed by the D0 stage where $ClO_2$ is introduced, the E or extraction stage, and the D1 stage where additional $ClO_2$ is applied. The off gases from all stages of the process are collected and passed through a wet scrubber utilizing an alkaline scrubbing solution.

Sample ports meeting the criteria of EPA Method 1 were located in a straight vertical section of the scrubber stack outlet. The sample ports were greater than 2 stack diameters upstream from the nearest flow disturbance, the elbow just prior to the stack outlet, and greater than 8 diameters downstream from the nearest flow disturbance. Access to the stack was made available via a permanent steel frame platform equipped with a caged safety ladder. The diameter of the exhaust stack was 41.75 inches. Appendix A contains a field sketch of the stack configuration and sample port locations.

GaPac personnel provided operational data from the process instrumentation. Data sets were recorded during each test run; the average of this data was recorded in the summary table. Copies of the original data are contained in Appendix C of this report.

## ANALYTICAL TECHNIQUE

The emissions from a bleach plant scrubber were measured to determine the quantity of emissions being emitted to the atmosphere under various operating conditions. The sampling and analysis procedures used during these tests conformed with those outlined in The Code of Federal Regulations, Title 40, Part 60, Appendix A, Methods 1, 2, 3a, 4, and 10. This section of the report describes the analytical techniques and procedures used during the testing.

The test matrix for the scrubber outlet consisted of three one-hour test runs following each test method specified by GaPac. The stack gas was analyzed for CO, $O_2$, and $CO_2$ by continuous instrumental monitors. All exhaust gas analyses were performed on a dry basis. Table 3 lists the instruments and detection principles used for these analyses.

Provisions were made to introduce the calibration gases to the instrumental monitors via two paths: 1) directly to the instruments via the sample manifold quick-connects and rotameters, and 2) through the complete sampling system including the sample probe, filter, heat trace, condenser, sample line, manifold, and rotameters. The former method was used for quick, convenient calibration checks. The latter method was used to demonstrate that the sample was not altered due to leakage, reactions, or adsorption within the sampling system (sample system bias check). An $O_2$ standard calibration gas was introduced into the $O_2$ analyzer directly. Then the response from the $O_2$ analyzer was noted as the calibration gas was introduced at the probe. Any difference between the two responses in the instrument was attributed to the bias of the sample system. Following the span gas bias check, a zero gas bias check was performed on the $O_2$ analyzer using nitrogen to check for any zero gas bias of the sample system. In accordance with EPA Method 3a, this span and zero bias check procedure was repeated for the $CO_2$ analyzer. This procedure was also used for the CO analyzer although not required by EPA Method 10.

As shown in Figure 1, a 1-inch diameter stainless steel probe was inserted into the sample port of the stack. The gas sample was continuously pulled through the probe and transported via a 100-foot long, $^3/_8$-inch diameter heat-traced Teflon® line into the mobile laboratory using a stainless steel/Teflon® diaphragm pump. At the pump exit the pressurized sample was pushed into a heated sample manifold. The bulk of the gas stream then passed into a stainless steel minimum contact condenser to dry the sample stream and into the (dry) sample manifold. From the manifold, the sample was partitioned to the analyzers through glass and stainless steel rotameters for flow control of the sample.

Instrumental monitors were housed in an air-conditioned trailer-mounted mobile laboratory. Gaseous calibration standards were provided in aluminum cylinders with concentrations certified by the vendor. EPA Protocol No. 1 was used to determine the cylinder concentrations where applicable (i.e., $NO_x$ calibration gases).

EPA Method 1 was used to determine the velocity traverse point locations. Prior to conducting the tests, a cyclonic flow check was conducted. No significant cyclonic flow was encountered. The stack met the minimum criteria set forth in the method. Pitot tube measurements were made at eight (8) separate traverse points in each stack cross section for a total of sixteen (16) traverse points. The location of the sample ports and the pitot tube traverse point distances for the scrubber stack are denoted in the "Circular Stack Sampling Traverse Point Layout" data sheet, see Appendix A.

EPA Method 2 was used for determination of stack gas velocity during each run. A pitot tube and inclined gauge oil manometer were used to measure the differential pressure at each traverse point. The stack temperature was determined with a K-type thermocouple and digital thermometer.

The stack gas analyses for $CO_2$ and $O_2$ concentrations were performed in accordance with procedures set forth in EPA Method 3a. Instrumental analyses were used in lieu of an Orsat or Fyrite procedure due to the greater accuracy and precision provided by the instruments. The $CO_2$ analyzer was based on the principle of infrared absorption. The $O_2$ analyzer operated using a paramagnetic detector.

EPA Method 4 was used to measure the moisture content of the stack gas. A chilled water impingement system was used in conjunction with a calibrated dry gas meter to pull a sample greater than 21 scf coincident with each test run. A K-type (chromel-alumel) thermocouple was used in conjunction with a digital thermometer to determine the exit temperatures in the chilled water impingement sampling train. This parameter is measured to ensure that the gas stream is cooled to a minimum of 68 degrees Fahrenheit as required by sampling methodology. Determination of the moisture content was necessary to determine stack gas molecular weights and volumetric flow rates.

CO emission concentrations were quantified in accordance with procedures set forth in EPA Method 10. A continuous non-dispersive infrared (NDIR) analyzer was used for this purpose. This reference method analyzer was equipped with a gas correlation filter that removes most interference from moisture, $CO_2$, and other combustion products.

All data from the continuous monitoring instruments were logged into a computer file in 1-minute intervals and rolling 1-minute averages. A data logging system with a computer generated display screen monitored, recorded and averaged the emission concentrations. The program controlling the logging of data was also

used to log QA data. See Appendix F of this report for copies of the raw data and Appendix D for the QA data.

Cubix personnel collected ambient absolute pressure, temperature and humidity data. A wet/dry bulb sling psychrometer was used to determine ambient temperature and humidity conditions. An aircraft-type aneroid barometer (altimeter) was used to measure absolute atmospheric pressure.

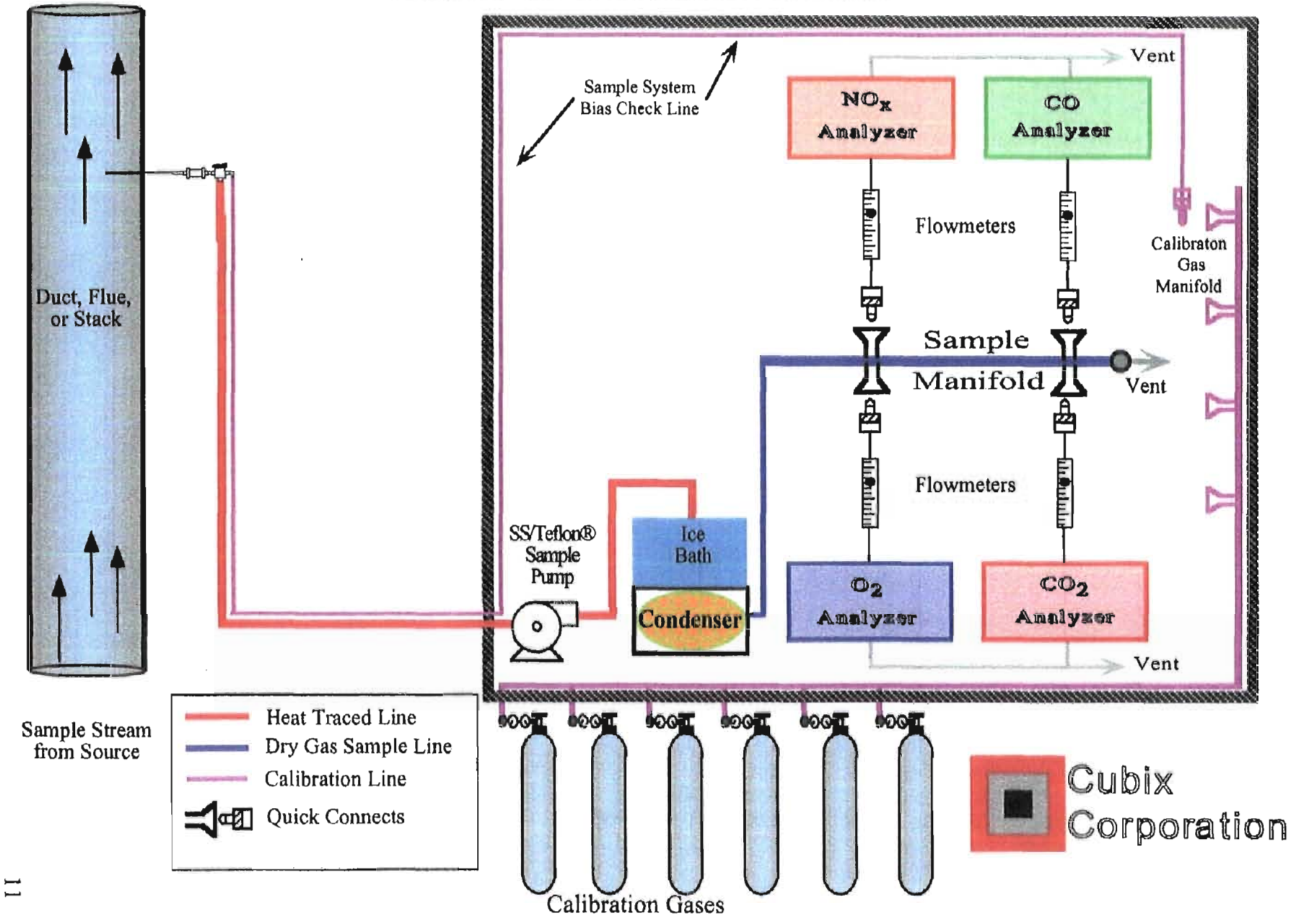
Emission calculations were conducted by a computer spreadsheet as shown in Table 2 of this report. Example calculations were performed manually using a hand-held calculator in order to verify the formulas used in the spreadsheet. Example calculations are in Appendix B of this report.

# TABLE 3
## ANALYTICAL INSTRUMENTATION

| Parameter | Model and Manufacturer | Common Use Ranges | Sensitivity | Response Time (sec.) | Detection Principle |
|---|---|---|---|---|---|
| CO | TECO Model 48C | 0-1 ppm<br>0-10 ppm<br>0-30 ppm<br>0-50, 0-100 ppm<br>0-200 ppm<br>0-500 ppm<br>0-1000 ppm | 0.1 ppm | 60 | Infrared absorption, gas filter correlation detector, micro-processor based linearization. |
| $CO_2$ | Servomex 1400 | 0-5%<br>0-10%<br>0-15% | 0.025%<br>0.05%<br>0.075% | < 10 | Non-dispersive infrared absorption, electronic linearization of a logarithmic signal (Beer's Law) |
| $O_2$ | Servomex 1400 | 0-5%<br>0-10%<br>0-25% | 0.02%<br>0.02%<br>0.02% | < 10 | Paramagnetic cell detector, inherently linear. |

**NOTE:** Higher ranges available by sample dilution.
Other ranges available via signal attenuation.

# FIGURE 1
## INSTRUMENTAL SAMPLE SYSTEM DIAGRAM



## QUALITY ASSURANCE ACTIVITIES

A number of quality assurance activities were undertaken before, during and after this testing project. This section of the report in conjunction with the documentation in Appendix D describes each of those activities.

Each instrument's response was checked and adjusted in the field prior to the collection of data via a multi-point calibration. The instrument's linearity was checked by first adjusting the instrument's zero and span responses to zero nitrogen and an upscale calibration gas in the range of the expected concentrations. The instrument response was then challenged with other calibration gases of known concentration. For CO, $O_2$, and $CO_2$, the instrument's response was accepted as being linear if the response of the other calibration gases agreed within ±2% span of the predicted values. The responses of the infrared absorption type CO and $CO_2$ analyzers are made linear through electronic suppression.

System bias checks were performed both before and after the sampling system was used for emissions testing. The sampling system's integrity was tested by comparing the responses of the $O_2$ analyzer to a calibration gas (and a zero gas) introduced via two paths as previously described in the *Analytical Techniques* section of this report. This system bias test was performed to assure that no alteration of the sample had occurred during the test due to leakage, reactions, or absorption. Similarly, system bias checks were performed with CO and $CO_2$ for added assurance of sample system integrity. Examination of the logged QA data records and Instrumental Analysis Quality Assurance Data worksheet in Appendix D shows that the analyzer response via both sample paths agreed within ±5%.

The residence time of the sampling and measurement system was estimated using the pump flow rate and the sampling system volume. The pump's rated flow rate is 0.8 scfm at 5 psig. The sampling system volume was approximately 0.175 scf. Therefore, the minimum sample residence time was approximately 13 seconds.

Cubix Corporation and instrument vendors conducted interference response tests on the CO, $O_2$, and $CO_2$ analyzers. The sum of the interference responses for $H_2O$, $C_3H_8$, CO, $CO_2$ and $O_2$ is less than 2 percent of the applicable full-scale span value. The instruments used for the tests meet the performance specifications for EPA Methods 3a and 10. The results of the interference tests are available in Appendix D of this report.

The sampling system was leak checked by demonstrating that it could hold a vacuum greater than 15 inches of mercury (Hg) for at least 1 minute with a decline of less than 1 inch Hg. A leak test was conducted after the sample system was set

up and before testing began and after testing was completed before the system was dismantled. This test was conducted to insure that ambient air was not diluting the sampling system. The actual vacuum was greater than 24 inches Hg during the leak tests with no leakage detected.

As a minimum, before and after each test run, the analyzers were checked for zero and span drift. This allows test runs to be bracketed by calibrations and documents the precision of the data just collected. Calibration gases were introduced to the analyzers through the entire sampling system. Based on the applicable test method, the criterion for acceptable data is that each instrument drifts no more than ±3% of the full-scale response. Appendix D contains quality assurance tables and logged QA calibration records that summarize the zero and span checks that were performed for each test run. The worksheets also contain the data used to correct the data for drift per EPA Method 6c, Equation 6c-1. $O_2$ and $CO_2$ emissions data were corrected for drift as required by the test methods. CO emissions data was also corrected for drift to provide more accurate results and consistent quality assurance procedures.

The control gases used to calibrate the instruments were analyzed and certified by the compressed gas vendors to ±1% accuracy for each calibration gas. EPA Protocol No. 1 was used, where applicable (i.e., $NO_X$ gases), to assign the concentration values traceable to the National Institute of Standards and Technology (NIST), Standard Reference Materials (SRM's). The gas calibration sheets as prepared by the vendor are contained in Appendix E.

The pitot tube tips used during the testing were visually inspected to insure that they met the criteria of EPA Method 2. The pitot tube lines were leak checked in the field in accordance with EPA Method 2 guidelines each time connection to the oil manometer was made.

The working dry gas meter used for the moisture train was calibrated prior to testing in accordance with EPA Method 4. A laboratory grade dry gas meter calibrated against a NIST reference instrument, a bell prover, was used for this calibration. Calibration certification documentation of the working meter can be found in Appendix E.

Appendix E also contains calibration data on ancillary measurement equipment used during this testing. The altimeter/barometer was used for determination of atmospheric pressure. Thermometers and thermocouples were used to determine stack gas temperatures and moisture train temperatures.

Cubix collected and reported the enclosed test data in accordance with the procedures and quality assurance activities described in this test report. Cubix makes no warranty as to the suitability of the test methods. Cubix assumes no liability relating to the interpretation and use of the test data by others.

# APPENDIX A:
FIELD DATA SHEETS

# Sign In Sheet

Job Name: GEORGIA-PACIFIC - PALATKA PLANT Date(s): OCTOBER 28, 2002

Job Number: CUBIX # 7382 Permit No. NA

Plant Name/Location: GEORGIA-PACIFIC Corp. PALATKA OPERATIONS / CR 216 PALATKA, PUTNAM CO, F

Emission Source(s): BLEACH PLANT WET SCRUBBER

PARTICIPANTS:

| | |
|---|---|
| Cubix Corporation | Test Contractor |
| GEORGIA PACIFIC Corp. | Owner/Operator |
| NA | Regulatory Agency |
| | |
| | |

| Name | Affiliation | Position | Phone Number | Job Safety Review(Y/N) |
|---|---|---|---|---|
| Roger Paul Osier | CUBIX | PROJECT FOREMAN | (352)378-0332 | Y |
| Jim Hastings | CUBIX | FIELD TECH. | (352)378-0332 | Y |
| Joe Taylor | GEORGIA PACIFIC | TEST COORDINATOR | (386)329-0027 | Y |
| | | | | |
| | | | | |
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# Cubix Corporation
# Air Emission Testing Job Safety Analysis

| | |
|---|---|
| Date: | October 27th and 28th, 2002 |
| Mobile Lab/Cubix Crew: | T-13/LJB, RPO, DLD, and JTH |
| Client: | Georgia-Pacific Corporation |
| Job #/Contact: | 7382-FL1/Joe Taylor |
| Plant Name: | Georgia-Pacific Palatka Operations |
| Unit Name(s): | Bleach Pplant Scrubber |
| Location (city/state): | Palatka, Florida |

*Description of Testing Activities:*

Set-up on 10/27/02. Tested wet scrubber outlet stack at the Bleach Plant on 10/28 02.

**Permits Required**

| | | Comments |
|---|---|---|
| Hot Work | Check | No permits required in area where we were working. |
| Cold Work | Check | |
| Lock & Tag | Check | |
| Scaffolding | Check | |
| Crane/Lift | Check | |
| Line Break | Check | |

**Personal Protective Equipment Required**

| | | | |
|---|---|---|---|
| hard hat | Check | acid suit | Check |
| ear plugs/muffs | Check | rubber boots | Check |
| safety glasses | Check | monogoggles | Check |
| steel toed shoes | Check | face shield | Check |
| gloves | Check | safety harness | Check |
| hot gloves | Check | respirator | Check |

**Emergency Response**

| | | |
|---|---|---|
| Safe Haven: | Upwind | *(Control room? Plant office?* |
| Wind Direction: | East | *N NE E SE S SW W NW* |
| Evacuation Route: | Upwind | *front gate? Back gate? Crosswind?* |
| Assembly Points: | Down the road | *office? Down the road?* |
| Plant Map Reviewed: | Not Applicable | *Yes or No or Not Applicable* |

**Phone No's. & Alarm Knowledge** (list type of sound)

| | | | |
|---|---|---|---|
| Plant Contact Ph.: | 386-329-0027 | Evacuate: | |
| Control Room Ph.: | | Fire: | |
| Emergency Ph.: | 911 | All Clear: | |
| Other: | | Poison Gas: | yes |

*If facility has no alarms, verify communication with control room*

**Emergency Equipment Locations Identified**

| | | | |
|---|---|---|---|
| Emergency Shut Off | Located | Not Applicable | *manual emergency trip* |
| Fire Extinguisher | Located | Not Applicable | *Cubix Mobile Lab & Plant Ext.* |
| Safety Showers | Located | Not Applicable | *required for plant?* |
| Escape Air Pack | Located | Not Applicable | *required for plant?* |

There was a plant alarm for chlorine gas but they didn't know what the alarm sounded like...They said we would know if we heard it.

## JOB HAZARD IDENTIFIED

**Hazardous Material** (in plant area)

(flammability, reactivity, health hazards)

List Hazmat?? ClO2.

## PRECAUTIONS TO BE IMPLEMENTED

Cubix MSDS in Mobile Lab — Yes / No

Plant MSDS reviewed??? — Yes / Not Available

**Environmental Hazards**

| | | | |
|---|---|---|---|
| airborne particulate | Present | No Hazard | Comments: Difficult access to stack and sample ports. |
| burn hazard | Present | No Hazard | |
| rain / fog | Present | No Hazard | |
| electrical shock | Present | No Hazard | |
| heat stress | Present | No Hazard | |
| cold weather/frostbite | Present | No Hazard | |
| inadequate lighting | Present | No Hazard | |
| noise | Present | No Hazard | |
| poor access/egress | Present | No Hazard | |

**Protective Equipment**

| | | | |
|---|---|---|---|
| respirator | Check | OTHER | Check |
| work gloves | Check | shade/cool breaks | Check |
| rain protect elect. equip. | Check | rain gear | Check |
| inspect extension cords | Check | secure/protect ext.cords | Check |
| hot gloves | Check | warm up breaks | Check |
| cold weather clothing | Check | liquid intake | Check |
| flash light/head lamp | Check | night lighting | Check |
| hearing protection | Check | hard hat liner | Check |
| housekeeping | Check | alternate route | Check |

**Chemical Hazards** (check hazards that are present at jobsite)

| | | | |
|---|---|---|---|
| asfixiation | Check | carcinogen | Check |
| poison gas | Check | chemical burns | Check |
| chemical eye exposure | Check | chemical skin exposure | Check |
| flammable gas | Check | flamable liquid | Check |
| strong acid | Check | strong base | Check |
| OTHER | Check | | |

**Respiratory Safety Equip**

| | | | |
|---|---|---|---|
| supplied fresh air | Check | fire suit | Check |
| SCBA | Check | acid suit | Check |
| respirator (correct type?) | Check | rubber boots | Check |
| escape pack | Check | monogoggles | Check |
| exposure dosiometer | Check | face shield | Check |
| OTHER | Check | OTHER | Check |

**Equipment Lifting & Fall Hazard**

| | | |
|---|---|---|
| test equipment hoisting (pulley/boom) | Required | Not Applicable |
| portable ladder | Required | Not Applicable |
| man lift (cherry picker) | Required | Not Applicable |
| personnel basket (crane) | Required | Not Applicable |
| Plant Stairs & Ladders | Required | Not Applicable |
| rigging sample lines, umbilicle | Required | Not Applicable |
| scaffold | Required | Not Applicable |

**Inspections and Protective Actions**

| | | | |
|---|---|---|---|
| equipment secure | Check | clear lift zone | Check |
| operator certification | Check | rope inspection | Check |
| guy lines | Check | body harness | Check |
| radios/handsignals | Check | guard rails, toe plates | Check |
| housekeeping | Check | ladder tie-off | Check |
| lines secure | Check | monorails secure | Check |
| secure tools | Check | hard hats | Check |

**Best Available Copy**

# Circular Stack Sampling Traverse Point Layout

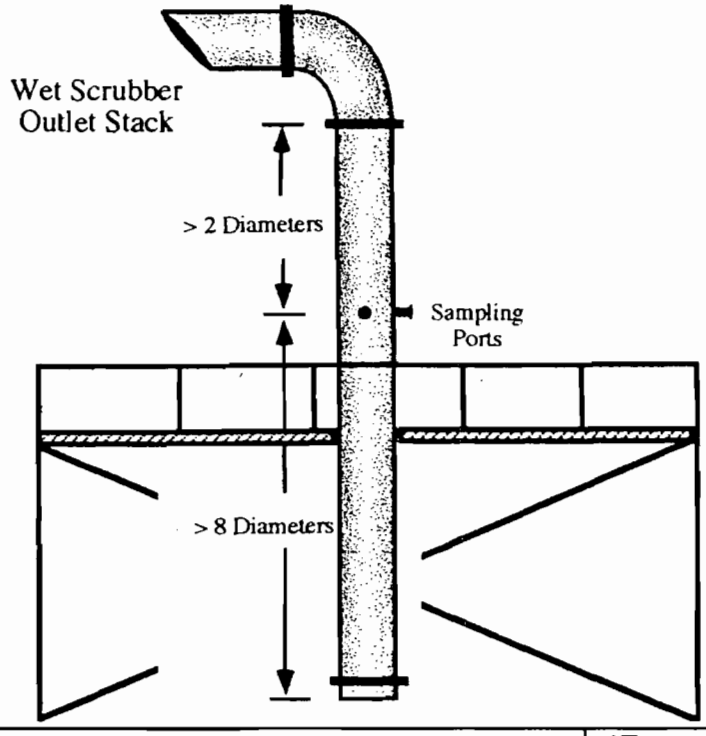
## (EPA Method 1, Velocity Measurement Traverse Points)

Date: October 27th, 2002
Client: Georgia-Pacific Corporation
Plant: G-P Palatka Operations
Source: Bleach Plant Scrubber
Technician(s): RPO, JTH

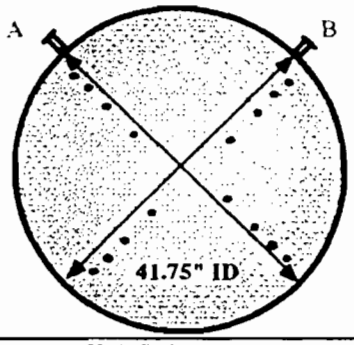
| | |
|---|---|
| Port + Stack ID (in): | 51.25 |
| Port Extension (in): | 9.50 |
| Stack ID (in): | 41.75 |
| Stack Area (ft²): | 9.507 |
| Duct Diameters **upstream** from flow disturbance (A): | > 2 |
| Duct Diameters **downstream** from flow disturbance (B): | >8 |
| Total Required Traverse Points: | 16 |
| No. of Traverse Points per Diameter: | 8 |

**Stack Diagram**

(Draw side view showing major components, dimensions, upstream/downstream flow disturbances)




**Cross Section**

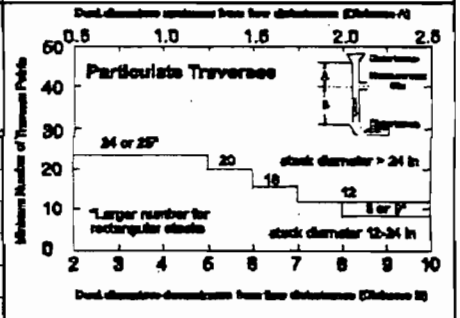


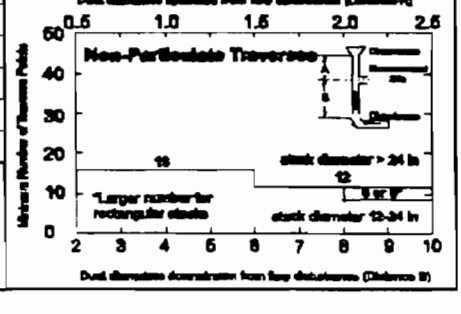

**Unit Information**

Bleach Plant Scrubber
Wet scrubber that uses an alkaline solution.

| Traverse Point Number | Number of Traverse Points on a Diameter 4 | 6 | 8 | 12 | *Calculated Traverse Point | *Traverse Point with Port Extension |
|---|---|---|---|---|---|---|
| 1 | 6.7 | 4.4 | 3.2 | 2.1 | 1.34 | 10.84 |
| 2 | 25.0 | 14.6 | 10.5 | 6.7 | 4.38 | 13.88 |
| 3 | 75.0 | 29.6 | 19.4 | 11.8 | 8.10 | 17.60 |
| 4 | 93.3 | 70.4 | 32.3 | 17.7 | 13.49 | 22.99 |
| 5 | | 85.4 | 67.7 | 25.0 | 28.26 | 37.76 |
| 6 | | 95.6 | 80.6 | 35.6 | 33.65 | 43.15 |
| 7 | | | 89.5 | 64.4 | 37.37 | 46.87 |
| 8 | | | 96.8 | 75.0 | 40.41 | 49.91 |
| 9 | | | | 82.3 | | |
| 10 | | | | 88.2 | | |
| 11 | | | | 93.3 | | |
| 12 | | | | 97.9 | | |

**Stack diameters > 24 in shall have no traverse points located within 1-inch of the stack wall*
**Stack diameters ≤ 24 in shall have no traverse points located within 0.5-inch of the stack wall*



# EPA Methods 1 through 4: Velocity, Moisture Content, Molecular Weight, and Volumetric Flow Rates

| **Test Run No:** | **Run 1** | **Run 2** | **Run 3** |
|---|---|---|---|
| Date | 10/28/02 | 10/28/02 | 10/28/02 |
| Start Time (Moisture Run Times) | 09:42 | 11:33 | 13:24 |
| Stop Time (Moisture Run Times) | 10:27 | 12:14 | 14:05 |
| **Stack Moisture & Molecular Wt. via EPA Methods 3a & 4** | | | |
| $O_2$ (% volume, dry basis) | 20.76 | 20.67 | 20.69 |
| $CO_2$ (% volume, dry basis) | 1.04 | 1.22 | 1.03 |
| Beginning Meter Reading ($ft^3$) | 675.970 | 703.905 | 739.319 |
| Ending Meter Reading ($ft^3$) | 703.495 | 726.224 | 762.465 |
| Beginning Impingers Weight (g) | 2235.2 | 2262.1 | 2285.0 |
| Ending Impingers Weight (g) | 2262.1 | 2285.0 | 2316.9 |
| Dry Gas Meter Factor ($K_d$) | 0.9869 | 0.9869 | 0.9869 |
| Dry Gas Meter Temperature (°F begin) | 96 | 84 | 88 |
| Dry Gas Meter Temperature (°F end) | 90.6 | 90 | 95 |
| Atmospheric Pressure ("Hg, absolute) | 29.98 | 29.96 | 29.91 |
| Volume of Water Vapor Collected (SCF) | 1.268 | 1.080 | 1.504 |
| Volume of Air Metered (SCF) | 25.964 | 21.281 | 21.851 |
| Stack Gas Moisture (% volume) | 4.66 | 4.83 | 4.50 |
| Dry Gas Fraction | 0.9534 | 0.9517 | 0.9550 |
| Stack Gas Molecular Wt. (lbs/lb-mole) | 28.48 | 28.49 | 28.50 |
| **Stack Flow Rate via Pitot Tube** | | | |
| ΔP #1 | 0.13 | 0.14 | 0.18 |
| ΔP #2 | 0.18 | 0.19 | 0.19 |
| ΔP #3 | 0.22 | 0.23 | 0.22 |
| ΔP #4 | 0.20 | 0.25 | 0.22 |
| ΔP #5 | 0.24 | 0.27 | 0.23 |
| ΔP #6 | 0.24 | 0.24 | 0.23 |
| ΔP #7 | 0.18 | 0.24 | 0.25 |
| ΔP #8 | 0.18 | 0.22 | 0.25 |
| ΔP #9 | 0.18 | 0.17 | 0.19 |
| ΔP #10 | 0.20 | 0.19 | 0.22 |
| ΔP #11 | 0.21 | 0.23 | 0.23 |
| ΔP #12 | 0.22 | 0.22 | 0.25 |
| ΔP #13 | 0.19 | 0.19 | 0.21 |
| ΔP #14 | 0.20 | 0.23 | 0.22 |
| ΔP #15 | 0.18 | 0.22 | 0.21 |
| ΔP #16 | 0.16 | 0.22 | 0.23 |
| Pitot Tube Factor | 0.84 | 0.84 | 0.84 |
| Sum of Square Root of ΔP's | 7.0355 | 7.4085 | 7.5071 |
| Number of Traverse Points | 16 | 16 | 16 |
| Average Square Root of ΔP's | 0.439721 | 0.463030 | 0.469191 |
| Average Temperature (°F) | 126.8 | 130.9 | 130.8 |
| Static Pressure ( "$H_2O$) | -0.28 | -0.14 | -0.18 |
| Stack Diameter (inches) | 41.75 | 41.75 | 41.75 |
| Stack Area ($ft^2$) | 9.507 | 9.507 | 9.507 |
| Stack Velocity (ft/min) | 1571 | 1660 | 1683 |
| Stack Flow, wet (ACFM) | 14936 | 15783 | 16005 |
| **Average Stack Flow, dry (SCFH)** | **7.70E+05** | **8.06E+05** | **8.19E+05** |

# MOISTURE & VELOCITY FIELD DATA SHEET

Date: 10-23-02
Plant: G-P Pulpkie Plant
Source: Chlorine Plant Scrubber
Technicians: KPO, JTH
Atm. Pressure: 29.98 " Hg (Pb)
Test Run No.: Run 1

Dry Gas Meter ID: T-10 EQUIMETER
Dry Gas Meter Factor: 0.9869 (Kd)
Pitot Tube No/Type: #2110 .7'x3/8" OD SS STYPE
Pitot Tube Factor: 0.84
Static Pressure: -.28 "$H_2O$ (Pg)
Ave. Stack Temp. 126.8 °F (Ts)

## Collection Data

| | | |
|---|---|---|
| Sample Box | 1 | |
| Leak Check ≤ 0.02 $ft^3$/min | | |
| Pre-Test Leak Check | 0.000 $ft^3$/min<br>24.2 "Hg Vac. | |
| Post-Test Leak Check | 0.000 $ft^3$/min<br>25.0 "Hg Vac. | |
| | Initial | Final |
| Time | 9:42 | 10.27 |
| DGM Reading ($ft^3$ or L) | 675.970 | 703.495 |
| DGM Average Temp (°F) | 96 | 90.6 |
| Last Impinger Temp. (°F) | 66 | 62.4 |
| DGM Flow Rate | 40 | 48 |
| $O_2$ (% vol.) | | |
| $CO_2$ (% vol.) | | |

## Impingment System

| Impinger | Contents | Initial Weight | Final Weight |
|---|---|---|---|
| 1 | $DiH_2O$ | 545.7 | 565.0 |
| 2 | $DiH_2O$ | 557.5 | 559.8 |
| 3 | Empty | 485.9 | 486.5 |
| 4 | Sicell | 646.1 | 650.8 |
| 5 | | | |
| 6 | | | |
| Totals | | 2235.2 | 2262.1 |

## Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

| Point | ΔP ("$H_2O$) | °F | α | Point | ΔP ("$H_2O$) | °F | α |
|---|---|---|---|---|---|---|---|
| 1-1 | .13 | 125 | 5 | 2-1 | .18 | 122 | 10 |
| 1-2 | .18 | 125 | 10 | 2-2 | .20 | 123 | 10 |
| 1-3 | .22 | 125 | 10 | 2-3 | .21 | 127 | 7 |
| 1-4 | .20 | 126 | 5 | 2-4 | .22 | 128 | 5 |
| 1-5 | .24 | 126 | 6 | 2-5 | .19 | 130 | 6 |
| 1-6 | .24 | 126 | 8 | 2-6 | .20 | 130 | 6 |
| 1-7 | .18 | 126 | 8 | 2-7 | .18 | 132 | 8 |
| 1-8 | .18 | 126 | 10 | 2-8 | .16 | 132 | 10 |

## Velocity System Leak Check

| Leak Check ≤ 0.1 "$H_2O$/min at a pressure ≥ 3.0 "$H_2O$ | + | − | |
|---|---|---|---|
| Pre-Test | 0.0 | 0.0 | "$H_2O$/min |
| Leak Check | 3.6 | 4.6 | "$H_2O$ Pres. |
| Post-Test | 0.0 | 0.0 | "$H_2O$/min |
| Leak Check | 4.2 | 4.1 | "$H_2O$ Pres. |

# MOISTURE & VELOCITY FIELD DATA SHEET

Date: 10-28-2002
Plant: G-P PRATKA PLANT
Source: Chlorine Plant Scrubber
Technicians: RPO, JTH
Atm. Pressure: 29.96 " Hg (Pb)
Test Run No.: RUN 2

Dry Gas Meter ID: T-10 EQUIMETER
Dry Gas Meter Factor: 0.9869 (Kd)
Pitot Tube No/Type: #2110 7'x3/8"OD SS S-TYPE
Pitot Tube Factor: 0.84
Static Pressure: -.14 "$H_2O$ (Pg)
Ave. Stack Temp. 130.9 °F (Ts)

## Collection Data

| | | |
|---|---|---|
| Sample Box | 1 | |
| Leak Check ≤ 0.02 $ft^3$/min | | |
| Pre-Test Leak Check | 0.000 $ft^3$/min<br>22.5 "Hg Vac. | |
| Post-Test Leak Check | 0.000 $ft^3$/min<br>23.0 "Hg Vac. | |
| | Initial | Final |
| Time | 1133 | 1214 |
| DGM Reading ( $ft^3$ or L) | 703.905 | 726.224 |
| DGM Average Temp (°F) | 84 | 90 |
| Last Impinger Temp. (°F) | 67 | 58 |
| DGM Flow Rate | 40 | 40 |
| $O_2$ (% vol.) | | |
| $CO_2$ (% vol.) | | |

## Velocity System Leak Check

| Leak Check ≤ 0.1 "$H_2O$/min at a pressure ≥ 3.0 "$H_2O$ | | |
|---|---|---|
| Pre-Test Leak Check | 0.0 / 3.6 | 0.0 "$H_2O$/min<br>4.6 "$H_2O$ Pres. |
| Post-Test Leak Check | 0.0 / 4.2 | 0.0 "$H_2O$/min<br>4.1 "$H_2O$ Pres. |

## Impingment System

| Impinger | Contents | Initial Weight | Final Weight |
|---|---|---|---|
| 1 | DI $H_2O$ | 565.0 | 582.6 |
| 2 | DI $H_2O$ | 559.8 | 561.7 |
| 3 | MT | 486.5 | 486.8 |
| 4 | SiGel | 650.8 | 653.9 |
| 5 | | | |
| 6 | | | |
| Totals | | 2262.1 | 2285.0 |

## Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

| Point | ΔP ("$H_2O$) | °F | α | Point | ΔP ("$H_2O$) | °F | α |
|---|---|---|---|---|---|---|---|
| 1-1 | .14 | 129 | | 2-1 | .17 | 133 | |
| 1-2 | .19 | 129 | | 2-2 | .19 | 133 | |
| 1-3 | .23 | 131 | | 2-3 | .23 | 133 | |
| 1-4 | .25 | 132 | | 2-4 | .22 | 133 | |
| 1-5 | .27 | 133 | | 2-5 | .19 | 131 | |
| 1-6 | .24 | 134 | | 2-6 | .23 | 130 | |
| 1-7 | .24 | 134 | | 2-7 | .22 | 125 | |
| 1-8 | .22 | 133 | ↓ | 2-8 | .22 | 121 | ↓ |

# MOISTURE & VELOCITY FIELD DATA SHEET

Date: 10-28-2002
Plant: GP PALATKA PLANT
Source: Chlorine Plant Scrubber
Technicians: RPO, JTH
Atm. Pressure: 29.91 "Hg (Pb)
Test Run No.: RUN 3

Dry Gas Meter ID: T-10 EQUIMETER
Dry Gas Meter Factor: 0.9869 (Kd)
Pitot Tube No/Type: #2110 7'x3/8"OD SS S-TYPE
Pitot Tube Factor: 0.84
Static Pressure: .1 - .18 "$H_2O$ (Pg)
Ave. Stack Temp. 130.8 °F (Ts)

## Collection Data

| | | |
|---|---|---|
| Sample Box | 1 | |
| Leak Check ≤ 0.02 $ft^3$/min | | |
| Pre-Test Leak Check | 0.000 $ft^3$/min<br>25.0 "Hg Vac. | |
| Post-Test Leak Check | 0.000 $ft^3$/min<br>25.5 "Hg Vac. | |
| | Initial | Final |
| Time | 13:24 | 14:05 |
| DGM Reading ($ft^3$ or L) | 739.319 | 762.465 |
| DGM Average Temp (°F) | 88 | 95 |
| Last Impinger Temp. (°F) | 66 | 64 |
| DGM Flow Rate | 40 | 40 |
| $O_2$ (% vol.) | | |
| $CO_2$ (% vol.) | | |

## Impingment System

| Impinger | Contents | Initial Weight | Final Weight |
|---|---|---|---|
| 1 | Di $H_2O$ | 582.6 | 605.0 |
| 2 | Di $H_2O$ | 561.7 | 565.6 |
| 3 | MT | 486.8 | 487.7 |
| 4 | SiGel | 653.9 | 658.6 |
| 5 | | | |
| 6 | | | |
| Totals | | 2285 | 2316.9 |

## Velocity System Leak Check

| Leak Check ≤ 0.1 "$H_2O$/min at a pressure ≥ 3.0 "$H_2O$ | + | − | |
|---|---|---|---|
| Pre-Test Leak Check | 0.0 | 0.0 | "$H_2O$/min |
| | 3.6 | 4.6 | "$H_2O$ Pres. |
| Post-Test Leak Check | + | − | |
| | 0.0 | 0.0 | "$H_2O$/min |
| | 4.2 | 4.1 | "$H_2O$ Pres. |

## Velocity Traverse Data
with Stack Temperature and Cyclonic Flow Check

| Point | ΔP ("$H_2O$) | °F | α | Point | ΔP ("$H_2O$) | °F | α |
|---|---|---|---|---|---|---|---|
| 1-1 | .18 | 129 | | 2-1 | .19 | 130 | |
| 1-2 | .19 | 129 | | 2-2 | .22 | 130 | |
| 1-3 | .22 | 131 | | 2-3 | .23 | 131 | |
| 1-4 | .22 | 131 | | 2-4 | .25 | 132 | |
| 1-5 | .23 | 131 | | 2-5 | .21 | 131 | |
| 1-6 | .23 | 132 | | 2-6 | .22 | 131 | |
| 1-7 | .25 | 131 | | 2-7 | .21 | 131 | |
| 1-8 | ~~.23~~ .25 | 131 | ↓ | 2-8 | .23 | 131 | ↓ |

# APPENDIX B:
# EXAMPLE CALCULATIONS

# EXAMPLE CALCULATIONS

## Moisture Content via EPA Method 4

*refers to Test Run # 1*

| | | |
|---|---|---|
| $M_{WC}$ | = net impinger weight gain = 2262.1 g – 2235.2 g | = 26.9 g |
| Y | = dry gas meter correction factor | = 0.9869 |
| $V_m$ | = volume metered = (703.495 – 675.970) | = 27.525 $ft^3$ |
| $P_{atm}$ | = atmospheric pressure | = 29.98 "Hg |
| $P_{met}$ | = average meter pressure = $P_{atm}$ | = 29.98 "Hg |
| $T_{met}$ | = average meter temperature = 93.3° F + 460 °F | = 553.3° R |
| $K_2$ | = conversion factor, water weight to vapor | = 0.04715 $ft^3/g$ |
| $K_3$ | = standard temp, pressure (STP) correction factor | = 17.64° R/ "Hg |

$V_{WC}$ = total volume of water vapor collected at STP

$= K_2 \times M_{WC}$

$= (0.04715 \times 26.9)$

$= 1.2683\ ft^3$

$V_{m(std)}$ = total volume metered at STP

$$= K_3 \times Y \times V_m \times \frac{P_{met}}{T_{met}}$$

$$= 17.64 \times 0.9869 \times 27.525 \times \frac{29.98}{553.3}$$

$$= 25.964\ ft^3$$

$\mathbf{B_{ws}}$ = moisture content by EPA Method 4

$$= \frac{V_{WC}}{V_{WC} + V_{STP}}$$

$$= \frac{1.2683}{1.2683 + 25.964}$$

$\mathbf{B_{ws}}$ = **0.04657**

= **4.66 % moisture**

## Stack Gas Molecular Weight

*Refers to Test Run # 1*

| | | |
|---|---|---|
| $MW_{H_2O}$ | = molecular wt of $H_2O$ | = 18 lb/lb-mole |
| $MW_{CO_2}$ | = molecular wt of $CO_2$ | = 44 lb/lb-mole |
| $MW_{O_2}$ | = molecular wt of $O_2$ | = 32 lb/lb-mole |
| $MW_{N_2}$ | = molecular wt of $N_2$ | = 28 lb/lb-mole |
| $C_{CO_2}$ | = concentration of $CO_2$ | = 0.0104 (from analyzer) |
| $C_{O_2}$ | = concentration of $O_2$ | = 0.2076 (from analyzer) |
| $C_{N_2}$ | = concentration of $N_2$ | = 1 - ($C_{CO_2}$ + $C_{O_2}$) = 0.782 |
| $F_d$ | = dry gas fraction = 1 - $B_{ws}$ | = 0.95343 |

**MW** = molecular weight of stack gas (lb/lb-mole)

= wt. of $H_2O$ + wt. of $CO_2$ + wt. of $O_2$ + wt. of $N_2$

$$= (MW_{H_2O} \times B_{ws}) + (F_d \times ((MW_{CO_2} \times C_{CO_2}) + (MW_{O_2} \times C_{O_2}) + (MW_{N_2} \times C_{N_2})))$$

$$= (18 \times 0.04657) + (0.95343 \times ((44 \times 0.0104) + (32 \times 0.2076) + (28 \times 0.782)))$$

**MW = 28.48(4) lb/lb-mole**

## Stack Gas Flow Rate via Pitot Tube, $Q_d$

*Refers to Test Run # 1*

$C_p$ = pitot tube coefficient = 0.84

$\Delta P$ = pressure difference in stack as measured (in. $H_2O$)

$\sqrt{\Delta P_{av}}$ = average of square root of $\Delta P$'s = 0.439721

$T_S$ = ave. stack temperature = 126.8° F + 460 = 586.8° R

$P_{atm}$ = site corrected atmospheric pressure = 29.98 "Hg

$P_g$ = stack static pressure (in. $H_2O$) = -0.28 "$H_2O$

$P_s$ = absolute stack pressure

= $P_{atm} + (P_g/13.6)$ = 29.959 "Hg

$K_p$ = pitot tube constant = $85.49 \frac{\text{ft}}{\text{sec}}\left(\frac{(\text{lb/lb-mole})(\text{in.Hg})}{(°\text{R})(\text{in.H}_2\text{O})}\right)^{\frac{1}{2}}$

$T_{std}$ = absolute Temperature = 528° R

$P_{std}$ = standard atmospheric pressure = 29.92 "Hg

$V_s$ = stack velocity (ft/sec)

$$= K_p \times C_p \times \sqrt{\Delta P_{av}} \times \sqrt{\frac{T_s}{(P_s \times MW)}}$$

$$= 85.49 \times 0.84 \times 0.439721 \times \sqrt{\frac{586.8}{(29.959 \times 28.484)}}$$

= 26.185 ft/sec x 60 sec/min

$V_s$ = 1571.1 ft/min

$Q_a$ = stack flow rate ($ft^3$/min, actual)

= V x A , where A = area of stack = 9.507 $ft^2$

$Q_a$ = 1571.1 x 9.507 = 14936.4 $ft^3$/min

**$Q_d$** = average stack flow rate on a dry basis at standard conditions (DSCFH)

$$= \frac{Q_a \times T_{std} \times P_s}{T_s \times P_{std}} \times F_d \times 60$$

$$= \frac{14936.4 \times 528 \times 29.959}{586.8 \times 29.92} \times 0.95343 \times 60$$

**$Q_d$ = $7.698 \times 10^5$ DSCFH, Average Flow**

## Correction of $O_2$ Gas Concentrations, $CO_2$

*Refers to Test Run # 1*

Analytical instruments tend to drift in their calibrations over time and with changes in atmospheric conditions. Span and zero gas bias drift checks (calibrations) were conducted prior to and following each test. The results of these calibrations were used to bracket and thus correct the raw gas concentrations into corrected (more accurate) gas concentrations. The calculation used for these correction is 40 CFR 60, Appendix A, Method 6c, Equation 6c-1. This correction is required for $CO_2$ exhaust concentrations when using Method 3a. Cubix also conducts this correction for EPA Method 10 in order to present more accurate and consistent test results.

$U_{O_2}$ = analyzer $O_2$ gas concentration, uncorrected for drift and bias
$U_{O_2}$ = 20.52 ppmv, uncorrected
$C_O$ = Average of initial/final zero gas concentrations
= -0.04 ppmv
$C_m$ = Average of initial/final span gas concentrations
= 11.785 ppmv
$C_{ma}$ = Actual upscale cylinder span gas concentrations
= 11.94 ppmv

$C_{O_2}$ = Effluent $O_2$ gas concentration, ppmv corrected

$$= (U_{O_2} - C_O) \times \frac{C_{ma}}{C_m - C_O}$$

$$= (20.52 + 0.04) \times \frac{11.94}{11.785 + 0.04}$$

**$C_{O_2}$ = 20.76 ppmv $O_2$, dry basis corrected**

## CO Mass Emission Rate (lbs/hr)

*Refers to Test Run # 1*

$C_{CO}$ = observed concentration of CO = 955.3 ppmv

$MW_{CO}$ = 28.01 lb/lb-mole for carbon monoxide
for ideal gas, 385.15 SCF = 1.0 lb/mole

$Q_d$ = $7.698 \times 10^5$ SCFH (from ave. pitot tube volumetric flow)

$E_{CO}$ = mass emission rate of CO in (lb/hr)

$$= C_{CO} \times 10^{-6} \times Q_d \times \frac{MW_{CO}}{385.15}$$

$$= 955.3 \times 10^{-6} \times 7.698 \times 10^5 \times \frac{28.01}{385.15}$$

**$E_{CO}$ = 53.5 lbs/hr**

# APPENDIX C:
# OPERATIONAL DATA

# PRODUCTION RATE DATA

| RUN | DATE | TIME | SPECIES | PRODUCTION RATE, adtbph | #ClO2/adtbp |
|---|---|---|---|---|---|
| 1 | 10/28/02 | 0934-1034 | softwood | 49.7 | 45.8 |
| 2 | 10/28/02 | 1127-1227 | softwood | 49.7 | 46.8 |
| 3 | 10/28/02 | 1317-1417 | softwood | 35.0 | 49.9 |

Please note that the Chemical Application Rate is considered Confidential Business Information

# APPENDIX D:
# QUALITY ASSURANCE ACTIVITIES

# Quality Assurance Activities
## Calibration Error, Bias, and Drift Checks

| Linearity Check | CO | $O_2$ | $CO_2$ |
|---|---|---|---|
| Analyzer Range (ppmv), $O_2$ & $CO_2$ in % vol | 1250.0 | 25.00 | 15.00 |
| Strip Chart Offset | 0.0 | 10.0 | 2.0 |
| Low Level Certified Value (ppm or % vol) | 253.0 | 4.53 | 4.48 |
| Mid Level Certified Value (ppm or % vol) | 441.0 | 11.94 | 7.99 |
| High Level Certified Value (ppm or % vol) | 885.0 | 20.90 | 12.62 |
| Zero Target (% Chart) | 0.0 | 10.0 | 2.0 |
| Low Level Target (% Chart) | 20.2 | 28.1 | 31.9 |
| Mid Level Target (% Chart) | 35.3 | 57.8 | 55.3 |
| High Level Target (% Chart) | 70.8 | 93.6 | 86.1 |
| Zero Observed (% Chart) | 0.0 | 10.0 | 2.0 |
| Low Level Observed (% Chart) | 19.6 | 28.0 | 32.1 |
| Mid Level Observed (% Chart) | 34.5 | 57.8 | 55.5 |
| High Level Observed (% Chart) | 71.2 | 93.6 | 86.1 |
| Zero Observed (ppm or % vol) | 0.33 | 0.00 | 0.00 |
| Low Level Observed (ppm or % vol) | 244.64 | 4.50 | 4.52 |
| Mid Level Observed (ppm or % vol) | 430.65 | 11.95 | 8.02 |
| High Level Observed (ppm or % vol) | 889.46 | 20.90 | 12.62 |
| % Difference From Zero to Target | 0.0 | 0.0 | 0.0 |
| % Difference From Low to Target | 0.7 | 0.1 | -0.3 |
| % Difference From Mid to Target | 0.8 | 0.0 | -0.2 |
| % Difference From High to Target | -0.4 | 0.0 | 0.0 |
| EPA Allowable % Difference from Target | ±2% Span | ±2% Span | ±2% Span |

| Test Run 1 | CO | $O_2$ | $CO_2$ |
|---|---|---|---|
| Analyzer Range (ppm), $O_2$ & $CO_2$ in % | 1250.0 | 25.00 | 15.00 |
| Calibration Gas Certified Value (ppm or %) | 885 | 11.94 | 7.99 |
| Strip Chart Offset | 0.0 | 10.0 | 2.0 |
| Target Calibration Gas (Chart %) | 70.8 | 57.8 | 55.3 |
| Actual Zero Gas from Direct (Chart %) | 0.0 | 10.0 | 2.0 |
| Actual Calibration Gas from Direct (Chart %) | 71.2 | 57.8 | 55.5 |
| Initial Readings | | | |
| Zero Gas (chart %) | -0.2 | 9.9 | 2.4 |
| Calibration Gas (chart %) | 71.0 | 57.1 | 54.9 |
| Zero Gas (ppmv) | -2.97 | -0.03 | 0.06 |
| Calibration Gas (ppmv) | 887.15 | 11.77 | 7.94 |
| Final Readings | | | |
| Zero Gas (chart %) | -0.2 | 9.8 | 2.3 |
| Calibration Gas (chart %) | 71.1 | 57.2 | 55.2 |
| Zero Gas (ppmv) | -2.97 | -0.05 | 0.04 |
| Calibration Gas (ppmv) | 888.80 | 11.80 | 7.98 |
| Bias and Drift Calculations | | | |
| Zero Bias (% Chart) (Run-Direct Cal) ≤5% | -0.3 | -0.2 | 0.3 |
| Calibration Bias (% Chart) ≤5% | -0.1 | -0.6 | -0.3 |
| Zero Drift (Chart %) (Run-Run) ≤3% | 0.0 | 0.1 | 0.1 |
| Calibration Drift (Chart %) ≤3% | -0.1 | -0.1 | -0.3 |
| Run Results | | | |
| Raw Results (chart %) | 76.7 | 92.1 | 9.2 |
| Raw Results (ppmv or % vol) | 958.7 | 20.52 | 1.08 |
| Corrected Results (ppmv or % vol) from % chart | 955.3 | 20.76 | 1.04 |

# Quality Assurance Activities
## Calibration Error, Bias, and Drift Checks

| Test Run 2 | CO | $O_2$ | $CO_2$ |
|---|---|---|---|
| Analyzer Range (ppm), $O_2$ & $CO_2$ in % | 1250.0 | 25.00 | 15.00 |
| Calibration Gas Certified Value (ppm or %) | 885 | 20.90 | 4.48 |
| Strip Chart Offset | 0.0 | 10.0 | 2.0 |
| Target Calibration Gas (Chart %) | 70.8 | 93.6 | 31.9 |
| Actual Zero Gas from Direct (Chart %) | 0.0 | 10.0 | 2.0 |
| Actual Calibration Gas from Direct (Chart %) | 71.2 | 93.6 | 32.1 |
| Initial Readings | | | |
| Zero Gas (chart %) | -0.2 | 9.8 | 2.3 |
| Calibration Gas (chart %) | 71.1 | 92.8 | 32.0 |
| Zero Gas (ppmv) | -2.97 | -0.05 | 0.04 |
| Calibration Gas (ppmv) | 888.80 | 20.70 | 4.50 |
| Final Readings | | | |
| Zero Gas (chart %) | -0.1 | 9.9 | 2.4 |
| Calibration Gas (chart %) | 71.4 | 92.5 | 31.9 |
| Zero Gas (ppmv) | -1.40 | -0.03 | 0.06 |
| Calibration Gas (ppmv) | 893.00 | 20.62 | 4.48 |
| Bias and Drift Calculations | | | |
| Zero Bias (% Chart) (Run-Direct Cal) ≤5% | -0.1 | -0.1 | 0.4 |
| Calibration Bias (% Chart) ≤5% | 0.3 | -1.1 | -0.3 |
| Zero Drift (Chart %) (Run-Run) ≤3% | -0.1 | -0.1 | -0.1 |
| Calibration Drift (Chart %) ≤3% | -0.3 | 0.3 | 0.1 |
| Run Results | | | |
| Raw Results (chart %) | 87.3 | 91.7 | 10.4 |
| Raw Results (ppmv or % vol) | 1091.3 | 20.43 | 1.26 |
| Corrected Results (ppmv or % vol) from % chart | 1083.6 | 20.67 | 1.22 |

| Test Run 3 | CO | $O_2$ | $CO_2$ |
|---|---|---|---|
| Analyzer Range (ppm), $O_2$ & $CO_2$ in % | 1250.0 | 25.00 | 15.00 |
| Calibration Gas Certified Value (ppm or %) | 885 | 20.90 | 4.48 |
| Strip Chart Offset | 0.0 | 10.0 | 2.0 |
| Target Calibration Gas (Chart %) | 70.8 | 93.6 | 31.9 |
| Actual Zero Gas from Direct (Chart %) | 0.0 | 10.0 | 2.0 |
| Actual Calibration Gas from Direct (Chart %) | 71.2 | 93.6 | 32.1 |
| Initial Readings | | | |
| Zero Gas (chart %) | -0.1 | 9.9 | 2.4 |
| Calibration Gas (chart %) | 71.4 | 92.5 | 31.9 |
| Zero Gas (ppmv) | -1.40 | -0.03 | 0.06 |
| Calibration Gas (ppmv) | 893.00 | 20.62 | 4.48 |
| Final Readings | | | |
| Zero Gas (chart %) | -0.1 | 9.9 | 2.3 |
| Calibration Gas (chart %) | 69.8 | 92.2 | 31.9 |
| Zero Gas (ppmv) | -1.40 | -0.03 | 0.04 |
| Calibration Gas (ppmv) | 873.00 | 20.55 | 4.48 |
| Bias and Drift Calculations | | | |
| Zero Bias (% Chart) (Run-Direct Cal) ≤5% | -0.1 | -0.1 | 0.3 |
| Calibration Bias (% Chart) ≤5% | -1.3 | -1.4 | -0.3 |
| Zero Drift (Chart %) (Run-Run) ≤3% | 0.0 | 0.0 | 0.1 |
| Calibration Drift (Chart %) ≤3% | 1.6 | 0.3 | 0.0 |
| Run Results | | | |
| Raw Results (chart %) | 75.9 | 91.5 | 9.1 |
| Raw Results (ppmv or % vol) | 949.3 | 20.38 | 1.07 |
| Corrected Results (ppmv or % vol) from % chart | 951.3 | 20.69 | 1.03 |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged QA Calibration Records

Run 1 10/28/02 9:34:18 10:34:18

| Initial Linearity Test | Zero | Low | Mid | Span | L-Lin | M-Lin | S-Lin |
|---|---|---|---|---|---|---|---|
| CO (ppmv) | 0.33 | 244.64 | 430.65 | 889.46 | 0.67 | 0.83 | -0.36 |
| O2 (% vol) | 0.00 | 4.50 | 20.90 | 11.95 | 0.12 | 0.00 | -0.04 |
| CO2 (% vol) | 0.00 | 4.52 | 12.62 | 8.02 | -0.27 | 0.00 | -0.20 |

| Initial and Final Bias and Drift | I-Zero | I-Span | F-Zero | F-Span | Z-Bias | S-Bias | Z-Drift | S-Drift |
|---|---|---|---|---|---|---|---|---|
| CO (ppmv) | -2.97 | 887.15 | -2.97 | 888.80 | -0.26 | -0.05 | 0.00 | -0.13 |
| O2 (% vol) | -0.03 | 11.77 | -0.05 | 11.80 | -0.20 | -0.60 | 0.08 | -0.12 |
| CO2 (% vol) | 0.06 | 7.94 | 0.04 | 7.98 | 0.27 | -0.27 | 0.13 | -0.27 |

| Run Results and Cal Gases Used | Raw | Corrected | Ranges | Low Gas | Mid Gas | Span Gas |
|---|---|---|---|---|---|---|
| CO (ppmv) | 958.7 | 955.3 | 1250.0 | 253.0 | 441.0 | 885.0 |
| O2 (% vol) | 20.52 | 20.76 | 25.00 | 4.53 | 20.90 | 11.94 |
| CO2 (% vol) | 1.08 | 1.04 | 15.00 | 4.48 | 12.62 | 7.99 |

Run 2 10/28/02 11:27:39 12:27:39

| Initial Linearity Test | Zero | Low | Mid | Span | L-Lin | M-Lin | S-Lin |
|---|---|---|---|---|---|---|---|
| CO (ppmv) | 0.33 | 244.64 | 430.65 | 889.46 | 0.67 | 0.83 | -0.36 |
| O2 (% vol) | 0.00 | 4.50 | 11.95 | 20.90 | 0.12 | -0.04 | 0.00 |
| CO2 (% vol) | 0.00 | 8.02 | 12.62 | 4.52 | -0.20 | 0.00 | -0.27 |

| Initial and Final Bias and Drift | I-Zero | I-Span | F-Zero | F-Span | Z-Bias | S-Bias | Z-Drift | S-Drift |
|---|---|---|---|---|---|---|---|---|
| CO (ppmv) | -2.97 | 888.80 | -1.40 | 893.00 | -0.14 | 0.28 | -0.13 | -0.34 |
| O2 (% vol) | -0.05 | 20.70 | -0.03 | 20.62 | -0.12 | -1.12 | -0.08 | 0.32 |
| CO2 (% vol) | 0.04 | 4.50 | 0.06 | 4.48 | 0.40 | -0.27 | -0.13 | 0.13 |

| Run Results and Cal Gases Used | Raw | Corrected | Ranges | Low Gas | Mid Gas | Span Gas |
|---|---|---|---|---|---|---|
| CO (ppmv) | 1091.3 | 1083.6 | 1250.0 | 253.0 | 441.0 | 885.0 |
| O2 (% vol) | 20.43 | 20.67 | 25.00 | 4.53 | 11.94 | 20.90 |
| CO2 (% vol) | 1.26 | 1.22 | 15.00 | 7.99 | 12.62 | 4.48 |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged QA Calibration Records

Run 3 10/28/02 13:17:44 PM 14:17:44 PM

| Initial Linearity Test | Zero | Low | Mid | Span | L-Lin | M-Lin | S-Lin |
|---|---|---|---|---|---|---|---|
| CO (ppmv) | 0.33 | 244.64 | 430.65 | 889.46 | 0.67 | 0.83 | -0.36 |
| O2 (% vol) | 0.00 | 4.50 | 11.95 | 20.90 | 0.12 | -0.04 | 0.00 |
| CO2 (% vol) | 0.00 | 8.02 | 12.62 | 4.52 | -0.20 | 0.00 | -0.27 |

| Initial and Final Bias and Drift | I-Zero | I-Span | F-Zero | F-Span | Z-Bias | S-Bias | Z-Drift | S-Drift |
|---|---|---|---|---|---|---|---|---|
| CO (ppmv) | -1.40 | 893.00 | -1.40 | 873.00 | -0.14 | -1.32 | 0.00 | 1.60 |
| O2 (% vol) | -0.03 | 20.62 | -0.03 | 20.55 | -0.12 | -1.40 | 0.00 | 0.28 |
| CO2 (% vol) | 0.06 | 4.48 | 0.04 | 4.48 | 0.27 | -0.27 | 0.13 | 0.00 |

| Run Results and Cal Gases Used | Raw | Corrected | Ranges | Low Gas | Mid Gas | Span Gas |
|---|---|---|---|---|---|---|
| CO (ppmv) | 949.3 | 951.3 | 1250.0 | 253.0 | 441.0 | 885.0 |
| O2 (% vol) | 20.38 | 20.69 | 25.00 | 4.53 | 11.94 | 20.90 |
| CO2 (% vol) | 1.07 | 1.03 | 15.00 | 7.99 | 12.62 | 4.48 |

# Instrumental Analyses
# Quality Assurance Data

| | |
|---|---|
| **Date:** | **October 28, 2002** |
| **Company:** | **Georgia-Pacific Corporation** |
| **Facility:** | **Georgia-Pacific Palatka Operations** |
| **Source ID:** | **Bleach Plany Wet Scrubber** |
| **Location:** | **Patatka, Putnam County, Florida** |
| **Technicians:** | **RPO, JTH** |

**Instrumental Sample System Leak Checks**

| Date | Run Number | Vacuum (inches Hg) | Leak Rate (inches Hg/min) | Pass |
|---|---|---|---|---|
| 10/27/02 | Set-Up | 24.8 | 0.0 | yes |
| 10/28/02 | pre Run 1 | 24.0 | 0.0 | yes |
| 10/28/02 | post Run 3 | 24.2 | 0.0 | yes |

Leak check criteria less than 1.0" Hg Vac. Decline at greater than 15.0" Hg Vac.

# Continuous Emission Analyzer
# Interference Response Tests

## Analyzer Interference Response Checks

*(Frequency: Prior to initial use of sampling system or after alteration or modification.)*

*Test Date:* *September 27, 2002* *Technician:* *RPO*
*Mobile Lab:* *T-13* *Location:* *Gainesville, Florida*

| Analyzer | Manufacturer | Model | Serial Number | Detection Method/Comments |
|---|---|---|---|---|
| $NO_x$ Analyzer | TECO | 42C | 42CHL-69541-363 | Chemiluminescence with Ozone |
| CO Analyzer | TECO | 48C | 48C-70472-365 | Infrared Absorption/GFC Detector |
| $O_2$ Analyzer | Servomex | 1440 | 1420C/2647 | Paramagnetic Cell Detector |
| $CO_2$ Analyzer | Servomex | 1440 | 01415/2537 | Infrared Absorption/ Solid State Detector |
| THC | California Analytical | 300-HFID CE | 4J11003 | Flame Ionization Detector |

| Interferrent Test Gases | | Analyzer Response (ppmv or % as applicable) | | | | |
|---|---|---|---|---|---|---|
| **Type Gas** | **Conc.** | **$NO_x$** | **CO** | **$O_2$** | **$CO_2$** | **THC** |
| | | **0-25 ppmv** | **0-50 ppmv** | **0-25% vol** | **0-15% vol** | **0-100 ppmv** |
| CO/Methane in air | 885/919 | 0.1 ppmv | | | 0.00 % | |
| Propane in air | 2000 | 0.1 ppmv | 0.4 ppmv | | 0.03 % | |
| $SO_2$ in $N_2$ | 4400 | 0.2 ppmv | -0.3 ppmv | 0.00 % | 0.00 % | no data |
| Air | dry instrument | < 0.1 ppmv | 0.4 ppmv | | 0.03 % | no data |
| Nitrogen | pre-purified | 0.0 ppmv | 0.3 ppmv | 0.00 % | 0.00 % | no data |
| Air | UHC, CO free | 0.0 ppmv | 0.0 ppmv | | 0.01 % | no data |
| $CO_2$/ $O_2$ | 4.54%/20.8% | < 0.1 ppmv | -0.2 ppmv | | | no data |
| $CO_2$/ $O_2$ | 8.004%/11.91% | < 0.1 ppmv | -0.4 ppmv | | | no data |
| $CO_2$/ $O_2$ | 12.62%/4.53% | < 0.1 ppmv | -0.6 ppmv | | | no data |
| $NO_x$ in $N_2$ | 1209 | | 0.4 ppmv | 0.18 % | 0.03 % | no data |

# APPENDIX E:
# CALIBRATION CERTIFICATIONS

**SPECTRA GASES INC.**
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE
**PROCEDURE # :** G1

**CUSTOMER:** Cubix Corporation
**SGI ORDER # :** 0016436
**ITEM# :** 7
**P.O.# :** 2001032 T12 SID

**CYLINDER # :** CC-94787
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

**CERTIFICATION DATE:** 2/11/02
**EXPIRATION DATE:** 2/6/2005

**CERTIFICATION HISTORY**

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 1/30/02<br>2/6/02 | 252.8 ppm<br>252.5 ppm | 253 ppm | +/- 1% |
| Methane | 2/11/02 | 249 ppm | 249 ppm | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Air
**PREVIOUS CERTIFICATION DATES:** None

**REFERENCE STANDARDS**

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | GMIS-1 | CC94699 | 486 ppm |
| Methane | GMIS-1 | CC52976 | 503.3 ppm |
| | | | |
| | | | |

**INSTRUMENTATION**

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 1/8/02 |
| Methane | H. Packard 6890 | US00001434 | GC - FID | 2/5/02 |
| | | | | |
| | | | | |

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

**ANALYST:** Ted Neeme
TED NEEME

**DATE:** 2/11/02

**SPECTRA GASES INC.**

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Cubix Corporation
**SGI ORDER # :** 0023960
**ITEM# :** 2
**P.O.# :** 2002420

**CYLINDER # :** CC-60135
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

**CERTIFICATION DATE:** 7/19/2002
**EXPIRATION DATE:** 7/11/2005

CERTIFICATION HISTORY

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 7/11/2002<br>7/19/2002 | 441.6 ppm<br>439.9 ppm | 441 ppm | +/- 1% |
| Methane | 7/11/2002 | 445 ppm | 445 ppm | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Air

**PREVIOUS CERTIFICATION DATES:** None

REFERENCE STANDARDS

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | NTRM-81681 | CC-55779 | 994 ppm |
| Methane | GMIS-1 | CC55777 | 993.6 ppm |
| | | | |
| | | | |

INSTRUMENTATION

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 7/19/2002 |
| Methane | H. Packard 6890 | US00001434 | GC - FID | 6/24/2002 |
| | | | | |
| | | | | |

**THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

ANALYST: _____
FRED PIKULA

DATE: 7/19/2002

**SPECTRA GASES INC.**

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Cubix Corporation
**SGI ORDER # :** 0000840
**ITEM# :** 4
**P.O.# :** G-1334

**CYLINDER # :** CC126532
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

**CERTIFICATION DATE:** 1/31/2001
**EXPIRATION DATE:** 1/30/2004

**CERTIFICATION HISTORY**

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Monoxide | 1/23/2001<br>1/31/2001 | 885.2 ppm<br>884.4 ppm | 885 ppm | +/- 1% |
| Methane | 1/30/2001 | 919 ppm | 919 ppm | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Air

**PREVIOUS CERTIFICATION DATES:** None

**REFERENCE STANDARDS**

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Monoxide | NTRM-81681 | CC55721 | 994 ppm |
| Methane | GMIS-1 | CC55777 | 994.1 ppm |
| | | | |
| | | | |

**INSTRUMENTATION**

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR | 1/19/2001 |
| Methane | H. Packard 6890 | US00001434 | GC - FID | 1/30/2001 |
| | | | | |
| | | | | |

**THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

**ANALYST:** FRED PIKULA

**DATE:** 1/31/2001

**SPECTRA GASES INC.**

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

**PROCEDURE # :** G1

**CUSTOMER:** Cubix Corporation
**SGI ORDER # :** 0021285
**ITEM# :** 1
**P.O.# :** 2002275 T10LENO

**CYLINDER # :** CC-133482
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

Begin use 7/24/02

**CERTIFICATION DATE:** 5/24/2002
**EXPIRATION DATE:** 5/24/2005

**CERTIFICATION HISTORY**

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Dioxide | 5/24/2002 | 4.48 % | 4.48 % | +/- 1% |
| Oxygen | 5/24/2002 | 20.9 % | 20.9 % | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**PREVIOUS CERTIFICATION DATES:** None

**REFERENCE STANDARDS**

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Dioxide | GMIS-1 | CC-90832 | 9.98 % |
| Oxygen | NTRM-1 | CC-83909 | 22.8 % |
| | | | |
| | | | |

**INSTRUMENTATION**

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Dioxide | Horiba VIA-510 | 571417045 | NDIR | 5/24/2002 |
| Oxygen | Horiba MPA-510 | 570694081 | PM | 5/20/2002 |
| | | | | |
| | | | | |

**THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

**ANALYST:** _____
**FRED PIKULA**

**DATE:** 5/24/2002

**SPECTRA GASES INC.**
3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE
PROCEDURE # : G1

**CUSTOMER:** Cubix Corporation
**SGI ORDER # :** 0023960
**ITEM# :** 1
**P.O.# :** 2002420

**CYLINDER # :** CC-127463
**CYLINDER PRES:** 2000 PSIG
**CGA OUTLET:** 590

**CERTIFICATION DATE:** 7/23/2002
**EXPIRATION DATE:** 7/23/2005

CERTIFICATION HISTORY

| COMPONENT | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|---|---|---|---|---|
| Carbon Dioxide | 7/23/2002 | 7.99 % | 7.99 % | +/- 1% |
| Oxygen | 7/23/2002 | 11.94 % | 11.94 % | +/- 1% |
| | | | | |
| | | | | |

**BALANCE** Nitrogen

**PREVIOUS CERTIFICATION DATES:** None

REFERENCE STANDARDS

| COMPONENT | SRM/NTRM# | CYLINDER# | CONCENTRATION |
|---|---|---|---|
| Carbon Dioxide | GMIS-1 | CC-90832 | 9.98 % |
| Oxygen | NTRM-1 | CC-83909 | 22.8 % |
| | | | |
| | | | |

INSTRUMENTATION

| COMPONENT | MAKE/MODEL | SERIAL # | DETECTOR | CALIBRATION DATE(S) |
|---|---|---|---|---|
| Carbon Dioxide | Horiba VIA-510 | 571417045 | NDIR | 6/25/2002 |
| Oxygen | Horiba MPA-510 | 570694081 | PM | 7/23/2002 |
| | | | | |
| | | | | |

**THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.**
**DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.**

ANALYST: _____
FRED PIKULA

DATE: 7/23/2002

# Scott Specialty Gases

**RATA CLASS**

*Dual-Analyzed Calibration Standard*

9810 BAY AREA BLVD,PASADENA,TX 77507 Phone: 281-474-5800 Fax: 281-474-5857

## CERTIFICATE OF ACCURACY: Interference Free™ Multi-Component EPA Protocol Gas

**Assay Laboratory**

SCOTT SPECIALTY GASES
9810 BAY AREA BLVD
PASADENA,TX 77507

P.O. No.: G-1291
Project No.: 04-85228-002

**Customer**

CUBIX CORPORATION

4536 NW 20TH DRIVE
GAINESVILLE FL 32605

ORDER ON-LINE • WWW.SCOTTGAS.COM

### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM009152 Certification Date: 4/03/00 Exp. Date: 4/03/2003
Cylinder Pressure***: 1883 PSIG

| COMPONENT | CERTIFIED CONCENTRATION (Moles) | ANALYTICAL ACCURACY** | TRACEABILITY |
|---|---|---|---|
| CARBON DIOXIDE | 12.62 % | +/- 1% | Direct NIST and NMi |
| OXYGEN | 4.53 % | +/- 1% | Direct NIST and NMi |
| NITROGEN | BALANCE | | |

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards

### REFERENCE STANDARD

| TYPE/SRM NO. | EXPIRATION DATE | CYLINDER NUMBER | CONCENTRATION | COMPONENT |
|---|---|---|---|---|
| NTRM | 1/01/03 | ALM042032 | 13.96 % | CO2/N2 |
| NTRM 2658 | 12/19/01 | ALM031738 | 9.680 % | OXYGEN |

### INSTRUMENTATION

| INSTRUMENT/MODEL/SERIAL# | DATE LAST CALIBRATED | ANALYTICAL PRINCIPLE |
|---|---|---|
| FTIR System/8220A/AAB9400260 | 03/28/00 | Scott Enhanced FTIR |
| MTI-A/M200/171109 | 03/21/00 | GAS CHROMATOGRAPHY |

### ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis | Second Triad Analysis | Calibration Curve

**CARBON DIOXIDE**

| | | |
|---|---|---|
| Date:04/03/00 | Response Unit:% | |
| Z1 = 0.0220 | R1 = 13.956 | T1 = 12.629 |
| R2 = 13.966 | Z2 = 0.0178 | T2 = 12.617 |
| Z3 = 0.0276 | T3 = 12.620 | R3 = 13.959 |
| Avg. Concentration: | 12.62 | % |

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999990
Constants: A = 0.000000
B = 1.000000 C = 0.000000
D = 0.000000 E = 0.000000

**OXYGEN**

| | | |
|---|---|---|
| Date:04/06/00 | Response Unit:AREA | |
| Z1 = 114.00 | R1 = 35455. | T1 = 16619. |
| R2 = 35183. | Z2 = 141.00 | T2 = 16552. |
| Z3 = 118.00 | T3 = 16573. | R3 = 35179. |
| Avg. Concentration: | 4.530 | % |

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 0.999999418
Constants: A = -0.03442397
B = 0.000275952 C =
D = E =

APPROVED BY: _____
John Hunnicutt

Air Products and Chemicals, Inc.
5837 W. Fifth Street
Jacksonville, FL 32254
Telephone (904) 786-2663
FAX (904) 693-9128

AIR PRODUCTS

30 March, 1995

Cubix Corporation
2106 NW 67th Place
Suite 7
Gainesville, FL 32653

# CERTIFICATE OF CONFORMANCE

This document certifies that the product listed below is supplied via Air Products and Chemicals, Inc. and complies with the current minimum purity specifications of Air Products and Chemicals, Inc., Specialty Gas Department.

| | |
|---|---|
| Product | Hydrogen |
| Product Code | 3602 |
| Product | Oxygen |
| Product Code | 1602 |
| Shipper Number | 854-C-78428 |
| Product | Compressed Air |
| Product Code | 9197 |
| Product | Nitrogen |
| Product Code | 2602 |
| Shipper Number | 854-C-78440 |

E Edward Henderson
Authorized Signature

# Dry Gas Meter Calibration

**WORKING METER**

| | |
|---|---|
| Date: | 4/12/02 |
| Prev. Calib. Date: | rebuilt |
| Location: | Cubix Austin Lab |
| Technician: | Bradley Rayhons |
| Meter Serial No: | 2962152 |
| Cubix DGM ID | T-10 |
| Prev. Calib Factor (Y): | 1.0000 |

**REFERENCE METER**

| | |
|---|---|
| Calibration Date: | 4/11/02 |
| Location: | Cubix Austin Lab |
| Technician: | Steve Oleyar |
| Meter Serial No: | P164240 |
| Cubix DGM ID | American |
| Calib. Factor (Y): | 1.0022 |

**REFERENCE METER**

| Calibration Run # | Time (min) | Start Temp (deg F) | Stop Temp (deg F) | Vol (initial) (cu ft) | Vol (final) (cu ft) | Vol. Total (cu ft) | Meter Rate (cu-ft /min) | Corr. Vol @ EPA STP (cu ft) |
|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 74 | 73.7 | 18.936 | 25.078 | 6.155 | 0.3078 | 5.998 |
| 2 | 18 | 74 | 74.5 | 26.261 | 33.362 | 7.117 | 0.3954 | 6.928 |
| 3 | 10 | 74 | 73.4 | 12.401 | 18.122 | 5.734 | 0.5734 | 5.589 |
| 4 | 11 | 74 | 74.6 | 35.001 | 42.645 | 7.661 | 0.6965 | 7.453 |
| 5 | 11 | 75 | 75.1 | 44.308 | 53.922 | 9.635 | 0.8759 | 9.367 |

**WORKING METER**

| Calibration Run # | Time (min) | Start Temp (deg F) | Stop Temp (deg F) | Vol (initial) (cu ft) | Vol (final) (cu ft) | Vol. Total (cu ft) | Meter Rate (cu-ft /min) | Corr. Vol @ EPA STP (cu ft) | Calculated DGM Factor (Y) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 75 | 73.7 | 19.158 | 25.436 | 6.278 | 0.314 | 6.108 | 0.9819 |
| 2 | 18 | 75 | 73.9 | 26.635 | 33.854 | 7.219 | 0.401 | 7.023 | 0.9866 |
| 3 | 10 | 73 | 74.6 | 12.465 | 18.285 | 5.820 | 0.582 | 5.672 | 0.9854 |
| 4 | 11 | 74 | 75.8 | 35.525 | 43.266 | 7.741 | 0.704 | 7.529 | 0.9900 |
| 5 | 11 | 76 | 73.9 | 44.957 | 54.684 | 9.727 | 0.864 | 9.455 | 0.9906 |

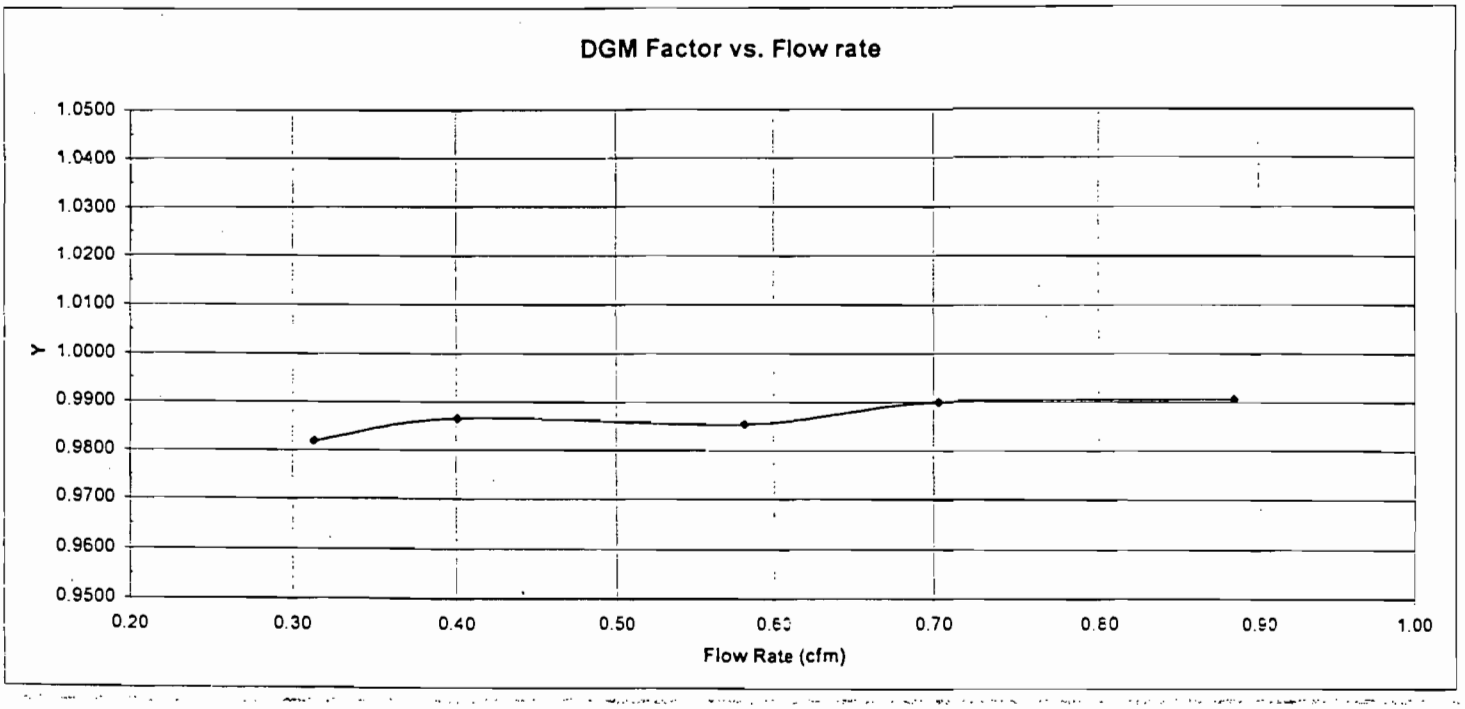
**Dry Gas Meter (DGM Factor) Calibration Test Results**

*** Average Y: 0.9869**

| | |
|---|---|
| Ave. Y w/in 5% of previous value: | *YES* |
| Ave. Y between 0.95 and 1.05: | *PASS* |
| Ind. Y values +/- 0.02 from Ave.: | *PASS* |

Criteria:

* Y- ratio of the reading of the reference meter to the working DGM. Acceptable tolerance of individual values from the average is +/- 0.02, with a value between 0.95 and 1.05.




signature

# Pitot Tube Calibration Sheet

S-Type Tip Inspection (Method 2, Section 4)

**Best Available Copy**

7 ft

## Alignment Inspection

Transverse tube axis pitot-tip angle:

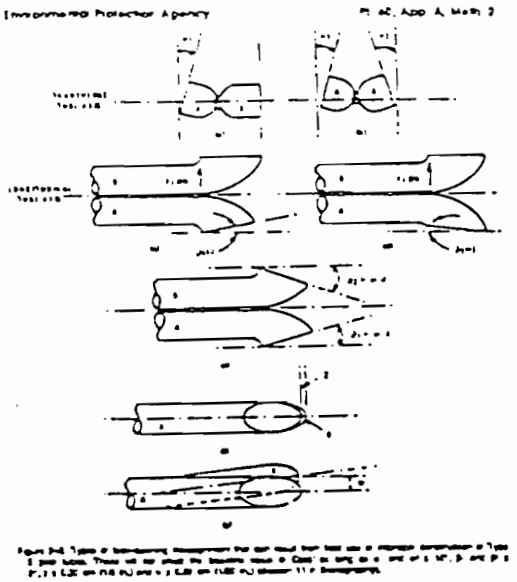
$\alpha_1 =$ 4 ° $\alpha_2 =$ 3 °

Each $\alpha$ must be less than 10° from perpendicular to the transverse tube axis

Longitudinal tube axis pitot-tip angle:

$\beta_1 =$ 2 ° $\beta_1 =$ 3 °

Each $\beta$ must be less than 5° from parrallel to the longitudinal tube axis



Pitot-tip end length alignment:

z = 0 (in or cm)

Z must be ≤ 0.32 cm (1/8 in)

Pitot-tip centriod alignment with respect to transverse axis:

w = 0 (in or cm)

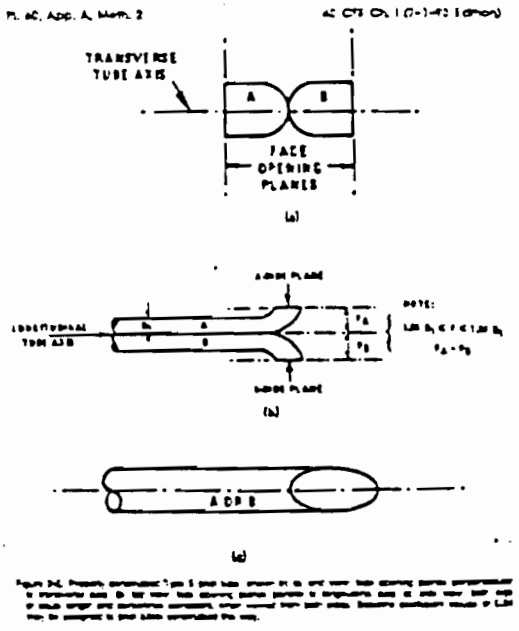
W must be ≤ 0.08 cm (1/32 in)

## Pitot Tip Dimension Check

External tubing diameter:

$D_t =$ .375 (in or cm)

$D_t$ must be between 0.48 and 0.95 cm (3/16 and 3/8 in)




Base to opening plane distance:

$P_A = P_B =$ .475 (in or cm)

$P_A$ and $P_B$ must be between 1.05 $D_t$ and 1.50 $D_t$

## Pitot Tube Coefficient

$C_p =$ 0.84 Pitot Tube: 2110 Date and Initials: 8-7-02 JH

# ALTIMETER TEST RECORD

This unit was tested and inspected IAW FAR Part 43,
Appendix E, and is approved for return to service.

DATE: 3-8-02

WORK ORDER #: 3501

SCALE ERROR

| | |
|---|---|
| -1000 | -15 |
| 0 | Ø |
| + 500 | Ø |
| +1000 | +10 |
| +1500 | Ø |
| +2000 | +10 |
| +3000 | +5 |
| +4000 | Ø |
| +6000 | -5 |
| +8000 | +5 |
| +10,000 | +15 |
| +12,000 | +20 |
| +14,000 | +20 |
| +16,000 | +15 |
| +18,000 | Ø |
| +20,000 | -10 |
| +22,000 | |
| +25,000 | |
| +30,000 | |
| +35,000 | |
| +40,000 | |
| +45,000 | |
| +50,000 | |

START PRESSURE 30.06

FINAL PRESSURE 30.06

BAROMETRIC SCALE ERROR TEST

| | | | |
|---|---|---|---|
| 28.10 | Ø | 30.50 | +5 |
| 28.50 | -5 | 30.90 | Ø |
| 29.00 | Ø | 30.99 | Ø |
| 29.50 | Ø | | |
| 29.92 | Ø | | |

FRICTION TEST

| | | | |
|---|---|---|---|
| 1000 | 30 | 20.000 | 50 |
| 2000 | 30 | 25.000 | |
| 3000 | 30 | 30.000 | |
| 5000 | 30 | 35.000 | |
| 10.000 | 40 | 40.000 | |
| 15.000 | 45 | 50,000 | |

CASE LEAK TEST @ 18,000 Ø

CASE LEAK TEST @ 1,200 Ø

HYSTERESIS TEST @ 50% 20

HYSTERESIS TEST @ 40% 15

AFTER EFFECT 15

SERIAL NUMBER 15924

INSPECTOR [signature]

# TRAILER 10
## ALTIMETER/BAROMETER CALIBRATION SHEET

BFG/C 9001

**BFGoodrich**
Aerospace

Component Overhaul & Repair

817 Dessau Road
Austin, Texas 78753
512-251-3441
FAX 512-990-1271

FAA Repair Station No. UZ2R232L

CASTLEBERRY AERCOR

# Serviceable Part Tag

COMPONENT Altimeter
PART NO. 5934P-1A-83
SERIAL NO. J5924
MFG United Fastc. WORK ORDER # V7071

☒ Overhaul ☐ Repair ☐ Bench Check & Test ☐ Other _____

**The Aircraft Appliance identified above was overhauled, repaired, or bench tested (as per block marked) and inspected, in accordance with current Federal Aviation Administration Regulations, and is approved for return to service. Details of this component are on file at this repair station.**

AUTHORIZED SIGNATURE

JAN 16 1995
DATE

| ALTIMETER SCALE ERROR | | | | | |
|---|---|---|---|---|---|
| PART NO. 5934P1A83 | | | SERIAL NO. J5924 | | |
| ALTIMETER PRESSURE | | | | | |
| TEST PT (FT) | INDICATOR READINGS AT + 25 °C | TEST PT (FT) | INDICATOR READINGS AT + 25 °C | TEST PT (FT) | INDICATOR READINGS AT + 25 °C |
| -1000 | +5 | 8,000 | +5 | 30,000 | |
| 0 0 | 0 | 10,000 | +10 | 35,000 | |
| 500 | 0 | 12,000 | +15 | 40,000 | |
| 1000 | 0 | 14,000 | +15 | 45,000 | |
| 1500 | 0 | 16,000 | +5 | 50,000 | |
| 2000 | 0 | 18,000 | 0 | 55,000 | |
| 3000 | -5 | 20,000 | -5 | 60,000 | |
| 4000 | -10 | 22,000 | | 70,000 | |
| 6000 | -10 | 25,000 | | 80,000 | |

BFG:C9102

# NIST CALIBRATION CERTIFICATE



Catalog Number : 17005-00 Certificate Reference Number 3924899

## Instrument Tolerance

±3% full-scale

### Equipment "As Found"

| | Test Points | Reading | Deviation | O.O.T |
|---|---|---|---|---|
| Measured in: °F | [illegible] | [illegible] | [illegible] | ☐ |
| | 32.00 | 32.0 | 0.0000 | ☐ |
| | [illegible] | [illegible] | [illegible] | ☐ |
| | 110.00 | 110.0 | 0.0000 | ☐ |
| Measured in: °F | [illegible] | [illegible] | [illegible] | ☐ |
| | 32.00 | 32.0 | 0.0000 | ☐ |
| | [illegible] | [illegible] | [illegible] | ☐ |
| | 110.00 | 110.0 | 0.0000 | ☐ |
| Measured in: | [illegible] | [illegible] | [illegible] | ☐ |
| | [illegible] | [illegible] | [illegible] | ☐ |
| Measured in: | [illegible] | [illegible] | [illegible] | ☐ |
| | [illegible] | [illegible] | [illegible] | ☐ |
| Measured in: | [illegible] | [illegible] | [illegible] | ☐ |
| | [illegible] | [illegible] | [illegible] | ☐ |

### Equipment "As Left"

| Test Points | Reading | Deviation |
|---|---|---|
| [illegible] | [illegible] | [illegible] |
| 32.00 | 32.0 | 0.0000 |
| [illegible] | [illegible] | [illegible] |
| 110.00 | 110.0 | 0.0000 |
| [illegible] | [illegible] | [illegible] |
| 32.00 | 32.0 | 0.0000 |
| [illegible] | [illegible] | [illegible] |
| 110.00 | 110.0 | 0.0000 |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | [illegible] |

**** Note **** Check mark under the O.O.T column indicates the equipment is Out Of Tolerance.

This certificate was performed under the climate controlled lab conditons of: 22 °C 50 %RH 29.5 "Hg

**Additional Comments:**

n/a

*This certificate shall not be reproduced except in full and requires written approval from InnoCal. * Results data shown relates only to above listed item(s) **

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# NIST CALIBRATION CERTIFICATE



Catalog Number : 17005-00 Certificate Reference Number 3924899

| | | | |
|---|---|---|---|
| Unit Under Test 1 : | 03312-20 | Unit Under Test 2: | n/a |
| Serial Number 1 : | 57778 | Serial Number 2: | n/a |

Certificate Completed for: Cubix Corp
3709 SW 42nd Ave
Gainsville FL 32608

InnoCal certifies that the calibration of the listed units, used procedure number MWI-17005-00 with equipment traceable to the National Institute of Standards and Technology (NIST), and the test was performed in accordance with ANSI/NCSL Z540-1, ISO Guide 25.

Best measurement uncertainty: k=2, ±0.08°C

Listed uncertainties represent the best measurement uncertainty expressed at 95% confidence level. Actual uncertainties available upon request.

Purchase Order Number: 2002615 Secondary ID #: n/a

Equipment Conditon : USED

Calibration Standards Used

| Manufacturer | Function Performed | Model Number | Serial Number | Due Date |
|---|---|---|---|---|
| Hart Scientific | Platinum Resistance Probe | 5680 | 1074 | 04/14/03 |
| Ertco/Hart | Temperature Indicator | 850 | 85307 | 04/14/03 |

Lab Technician: 321

Date Completed: 10/17/02 Issue Date: 10/17/02 Received Date 9/18/02

*This certificate shall not be reproduced except in full and requires written approval from InnoCal. * Results data shown relates only to above listed item(s) **

OMEGA ENGINEERING, INC.

One Omega Drive, Box 4047, Stamford, CT 06907
(203) 359-1660 – http://www.omega.com – e-mail: info@omega.com

## CERTIFICATE OF CALIBRATION

**Model** HH-25KF **Serial Number** T-233418

Omega Engineering, Inc., certifies that the above listed instrument has been calibrated using standards whose accuracy is traceable to the U.S. National Institute of Standards and Technology, and meets or exceeds its published specifications. Calibration traceability of the above listed instrument is in full compliance with ANSI/Z540-1-1994 standards and requirements.

2-1-02
*DATE*

RF
*TESTED BY*

mcK
*AUTHORIZED SIGNATURE*

MD-4 ©Copyright 1998 Omega Engineering, Inc.

Placed in service: August 14, 2002
Recalibration Date: February 1, 2003
Location: Trailer 10

OMEGA ENGINEERING, INC.
An OMEGA Technologies Company

Best Available Copy

# Certificate Of Calibration

CUBIX

| | | | |
|---|---|---|---|
| Cust. P.O. #: | G1342 | Report #: | 102915471 |
| Test Item: | ASTM-1C-CC | Test Date: | 22-FEB-01 |
| Serial #: | 99293 | Recal Date: | Per System Application |

Omega Engineering, Inc. certifies that the above instrumentation has been calibrated and tested to **meet or exceed** the published specifications. This calibration and testing was performed using instrumentation and standards that are traceable to the United States National Institute of Standards and Technology. Calibration on this product was performed by an approved Supplier/ Lab of Omega Engineering, Inc. and is in compliance with **MIL-STD-45662A.**

Test Conditions: Temperature 22 C Relative Humidity 35%

**NIST Traceable Test Numbers:** 213426,264615-01

| Temperature | Thermometer Reading | Correction |
|---|---|---|
| | We certify that subject thermometer conforms to specifications and tolerances stated in A.S.T.M. Designate E-1, Table 1, No. 1C, Scale Error + or - 0.5 C Max. | |
| | | |

Richard G Patterson
**Metrology Inspector** 27-FEB-01

OMEGA Engineering, Inc., One Omega Drive, Box 4047, Stamford, CT 06907 Telephone (203) 359-1660 • FAX: (203) 359-7811
www.omega.com e-mail: info@omega.com

# APPENDIX F:
# LOGGED DATA RECORDS
# 1-MINUTE AVERAGES

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| START Run 1 | 10/28/02 | 9:34:18 | 843.3 | 20.60 | 0.88 | 843.3 | 20.60 | 0.88 |
| Run 1 | 10/28/02 | 9:35:18 | 850.0 | 20.58 | 0.94 | 846.6 | 20.60 | 0.91 |
| Run 1 | 10/28/02 | 9:36:18 | 841.2 | 20.60 | 0.94 | 844.8 | 20.60 | 0.92 |
| Run 1 | 10/28/02 | 9:37:18 | 910.5 | 20.60 | 0.96 | 861.2 | 20.60 | 0.93 |
| Run 1 | 10/28/02 | 9:38:18 | 853.2 | 20.60 | 0.96 | 859.6 | 20.60 | 0.94 |
| Run 1 | 10/28/02 | 9:39:18 | 895.1 | 20.60 | 0.94 | 865.5 | 20.60 | 0.95 |
| Run 1 | 10/28/02 | 9:40:18 | 910.5 | 20.60 | 1.00 | 871.9 | 20.60 | 0.95 |
| Run 1 | 10/28/02 | 9:41:18 | 856.6 | 20.58 | 0.96 | 870.0 | 20.60 | 0.95 |
| Run 1 | 10/28/02 | 9:42:18 | 909.4 | 20.58 | 0.94 | 874.4 | 20.60 | 0.95 |
| Run 1 | 10/28/02 | 9:43:18 | 851.1 | 20.58 | 0.94 | 872.0 | 20.59 | 0.94 |
| Run 1 | 10/28/02 | 9:44:18 | 833.5 | 20.58 | 0.90 | 868.5 | 20.59 | 0.94 |
| Run 1 | 10/28/02 | 9:45:18 | 908.3 | 20.58 | 0.92 | 871.9 | 20.59 | 0.94 |
| Run 1 | 10/28/02 | 9:46:18 | 868.7 | 20.55 | 0.98 | 871.6 | 20.59 | 0.94 |
| Run 1 | 10/28/02 | 9:47:18 | 930.3 | 20.53 | 1.00 | 875.8 | 20.59 | 0.94 |
| Run 1 | 10/28/02 | 9:48:17 | 869.8 | 20.53 | 1.02 | 875.4 | 20.58 | 0.94 |
| Run 1 | 10/28/02 | 9:49:16 | 919.3 | 20.55 | 1.04 | 878.1 | 20.58 | 0.95 |
| Run 1 | 10/28/02 | 9:50:18 | 953.4 | 20.55 | 1.06 | 882.6 | 20.58 | 0.96 |
| Run 1 | 10/28/02 | 9:51:17 | 892.9 | 20.55 | 1.04 | 883.1 | 20.58 | 0.96 |
| Run 1 | 10/28/02 | 9:52:18 | 944.6 | 20.55 | 1.04 | 886.4 | 20.57 | 0.96 |
| Run 1 | 10/28/02 | 9:53:17 | 928.1 | 20.58 | 1.06 | 888.4 | 20.57 | 0.97 |
| Run 1 | 10/28/02 | 9:54:17 | 961.1 | 20.53 | 1.08 | 891.9 | 20.57 | 0.97 |
| Run 1 | 10/28/02 | 9:55:17 | 963.3 | 20.53 | 1.12 | 895.2 | 20.57 | 0.98 |
| Run 1 | 10/28/02 | 9:56:18 | 985.5 | 20.53 | 1.12 | 899.1 | 20.57 | 0.99 |
| Run 1 | 10/28/02 | 9:57:18 | 961.1 | 20.55 | 1.14 | 901.7 | 20.57 | 0.99 |
| Run 1 | 10/28/02 | 9:58:18 | 1000.7 | 20.58 | 1.12 | 905.6 | 20.57 | 1.00 |
| Run 1 | 10/28/02 | 9:59:18 | 999.6 | 20.55 | 1.16 | 909.2 | 20.57 | 1.00 |
| Run 1 | 10/28/02 | 10:00:18 | 1015.4 | 20.58 | 1.08 | 913.2 | 20.57 | 1.01 |
| Run 1 | 10/28/02 | 10:01:18 | 997.4 | 20.55 | 1.08 | 916.2 | 20.57 | 1.01 |
| Run 1 | 10/28/02 | 10:02:18 | 964.4 | 20.55 | 1.04 | 917.8 | 20.57 | 1.01 |
| Run 1 | 10/28/02 | 10:03:18 | 1000.7 | 20.55 | 1.06 | 920.6 | 20.57 | 1.01 |
| Run 1 | 10/28/02 | 10:04:18 | 975.4 | 20.53 | 1.10 | 922.4 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:05:18 | 995.8 | 20.53 | 1.08 | 924.7 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:06:18 | 954.5 | 20.53 | 1.06 | 925.6 | 20.56 | 1.02 |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| Run 1 | 10/28/02 | 10:07:18 | 987.5 | 20.53 | 1.06 | 927.4 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:08:18 | 930.3 | 20.50 | 1.06 | 927.5 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:09:18 | 987.5 | 20.53 | 1.02 | 929.1 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:10:18 | 949.0 | 20.50 | 1.08 | 929.7 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:11:18 | 1000.7 | 20.50 | 1.08 | 931.5 | 20.56 | 1.02 |
| Run 1 | 10/28/02 | 10:12:18 | 1015.0 | 20.48 | 1.10 | 933.7 | 20.55 | 1.03 |
| Run 1 | 10/28/02 | 10:13:17 | 1021.3 | 20.45 | 1.10 | 935.9 | 20.55 | 1.03 |
| Run 1 | 10/28/02 | 10:14:17 | 1003.2 | 20.45 | 1.16 | 937.5 | 20.55 | 1.03 |
| Run 1 | 10/28/02 | 10:15:17 | 1000.7 | 20.45 | 1.16 | 939.0 | 20.55 | 1.03 |
| Run 1 | 10/28/02 | 10:16:17 | 1003.0 | 20.45 | 1.18 | 940.5 | 20.55 | 1.04 |
| Run 1 | 10/28/02 | 10:17:17 | 1005.7 | 20.45 | 1.22 | 942.0 | 20.54 | 1.04 |
| Run 1 | 10/28/02 | 10:18:17 | 1015.7 | 20.45 | 1.18 | 943.6 | 20.54 | 1.04 |
| Run 1 | 10/28/02 | 10:19:17 | 1008.7 | 20.45 | 1.18 | 945.0 | 20.54 | 1.05 |
| Run 1 | 10/28/02 | 10:20:17 | 1002.7 | 20.48 | 1.18 | 946.3 | 20.54 | 1.05 |
| Run 1 | 10/28/02 | 10:21:17 | 947.9 | 20.45 | 1.10 | 946.3 | 20.54 | 1.05 |
| Run 1 | 10/28/02 | 10:22:17 | 990.7 | 20.40 | 1.16 | 947.2 | 20.53 | 1.05 |
| Run 1 | 10/28/02 | 10:23:17 | 990.1 | 20.43 | 1.18 | 948.1 | 20.53 | 1.05 |
| Run 1 | 10/28/02 | 10:24:17 | 1000.3 | 20.50 | 1.16 | 949.1 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:25:17 | 1024.1 | 20.53 | 1.10 | 950.5 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:26:17 | 1035.3 | 20.50 | 1.16 | 952.1 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:27:17 | 1007.3 | 20.50 | 1.16 | 953.1 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:28:17 | 1002.0 | 20.50 | 1.18 | 954.0 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:29:17 | 1012.8 | 20.50 | 1.22 | 955.1 | 20.53 | 1.06 |
| Run 1 | 10/28/02 | 10:30:17 | 998.6 | 20.50 | 1.24 | 955.8 | 20.53 | 1.07 |
| Run 1 | 10/28/02 | 10:31:17 | 987.5 | 20.48 | 1.28 | 956.4 | 20.53 | 1.07 |
| Run 1 | 10/28/02 | 10:32:17 | 999.6 | 20.45 | 1.26 | 957.1 | 20.53 | 1.07 |
| Run 1 | 10/28/02 | 10:33:17 | 1000.7 | 20.43 | 1.28 | 957.8 | 20.52 | 1.08 |
| END Run 1 | 10/28/02 | 10:34:17 | 1012.4 | 20.43 | 1.32 | **958.7** | **20.52** | **1.08** |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| START Run 2 | 10/28/02 | 11:27:40 | 1012.8 | 20.43 | 1.32 | 1012.8 | 20.43 | 1.32 |
| Run 2 | 10/28/02 | 11:28:40 | 1000.8 | 20.45 | 1.28 | 1034.6 | 20.44 | 1.31 |
| Run 2 | 10/28/02 | 11:29:39 | 1043.0 | 20.45 | 1.32 | 1020.5 | 20.43 | 1.32 |
| Run 2 | 10/28/02 | 11:30:39 | 1022.8 | 20.43 | 1.32 | 1020.2 | 20.44 | 1.31 |
| Run 2 | 10/28/02 | 11:31:39 | 1047.0 | 20.43 | 1.34 | 1027.8 | 20.43 | 1.32 |
| Run 2 | 10/28/02 | 11:32:39 | 1105.0 | 20.45 | 1.30 | 1034.8 | 20.43 | 1.32 |
| Run 2 | 10/28/02 | 11:33:39 | 1049.0 | 20.48 | 1.30 | 1041.2 | 20.43 | 1.32 |
| Run 2 | 10/28/02 | 11:34:39 | 788.8 | 20.30 | 1.22 | 1040.1 | 20.44 | 1.29 |
| Run 2 | 10/28/02 | 11:35:39 | 1063.0 | 20.40 | 1.28 | 1030.5 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:36:39 | 1022.8 | 20.43 | 1.26 | 1033.0 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:37:39 | 1071.0 | 20.43 | 1.28 | 1034.2 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:38:39 | 1089.0 | 20.45 | 1.32 | 1036.9 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:39:39 | 1041.0 | 20.45 | 1.30 | 1042.5 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:40:39 | 1107.0 | 20.48 | 1.30 | 1044.7 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:41:39 | 1051.0 | 20.43 | 1.32 | 1045.3 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:42:39 | 1057.0 | 20.45 | 1.30 | 1047.6 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:43:39 | 1087.0 | 20.43 | 1.30 | 1048.9 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:44:39 | 1092.8 | 20.45 | 1.30 | 1050.3 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:45:39 | 1069.0 | 20.43 | 1.28 | 1053.1 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:46:39 | 1083.0 | 20.40 | 1.32 | 1053.8 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:47:39 | 1081.0 | 20.40 | 1.30 | 1055.6 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:48:39 | 1083.0 | 20.43 | 1.28 | 1057.1 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:49:39 | 1047.0 | 20.53 | 0.78 | 1057.6 | 20.43 | 1.29 |
| Run 2 | 10/28/02 | 11:50:39 | 1061.0 | 20.40 | 1.26 | 1052.9 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:51:39 | 1123.0 | 20.40 | 1.32 | 1054.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:52:39 | 1081.0 | 20.43 | 1.24 | 1057.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:53:39 | 1127.0 | 20.43 | 1.24 | 1058.8 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:54:39 | 1061.0 | 20.43 | 1.26 | 1059.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:55:39 | 1076.8 | 20.45 | 1.22 | 1060.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:56:39 | 1127.0 | 20.40 | 1.30 | 1061.0 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:57:39 | 1097.0 | 20.43 | 1.28 | 1063.2 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:58:39 | 1127.0 | 20.43 | 1.28 | 1064.7 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 11:59:39 | 1081.0 | 20.43 | 1.30 | 1065.7 | 20.43 | 1.28 |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| Run 2 | 10/28/02 | 12:00:39 | 1095.0 | 20.45 | 1.30 | 1066.8 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:01:39 | 1079.0 | 20.43 | 1.26 | 1067.1 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:02:39 | 1093.0 | 20.45 | 1.28 | 1067.8 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:03:39 | 1087.0 | 20.45 | 1.30 | 1067.8 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:04:39 | 1101.0 | 20.40 | 1.28 | 1069.0 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:05:39 | 1149.0 | 20.43 | 1.30 | 1070.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:06:39 | 1145.0 | 20.38 | 1.28 | 1072.7 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:07:39 | 1209.0 | 20.38 | 1.32 | 1075.0 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:08:39 | 1171.0 | 20.40 | 1.32 | 1077.7 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:09:39 | 1187.0 | 20.40 | 1.32 | 1079.9 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:10:39 | 1109.0 | 20.43 | 1.28 | 1081.8 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:11:39 | 1131.0 | 20.43 | 1.22 | 1082.9 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:12:39 | 1125.0 | 20.70 | 1.20 | 1083.4 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:13:39 | 1099.0 | 20.48 | 1.16 | 1083.3 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:14:39 | 1125.0 | 20.45 | 1.20 | 1083.4 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:15:39 | 1091.0 | 20.48 | 1.18 | 1084.1 | 20.43 | 1.28 |
| Run 2 | 10/28/02 | 12:16:39 | 1135.0 | 20.48 | 1.20 | 1084.5 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:17:39 | 1083.0 | 20.48 | 1.18 | 1085.0 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:18:39 | 1127.0 | 20.45 | 1.18 | 1085.8 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:19:38 | 1113.0 | 20.45 | 1.20 | 1086.0 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:20:38 | 1079.0 | 20.45 | 1.20 | 1086.5 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:21:38 | 1145.0 | 20.45 | 1.20 | 1087.0 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:22:38 | 1153.0 | 20.45 | 1.20 | 1087.6 | 20.43 | 1.27 |
| Run 2 | 10/28/02 | 12:23:38 | 1091.0 | 20.43 | 1.22 | 1088.5 | 20.43 | 1.26 |
| Run 2 | 10/28/02 | 12:24:38 | 1113.0 | 20.45 | 1.16 | 1089.4 | 20.43 | 1.26 |
| Run 2 | 10/28/02 | 12:25:38 | 1173.0 | 20.45 | 1.20 | 1089.7 | 20.43 | 1.26 |
| Run 2 | 10/28/02 | 12:26:38 | 1127.0 | 20.45 | 1.20 | 1090.3 | 20.43 | 1.26 |
| END Run 2 | 10/28/02 | 12:27:38 | 1137.0 | 20.40 | 1.26 | **1091.3** | **20.43** | **1.26** |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| START Run 3 | 10/28/02 | 13:17:45 | 1009.0 | 20.40 | 1.04 | 1009.0 | 20.40 | 1.04 |
| Run 3 | 10/28/02 | 13:18:45 | 1023.0 | 20.45 | 1.06 | 1004.8 | 20.42 | 1.06 |
| Run 3 | 10/28/02 | 13:19:45 | 969.0 | 20.45 | 1.04 | 999.4 | 20.44 | 1.04 |
| Run 3 | 10/28/02 | 13:20:45 | 991.0 | 20.45 | 1.00 | 996.6 | 20.43 | 1.04 |
| Run 3 | 10/28/02 | 13:21:45 | 983.0 | 20.45 | 0.98 | 992.1 | 20.44 | 1.03 |
| Run 3 | 10/28/02 | 13:22:45 | 979.0 | 20.43 | 1.02 | 991.8 | 20.44 | 1.02 |
| Run 3 | 10/28/02 | 13:23:45 | 991.0 | 20.43 | 1.02 | 988.9 | 20.44 | 1.02 |
| Run 3 | 10/28/02 | 13:24:45 | 957.0 | 20.43 | 1.02 | 987.7 | 20.44 | 1.02 |
| Run 3 | 10/28/02 | 13:25:45 | 1007.0 | 20.43 | 1.06 | 986.4 | 20.43 | 1.02 |
| Run 3 | 10/28/02 | 13:26:45 | 923.0 | 20.28 | 1.04 | 985.4 | 20.42 | 1.02 |
| Run 3 | 10/28/02 | 13:27:45 | 1015.0 | 20.33 | 1.04 | 985.1 | 20.41 | 1.03 |
| Run 3 | 10/28/02 | 13:28:45 | 1025.0 | 20.33 | 1.14 | 986.6 | 20.40 | 1.03 |
| Run 3 | 10/28/02 | 13:29:45 | 1039.0 | 20.38 | 1.12 | 992.9 | 20.40 | 1.04 |
| Run 3 | 10/28/02 | 13:30:45 | 1089.0 | 20.38 | 1.12 | 997.1 | 20.40 | 1.05 |
| Run 3 | 10/28/02 | 13:31:45 | 1055.0 | 20.38 | 1.14 | 1002.2 | 20.39 | 1.06 |
| Run 3 | 10/28/02 | 13:32:45 | 1093.0 | 20.38 | 1.12 | 1007.8 | 20.39 | 1.06 |
| Run 3 | 10/28/02 | 13:33:45 | 1065.0 | 20.35 | 1.14 | 1010.7 | 20.39 | 1.07 |
| Run 3 | 10/28/02 | 13:34:44 | 1015.0 | 20.35 | 1.10 | 1014.0 | 20.39 | 1.07 |
| Run 3 | 10/28/02 | 13:35:44 | 1083.0 | 20.35 | 1.14 | 1015.7 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 13:36:44 | 1007.0 | 20.35 | 1.14 | 1017.6 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 13:37:44 | 1013.0 | 20.38 | 1.08 | 1018.3 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 13:38:44 | 1025.0 | 20.35 | 1.14 | 1017.1 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 13:39:44 | 1005.0 | 20.35 | 1.12 | 1017.4 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 13:40:44 | 1037.0 | 20.33 | 1.12 | 1016.7 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 13:41:44 | 993.0 | 20.33 | 1.14 | 1016.6 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:42:44 | 999.0 | 20.33 | 1.12 | 1016.1 | 20.37 | 1.09 |
| Run 3 | 10/28/02 | 13:43:44 | 947.0 | 20.43 | 1.14 | 1013.9 | 20.37 | 1.09 |
| Run 3 | 10/28/02 | 13:44:44 | 937.0 | 20.38 | 1.12 | 1011.8 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:45:44 | 935.0 | 20.40 | 1.10 | 1008.9 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:46:44 | 911.0 | 20.40 | 1.08 | 1006.3 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:47:44 | 959.0 | 20.40 | 1.12 | 1003.6 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:48:44 | 945.0 | 20.40 | 1.14 | 1001.9 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:49:44 | 971.0 | 20.40 | 1.10 | 1000.9 | 20.38 | 1.09 |

# Georgia-Pacific Palatka Operations, Bleach Plant Scrubber, Logged Data Records

| Run Number | Date | Time | CO (ppmv) | O2 (% vol) | CO2 (% vol) | AVE CO (ppmv) | AVE O2 (% vol) | AVE CO2 (% vol) |
|---|---|---|---|---|---|---|---|---|
| Run 3 | 10/28/02 | 13:50:44 | 961.0 | 20.38 | 1.16 | 999.0 | 20.38 | 1.10 |
| Run 3 | 10/28/02 | 13:51:44 | 929.0 | 20.35 | 1.08 | 998.1 | 20.38 | 1.10 |
| Run 3 | 10/28/02 | 13:52:44 | 973.0 | 20.35 | 1.08 | 996.5 | 20.38 | 1.10 |
| Run 3 | 10/28/02 | 13:53:44 | 909.0 | 20.38 | 1.12 | 994.6 | 20.38 | 1.10 |
| Run 3 | 10/28/02 | 13:54:44 | 945.0 | 20.33 | 1.06 | 993.4 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:55:44 | 933.0 | 20.33 | 1.08 | 991.5 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:56:44 | 690.8 | 20.35 | 0.98 | 988.5 | 20.38 | 1.09 |
| Run 3 | 10/28/02 | 13:57:44 | 927.0 | 20.33 | 1.04 | 984.3 | 20.37 | 1.09 |
| Run 3 | 10/28/02 | 13:58:44 | 873.0 | 20.35 | 1.00 | 982.1 | 20.37 | 1.09 |
| Run 3 | 10/28/02 | 13:59:44 | 891.0 | 20.38 | 1.02 | 980.0 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:00:44 | 915.0 | 20.38 | 1.06 | 977.9 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:01:44 | 861.0 | 20.38 | 1.04 | 976.3 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:02:44 | 921.0 | 20.40 | 1.06 | 974.2 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:03:44 | 855.0 | 20.38 | 1.06 | 972.2 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:04:44 | 893.0 | 20.38 | 1.02 | 970.4 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:05:44 | 849.0 | 20.38 | 1.04 | 967.8 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:06:44 | 889.0 | 20.40 | 1.04 | 966.3 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:07:44 | 917.0 | 20.40 | 1.04 | 964.7 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:08:44 | 879.0 | 20.40 | 1.06 | 963.3 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:09:44 | 903.0 | 20.38 | 1.04 | 962.1 | 20.37 | 1.08 |
| Run 3 | 10/28/02 | 14:10:44 | 863.0 | 20.38 | 1.08 | 960.2 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 14:11:44 | 855.0 | 20.38 | 1.02 | 958.7 | 20.38 | 1.08 |
| Run 3 | 10/28/02 | 14:12:44 | 917.0 | 20.38 | 1.06 | 957.2 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 14:13:44 | 879.0 | 20.38 | 1.06 | 956.0 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 14:14:44 | 845.0 | 20.40 | 0.96 | 954.6 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 14:15:44 | 883.0 | 20.38 | 0.98 | 952.6 | 20.38 | 1.07 |
| Run 3 | 10/28/02 | 14:16:44 | 825.0 | 20.38 | 0.96 | 951.0 | 20.38 | 1.07 |
| END Run 3 | 10/28/02 | 14:17:44 | 849.0 | 20.38 | 0.90 | **949.3** | **20.38** | **1.07** |

# Attachment C

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

November 13, 2002

VIA FAX (904) 448-4363

Mr. Christopher L. Kirts, P.E.
State of Florida
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256-7590

RE: Georgia-Pacific Corporation
Facility 1070005

Dear Mr. Kirts:

As you know, the Palatka mill conducted an initial performance test on the bleach plant scrubber stack in May 2001 and submitted the throughput rates and stack test results to the Department on June 11, 2001. The mill's submittal did not include other detailed information about chemical application rates, Kappa number, or the specific production mix (in terms of hardwood/softwood) being run at the time.

Enclosed is a table that contains additional information about the three test runs from that event. Also enclosed is a stack test report from the first three stack tests that were conducted during the week of October 28, 2002. Georgia-Pacific considers information about its chemical application rates, Kappa number, and other detailed production parameters to be confidential business information, pursuant to Section 403.111, F.S. This data relates to secret processes or secret methods of manufacture or production and is exempted from the public records act. G-P respectfully requests that you not copy or distribute it except to others in DEP who need to see it.

I hereby certify, based on the information and belief formed after reasonable inquiry, that the statements made and data contained in this document are true, accurate, and complete.

Feel free to call Myra Carpenter if you have any questions about this information. She can be reached at (386) 329-0918.

Sincerely,

Theodore D. Kennedy

Theodore D. Kennedy
Vice President

tk

cc: W. M. Jernigan
S. Matchett

# MAY 25, 2001 PRODUCTION DATA FOR TESTS

| Times | |
|---|---|
| 5/25/01 21:50 | Run 1 |
| 5/25/01 22:49 | |
| 5/25/01 23:02 | Run 2 |
| 5/26/01 0:01 | |
| 5/26/01 0:12 | Run 3 |
| 5/26/01 0:42 | |
| 5/26/01 1:43 | |
| 5/26/01 2:13 | |

| | | Do Stage | | | | Eop Stage | | D1 Stage | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | ADTBPH | %SW | %HW | Kappa | %ClO2 | %SW | %HW | %SW | %HW | %ClO2 |
| Run 1 | 50.0 | 0 | 100 | 13.4 | 0.8 | 44.1 | 55.9 | 100 | 0 | 1.0 |
| Run 2 | 52.6 | 0 | 100 | 13.2 | 0.8 | 0 | 100 | 67.9 | 32.1 | 1.0 |
| Run 3 | 49.4 | 0 | 100 | 13.8 | 0.8 | 0 | 100 | 8.0 | 92.0 | 0.9 |

Notes: ADTBPH is air-dried tons of bleached pulp per hour
Kappa is the pre-washer kappa
%ClO2 is the %ClO2 applied in that stage

**Please note that the Kappa and Chemical Application Rates are considered Confidential Business Information.**

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

December 13, 2002

RECEIVED
JAN 06 2003
BUREAU OF AIR REGULATION

Mr. Christopher L. Kirts
District Air Program Administrator
State of Florida
Department of Environmental Protection
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590

Re: Bleach Plant Compliance Test – October 2002
Georgia-Pacific Palatka Operations

Dear Mr. Kirts:

Continuous monitoring system (CMS) parameters, monitoring frequencies, averaging times and the rationale for selecting the CMS are required to be submitted for approval pursuant to 40 CFR 63.453 (n). This information has been updated from a previous submittal (letter dated October 25, 2002, Appendix A) reflecting recent compliance testing conducted in October 2002, which has been summarized and included in this correspondence for your review. (A copy of the test report is included as an attachment.)

The Bleach Plant scrubber collects and treats emissions from the No. 3 Bleach Plant as well as emissions from the R8/10 Chlorine Dioxide Generator. The pH of the gas scrubber effluent, the scrubber liquid influent flow rate, and the fan amps were continuously recorded during the testing. We have analyzed this information pursuant to 40 CFR 63.453 (n) as follows.

Although all runs demonstrated compliance with 40 CFR 63.445 (c) (2) by a considerable margin, four of the six runs were selected to develop operating parameter values providing the greatest operating flexibility while also demonstrating continuous compliance (see Table 1).

The average pH during these runs was 9.2 with a minimum during one run of 9.0 (see Figures 1 and 2 in Appendix B). We, therefore, propose for the Administrator's approval that we operate the scrubber effluent pH above a minimum of 9.0 as a rolling 3-hour average with a monitoring frequency of at least once every 15 minutes (see Table 2). We believe the monitoring frequency of once every 15 minutes to be appropriate because the standard deviation of the data was quite low. The average flow of the scrubber medium was 1257 gpm with a minimum of 1252 gpm. By the same rationale we propose for the Administrator's approval that we operate above a minimum flow of 1252 as a rolling 3-hour average with the same monitoring frequency described above.

Region 4 previously approved monitoring fan amperage of the bleaching system vent gas fan as an alternative monitoring parameter to 40 CFR 63.453 (c)(2) (letter dated December 22,

2000). The mill continuously monitors fan amperage and displays it as fan load on its Distributed Control System (DCS). Fan load during the time of the testing was calculated as follows (Equation 1).

$$\%Load = \frac{measured\ amps}{0.701 * full\ load\ amps} * 100 = \frac{measured\ amps}{0.701 * 25.7} * 100 = \frac{measured\ amps}{18.02} * 100$$

Please note 0.701 represents a conversion factor for ranging of the signal from the field instrumentation to the DCS.

Figure 3 reflects the fan load/amperage when the Bleach Plant goes down. Because the mill continues to run the fan the amperage goes up although the process is down. We have also taken all the belts off the fan motor to determine its "no load" amperage, 9.8 amps. Because of data variability we propose to operate the fan such that the amperage is below 19.3 and above 10.8 amps as a rolling 3-hour average. This will be converted to fan load for convenience of the operators. Note that this calculation has been simplified according to the following (Equation 2) and became effective on December 5, 2002 at 13:05.

$$\%Load = \frac{measured\ amps}{full\ load\ amps} * 100 = \frac{measured\ amps}{25.7} * 100$$

Again, we propose to monitor fan amperage/load at least once every 15 minutes. In all cases, pH, flow, and % Load data will be transferred to a plant wide information (PI) system for record keeping purposes.

We respectfully request written approval as required by 40 CFR 63.453 (n). If you have any questions about our rationale please do not hesitate to call me at (386) 329-0918.

Sincerely.

Theodore D. Kennedy
Vice President

tk

Enclosures

cc: Lee Page, EPA Region 4
William Jernigan, Atlanta
Scott Matchett, Atlanta
Cindy Barlow
Nickolai Selbach

# Appendix A

Letter Dated October 25, 2002

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

October 25, 2002

Mr. Mort Benjamin
Air Compliance Supervisor
Northeast District
Florida Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, FL 32256-7577

**Re: Cluster Rule CMS Parameters (40 CFR 63.453(n))**
**Georgia-Pacific Palatka Operations**
**1070005**

Dear Mr. Benjamin:

During a recent review of recordkeeping and reporting procedures we discovered that continuous monitoring system (CMS) parameters, monitoring frequencies, averaging times and the rationale for choosing the CMS were not submitted in a readable, concise format and summary to the Department pursuant to 40 CFR 63.453 (n).

The CMS listed in the attached tables were chosen because they indicate when there is a breach of the Closed Vent Collection System, a bypass of the Condensate Collection System, or they otherwise indicate operation outside of tested operating ranges on the condensate, low-volume-high-concentration (LVHC) and bleach plant treatment systems specifically identified in 40 CFR Subpart S. The tables show the equipment, the parameters that are monitored, the CMS tag numbers, the limits that have been evaluated and the thresholds or minimum averaging times.

Limit switches, pressure measurements, stream flows, temperatures, pH, fan load, pH and indications of valve positions are forms of CMS that are generally accepted industry-wide for monitoring for compliance.

The parameters designated as "Valve Position" or "Vent Valve Position" in the attached Tables indicate that a system is either being collected (valve "Closed") or bypassed (valve "Open") to show compliance with the requirement to collect gases from the named LVHC systems.

The incinerator temperature values were selected because data collected during the IPT of the two incinerators indicated that compliance with the treatment requirements of 63.443(d) were met at all times when the temperatures were above the chosen values. The averaging time was selected based on run times of the reference test methods. Similarly, the parameter values shown for the stripper parameters mandated under 63.453(g) were based on data gathered during the stripper characterization study.

Finally, the scrubber parameters are either mandated by the rule (see 63.453(c)) or approved as acceptable alternative monitoring. Parameter values were chosen based on data gathered during the scrubber IPTand subsequent performance tests, and when the parameters are within the designated ranges, we meet the bleach plant treatment requirements found in 63.445(c). Averaging times were selected based on normal compliance test times.

If you have any more questions concerning this issue, please do not hesitate to contact either Joe Taylor at 386-329-0027 or via e-mail at jetaylor@gapac.com or me at 386-329-0918.

Sincerely,

Theodore D Kennedy

Theodore D. Kennedy
Vice-President
Palatka Operations

Bc: S. D. Matchett (GA030-43)
W. M. Jernigan (GA030-09)

# MACT I CONTINUOUS MONITORING SYSTEMS

| Area | Parameter/Equipment | Parameter Monitored | PI Tag Number | Range/Limit | Threshold/Averaging Time |
|---|---|---|---|---|---|
| **Bleach Plant (scrubber)** | Scrubbant Recirculation Flow | Flow | 40fif31.pv | ≥ 1229 gpm | 3-hr average |
| | Scrubber Fan Load | Load | 40iif33.pv | ≥ 85% | Continuous |
| | Scrubbant Recirculation pH | PH | 40aif32.pv | ≥ 9.1 | 3-hr average |
| **Thermal Oxidizer** | Primary Incinerator Temperature | Temperature | 13ncgincin:13ttm22a.pnt | ≥ 1300° F | 3-hr rolling average |
| | Backup Incinerator Temperature | Temperature | 13ncgincin:13ttm22b.pnt | ≥ 1300° F | |
| **Steam Stripper** | Steam Flow to Stripper | Steam Flow | 13constrip:13fcc01.meas | | 3-hr rolling average |
| | Condensate Flow to Stripper | Condensate Flow | 13constrip:13fcc19.meas | N/A | 3-hr rolling average |
| | Condensate Temperature entering Column | Temperature | 13constrip:13ttc30.pnt | ≥ 160° F | 3-hr rolling average |
| **Condensate Collection** | Pre-evaporator 1st and 2nd effect foul, Pre-evaporator hotwell condensate | Flow, gpm | 13concollect:13ftk20.pnt | N/A | Daily average rolled into 15-day rolling average |
| | 1st and 2nd effect contaminated condensate, as makeup | Flow, gpm | 13concollect:13ftk03.pnt | N/A | Daily average rolled into 15-day rolling average |
| | Turpentine Decanter Underflow and Secondary Condenser condensate | Flow, gpm | 13concollect:13ftk21.pnt | N/A | Daily average rolled into 15-day rolling average |

# MACT I CONTINUOUS MONITORING SYSTEMS

| Area | Parameter/Equipment | Parameter Monitored | Loop Number | Range/Limit | Threshold/Averaging Time |
|---|---|---|---|---|---|
| Closed Vent System | #1 Blow Tank Safety Valve | Limit Switch | 05VL1VNT | Open/Closed | minute |
| | #2 Blow Tank Safety Valve | Limit Switch | 05VL2VNT | Open/Closed | minute |
| | #3 Blow Tank Safety Valve | Limit Switch | 05VL3VNT | Open/Closed | minute |
| | Secondary Condenser Vent | Limit Switch | 13D06 | Open/Closed | minute |
| | Secondary Condenser Rupture Disc | Pressure Transmitter | 13D07 | 14.5 psi | minute |
| | Secondary Condenser Rupture Disc | Pressure Transmitter | 13D61 | 14.5 psi | minute |
| | Accumulator Safety Valve | Limit Switch | 13A07 | Open/Closed | minute |
| | Accumulator Safety Valve | Limit Switch | 13A22 | Open/Closed | minute |
| | Pre-evaporator Hotwell Loop Seal | Pressure Transmitter | 13PTB23 | 14" water column | minute |
| | Pre-evaporator Hotwell Vent | Limit Switch | 13D01 | Open/Closed | minute |
| | Pre-evaporator Hotwell Rupture Disc | Pressure Switch | 13D02 | 10 psi | minute |
| | Turpentine Condenser Vent | Limit Switch | 13J01 | Open/Closed | minute |
| | Turpentine Condenser Rupture Disc | Pressure Switch | 13J02 | 10 psi | minute |
| | #1 Evaporator Hotwell Vent | Limit Switch | 13J26 | Open/Closed | minute |

# MACT I CONTINUOUS MONITORING SYSTEMS

| Area | Parameter/Equipment | Parameter Monitored | Loop Number | Range/Limit | Threshold/Averaging Time |
|---|---|---|---|---|---|
| Closed Vent System | #1 Evaporator Hotwell Rupture Disc | Pressure Switch | 13J27 | 10 psi | minute |
| | #2 Evaporator Hotwell Vent | Limit Switch | 13J21 | Open/Closed | minute |
| | #2 Evaporator Hotwell Rupture Disc | Pressure Switch | 13J22 | 10 psi | minute |
| | #3 Evaporator Hotwell Vent | Limit Switch | 13J16 | Open/Closed | minute |
| | #3 Evaporator Hotwell Rupture Disc | Pressure Switch | 13J17 | 10 psi | minute |
| | #3 Evaporator Hotwell Loop Seal | Pressure Transmitter | 11PTJ12 | 14" water column | minute |
| | #4 Evaporator Hotwell Vent | Limit Switch | 13J11 | Open/Closed | minute |
| | #4 Evaporator Hotwell Rupture Disc | Pressure Switch | 13J12 | 10 psi | minute |
| | #4 Evaporator Hotwell Rupture Disc | Pressure Switch | 13J15 | 10 psi | minute |
| | #4 Evaporator Hotwell Loop Seal | Pressure Transmitter | 68PTO46 | 14" water column | minute |
| | Stripper Feed Tank Water Seal | Water Seal | 13K09 | 8 psi | minute |
| | Stripper Feed Tank Rupture Disc | Pressure Transmitter | 13K15 | 14.5 psi | minute |
| | Stripper-off-gas to Oxidizer | Limit Switch | 13L04 | Open/Closed | minute |
| | Stripper-off-gas to Oxidizer Rupture Disc | Temperature Transmitter | 13L14 | 160° F | minute |

# MACT I CONTINUOUS MONITORING SYSTEMS

| Area | Parameter/Equipment | Parameter Monitored | Loop Number | Range/Limit | Threshold/Averaging Time |
|---|---|---|---|---|---|
| Closed Vent System | Stripper-off-gas to Boiler | Limit Switch | 59D12 | Open/Closed | |
| | Stripper-off-gas to Boiler Rupture Disc | Pressure Transmitter | 59D35 | 14.5 psi | |
| | NCG Vent to Oxidizer | Limit Switch | 13D70 | Open/Closed | |
| | NCG to Oxidizer Rupture Disc | Pressure Transmitter | 13D65 | 14.5 psi | |
| | NCG to Oxidizer Rupture Disc | Temperature Transmitter | 13D68 | 160° F | |
| | Batch NCG to Boiler Rupture Disc | Pressure Transmitter | 13D63 | 14.5 psi | |
| | NCG Vent to Boiler | Limit Switch | 59D08 | Open/Closed | |
| | NCG to Boiler Rupture Disc | Temperature Transmitter | 59D06 | 160° F | |

# Appendix B

Miscellaneous Information

Table 1

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Start = | 10/29/02 12:18 | 10/31/02 13:32 | 10/31/02 15:50 | 10/31/02 17:10 |
| End = | 10/29/02 13:23 | 10/31/02 14:43 | 10/31/02 16:56 | 10/31/02 18:16 |

| | Do Stage | | | | | Eop Stage | | D1 Stage | | BP Scrubber | | | | | | | | R-10 Run Status | Test |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BAST/h | | | % Pine | % HW | % Pine | % HW | % Pine | % HW | Flow (gpm) | | | pH | | | Fan Load (%) | Fan Load (amps) | Fan Delta P (in H2O) | ClO2 (STPD) | Cl2 |
| | 43FYB04.PV | Maximum | STDEV | 43AYB04W.PV | Calculation | 43AYD04W.PV | Calculation | 43AYF04W.PV | Calculation | 40FIF31.PV | Minimum | STDEV | 40AIF32.PV | Minimum | STDEV | 40IIF33.PV | 40IIF33.PV | 40PIF03.PV | 37FYF14.PV | ppm |
| Run 1 | 50 | 52 | 0.6 | 100.0 | 0.0 | 100.0 | 0.0 | 100.0 | 0.0 | 1262 | 1261 | 0.6 | 9.1 | 9.0 | 0.05 | 83.9 | 15.1 | 20.9 | 0.00 | 0.233 |
| Run 2 | 50 | 52 | 0.8 | 100.0 | 0.0 | 100.0 | 0.0 | 100.0 | 0.0 | 1253 | 1252 | 1.0 | 9.3 | 9.3 | 0.01 | 85.5 | 15.4 | 21.4 | 31.6 | 0.073 |
| Run 3 | 50 | 52 | 0.6 | 100.0 | 0.0 | 100.0 | 0.0 | 100.0 | 0.0 | 1258 | 1257 | 0.8 | 9.3 | 9.3 | 0.00 | 85.4 | 15.4 | 21.4 | 37.3 | 0.020 |
| Run 4 | 50 | 52 | 0.6 | 100.0 | 0.0 | 100.0 | 0.0 | 100.0 | 0.0 | 1262 | 1260 | 0.9 | 9.3 | 9.2 | 0.02 | 85.8 | 15.4 | 21.4 | 30.3 | 0.032 |
| | | | | | | | | | | **Average =** | **1257** | | | **9.2** | | **85.1** | **15.3** | | | |

Table 2

| No. 3 Bleach Plant | | | | | |
|---|---|---|---|---|---|
| **Parameter** | | **Test Condition** | **Proposed Operating Value** | **Monitoring Frequency** | **Averaging Time** |
| pH, Minimum | | 9.0 | 9.0 | 5 min | 3-hr., rolling |
| Scrubber flow, Minimum | (gpm) | 1252 | 1252 | 5 min | 3-hr., rolling |
| Fan load Minimum | (amps) | 15.11[a] | 10.8[c] | 5 min | 3-hr., rolling |
| Fan load Maximum | (amps) | 15.45[b] | 19.3[d] | 5 min | 3-hr., rolling |
| Fan "No Load" | (amps) | 9.8 | | | |

[a] Equivalent to 83.9% Load, using Equation 1

[b] Equivalent to 85.8% Load, using Equation 1

[c] Equivalent to 41.9% Load using Equation 2

[d] Equivalent to75% Load using Equation 2

Figure 1

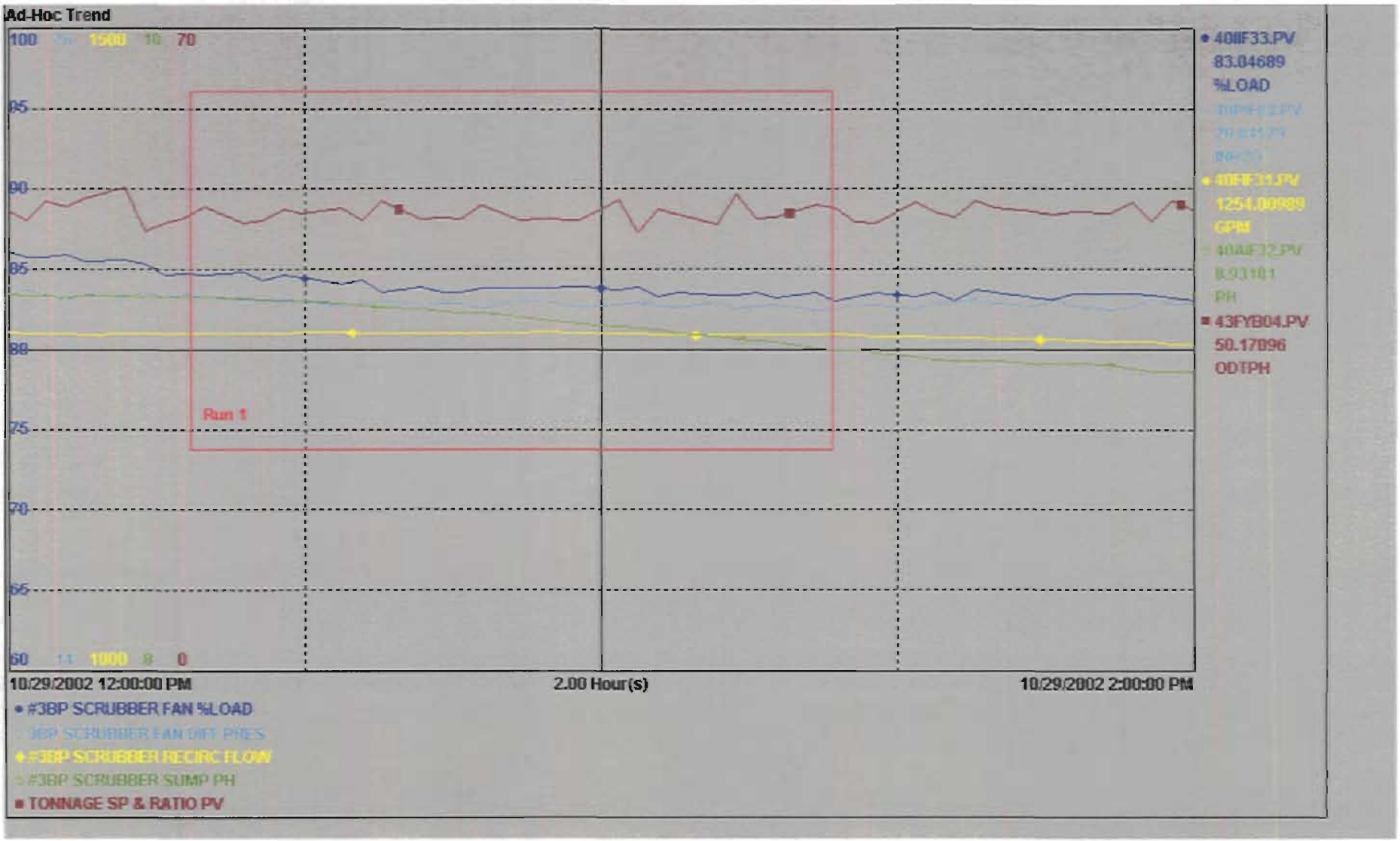

Ad-Hoc Trend
100
85
90
85
80
75
70
65
60
1500
70
1000
0
Run 1
40IF33.PV
83.04689
%LOAD
1254.00989
GPM
PH
43FYB04.PV
50.17096
ODTPH
10/29/2002 12:00:00 PM
2.00 Hour(s)
10/29/2002 2:00:00 PM
#3BP SCRUBBER FAN %LOAD
#3BP SCRUBBER RECIRC FLOW
#3BP SCRUBBER SUMP PH
TONNAGE SP & RATIO PV

Figure 2

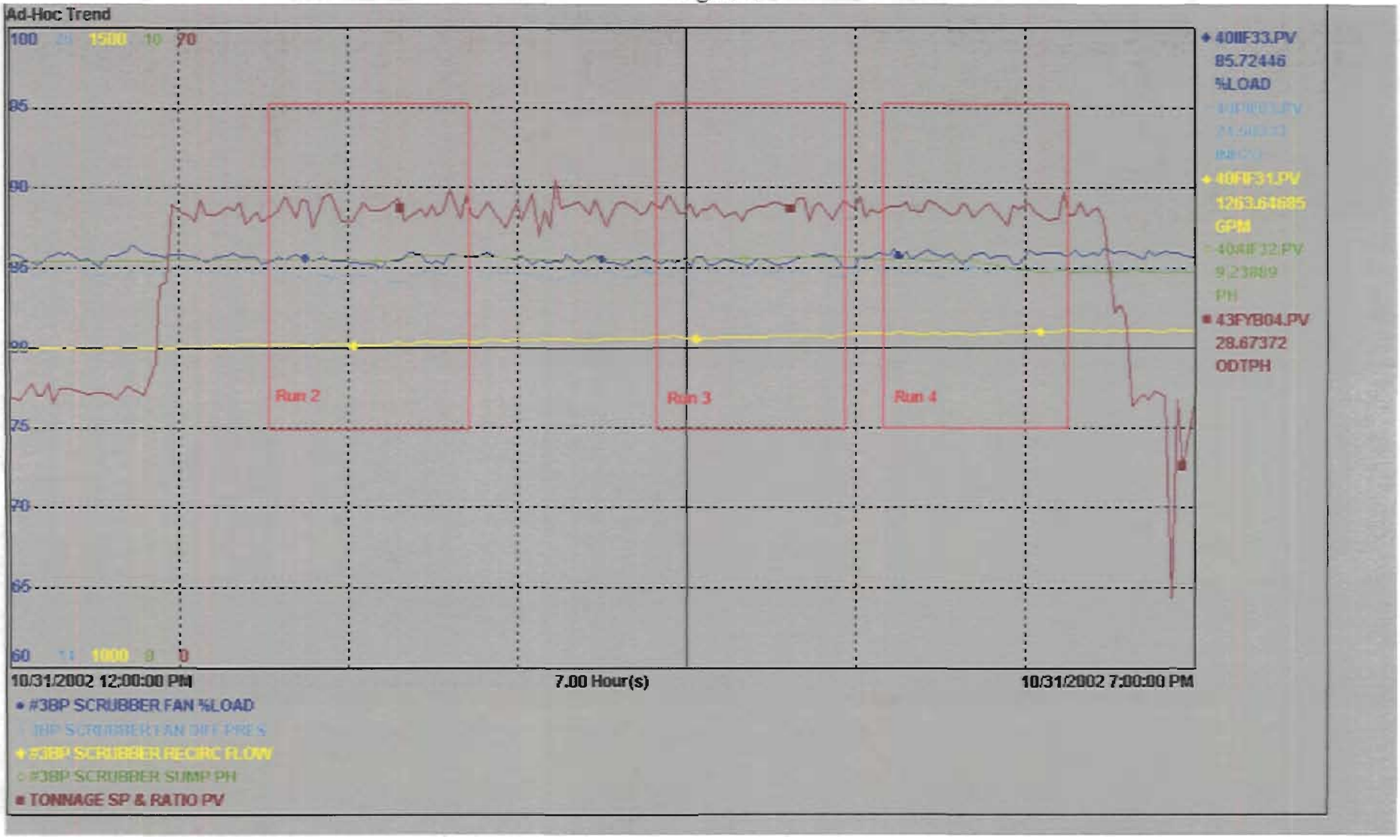
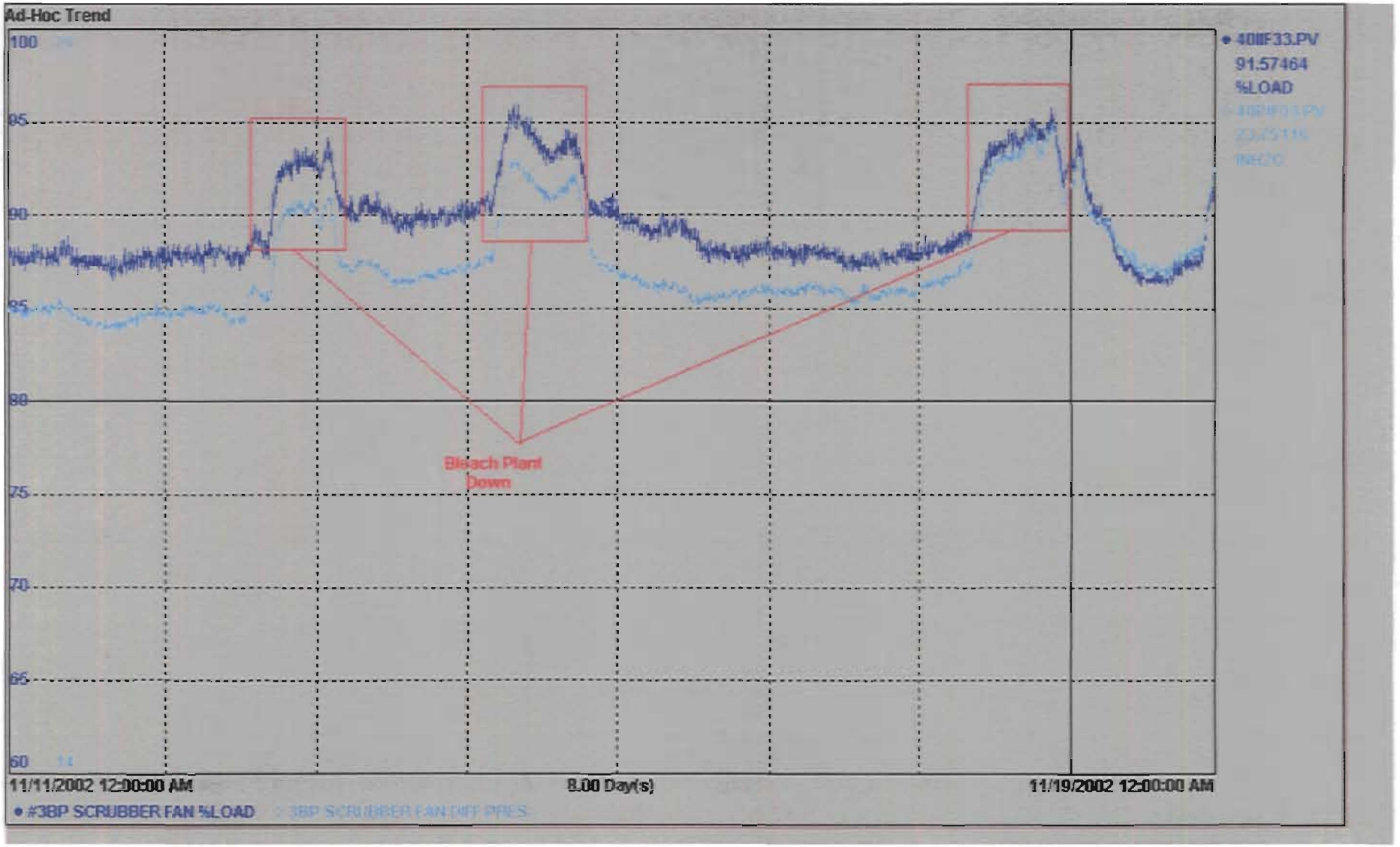

Ad-Hoc Trend
100
95
90
85
80
75
70
65
60
1500
1000
0
Run 2
Run 3
Run 4
40IIF33.PV
85.72446
%LOAD
40IIF31.PV
1263.64685
GPM
40IIF32.PV
9.23889
PH
43FYB04.PV
28.67372
ODTPH
10/31/2002 12:00:00 PM
7.00 Hour(s)
10/31/2002 7:00:00 PM
#3BP SCRUBBER FAN %LOAD
#3BP SCRUBBER FAN DIFF PRES
#3BP SCRUBBER RECIRC FLOW
#3BP SCRUBBER SUMP PH
TONNAGE SP & RATIO PV

Figure 3


Ad-Hoc Trend
100
95
90
85
80
75
70
65
60
Bleach Plant Down
11/11/2002 12:00:00 AM
8.00 Day(s)
11/19/2002 12:00:00 AM
• #3BP SCRUBBER FAN %LOAD
• 40IIF33.PV
91.57464
%LOAD

# Appendix C

Raw Data
(5-minute averages)

| pH Run 1 | | pH Run 2 | | pH Run 3 | | pH Run 4 | |
|---|---|---|---|---|---|---|---|
| 29-Oct-02 12:18:00 | 9.2 | 31-Oct-02 13:32:00 | 9.3 | 31-Oct-02 15:50:00 | 9.3 | 31-Oct-02 17:10:00 | 9.3 |
| 29-Oct-02 12:23:00 | 9.2 | 31-Oct-02 13:37:00 | 9.3 | 31-Oct-02 15:55:00 | 9.3 | 31-Oct-02 17:15:00 | 9.3 |
| 29-Oct-02 12:28:00 | 9.1 | 31-Oct-02 13:42:00 | 9.3 | 31-Oct-02 16:00:00 | 9.3 | 31-Oct-02 17:20:00 | 9.3 |
| 29-Oct-02 12:33:00 | 9.1 | 31-Oct-02 13:47:00 | 9.3 | 31-Oct-02 16:05:00 | 9.3 | 31-Oct-02 17:25:00 | 9.3 |
| 29-Oct-02 12:38:00 | 9.1 | 31-Oct-02 13:52:00 | 9.3 | 31-Oct-02 16:10:00 | 9.3 | 31-Oct-02 17:30:00 | 9.3 |
| 29-Oct-02 12:43:00 | 9.1 | 31-Oct-02 13:57:00 | 9.3 | 31-Oct-02 16:15:00 | 9.3 | 31-Oct-02 17:35:00 | 9.3 |
| 29-Oct-02 12:48:00 | 9.1 | 31-Oct-02 14:02:00 | 9.3 | 31-Oct-02 16:20:00 | 9.3 | 31-Oct-02 17:40:00 | 9.3 |
| 29-Oct-02 12:53:00 | 9.1 | 31-Oct-02 14:07:00 | 9.3 | 31-Oct-02 16:25:00 | 9.3 | 31-Oct-02 17:45:00 | 9.3 |
| 29-Oct-02 12:58:00 | 9.1 | 31-Oct-02 14:12:00 | 9.3 | 31-Oct-02 16:30:00 | 9.3 | 31-Oct-02 17:50:00 | 9.3 |
| 29-Oct-02 13:03:00 | 9.1 | 31-Oct-02 14:17:00 | 9.3 | 31-Oct-02 16:35:00 | 9.3 | 31-Oct-02 17:55:00 | 9.2 |
| 29-Oct-02 13:08:00 | 9.0 | 31-Oct-02 14:22:00 | 9.3 | 31-Oct-02 16:40:00 | 9.3 | 31-Oct-02 18:00:00 | 9.2 |
| 29-Oct-02 13:13:00 | 9.0 | 31-Oct-02 14:27:00 | 9.3 | 31-Oct-02 16:45:00 | 9.3 | 31-Oct-02 18:05:00 | 9.2 |
| 29-Oct-02 13:18:00 | 9.0 | 31-Oct-02 14:32:00 | 9.3 | 31-Oct-02 16:50:00 | 9.3 | 31-Oct-02 18:10:00 | 9.2 |
| | | 31-Oct-02 14:37:00 | 9.3 | | | | |

| Flow Run 1 | | Flow Run 2 | | Flow Run 3 | | Flow Run 4 | |
|---|---|---|---|---|---|---|---|
| 29-Oct-02 12:18:00 | 1263 | 31-Oct-02 13:32:00 | 1253 | 31-Oct-02 15:50:00 | 1258 | 31-Oct-02 17:10:00 | 1261 |
| 29-Oct-02 12:23:00 | 1262 | 31-Oct-02 13:37:00 | 1253 | 31-Oct-02 15:55:00 | 1258 | 31-Oct-02 17:15:00 | 1261 |
| 29-Oct-02 12:28:00 | 1263 | 31-Oct-02 13:42:00 | 1252 | 31-Oct-02 16:00:00 | 1257 | 31-Oct-02 17:20:00 | 1261 |
| 29-Oct-02 12:33:00 | 1263 | 31-Oct-02 13:47:00 | 1252 | 31-Oct-02 16:05:00 | 1257 | 31-Oct-02 17:25:00 | 1261 |
| 29-Oct-02 12:38:00 | 1263 | 31-Oct-02 13:52:00 | 1253 | 31-Oct-02 16:10:00 | 1258 | 31-Oct-02 17:30:00 | 1261 |
| 29-Oct-02 12:43:00 | 1262 | 31-Oct-02 13:57:00 | 1252 | 31-Oct-02 16:15:00 | 1258 | 31-Oct-02 17:35:00 | 1261 |
| 29-Oct-02 12:48:00 | 1263 | 31-Oct-02 14:02:00 | 1252 | 31-Oct-02 16:20:00 | 1258 | 31-Oct-02 17:40:00 | 1261 |
| 29-Oct-02 12:53:00 | 1263 | 31-Oct-02 14:07:00 | 1252 | 31-Oct-02 16:25:00 | 1259 | 31-Oct-02 17:45:00 | 1262 |
| 29-Oct-02 12:58:00 | 1262 | 31-Oct-02 14:12:00 | 1252 | 31-Oct-02 16:30:00 | 1259 | 31-Oct-02 17:50:00 | 1262 |
| 29-Oct-02 13:03:00 | 1262 | 31-Oct-02 14:17:00 | 1253 | 31-Oct-02 16:35:00 | 1260 | 31-Oct-02 17:55:00 | 1262 |
| 29-Oct-02 13:08:00 | 1261 | 31-Oct-02 14:22:00 | 1254 | 31-Oct-02 16:40:00 | 1259 | 31-Oct-02 18:00:00 | 1263 |
| 29-Oct-02 13:13:00 | 1262 | 31-Oct-02 14:27:00 | 1254 | 31-Oct-02 16:45:00 | 1259 | 31-Oct-02 18:05:00 | 1263 |
| 29-Oct-02 13:18:00 | 1261 | 31-Oct-02 14:32:00 | 1254 | 31-Oct-02 16:50:00 | 1259 | 31-Oct-02 18:10:00 | 1263 |
| | | 31-Oct-02 14:37:00 | 1255 | | | | |

| Fan Load (Amps) Run 1 | | Fan Load (Amps) Run 2 | | Fan Load (Amps) Run 3 | | Fan Load (Amps) Run 4 | |
|---|---|---|---|---|---|---|---|
| 29-Oct-02 12:18:00 | 15.26 | 31-Oct-02 13:32:00 | 15.40 | 31-Oct-02 15:50:00 | 15.37 | 31-Oct-02 17:10:00 | 15.47 |
| 29-Oct-02 12:23:00 | 15.23 | 31-Oct-02 13:37:00 | 15.44 | 31-Oct-02 15:55:00 | 15.39 | 31-Oct-02 17:15:00 | 15.44 |
| 29-Oct-02 12:28:00 | 15.20 | 31-Oct-02 13:42:00 | 15.43 | 31-Oct-02 16:00:00 | 15.39 | 31-Oct-02 17:20:00 | 15.45 |
| 29-Oct-02 12:33:00 | 15.14 | 31-Oct-02 13:47:00 | 15.41 | 31-Oct-02 16:05:00 | 15.38 | 31-Oct-02 17:25:00 | 15.48 |
| 29-Oct-02 12:38:00 | 15.09 | 31-Oct-02 13:52:00 | 15.40 | 31-Oct-02 16:10:00 | 15.38 | 31-Oct-02 17:30:00 | 15.45 |
| 29-Oct-02 12:43:00 | 15.07 | 31-Oct-02 13:57:00 | 15.38 | 31-Oct-02 16:15:00 | 15.38 | 31-Oct-02 17:35:00 | 15.39 |
| 29-Oct-02 12:48:00 | 15.10 | 31-Oct-02 14:02:00 | 15.36 | 31-Oct-02 16:20:00 | 15.36 | 31-Oct-02 17:40:00 | 15.46 |
| 29-Oct-02 12:53:00 | 15.11 | 31-Oct-02 14:07:00 | 15.34 | 31-Oct-02 16:25:00 | 15.40 | 31-Oct-02 17:45:00 | 15.45 |
| 29-Oct-02 12:58:00 | 15.10 | 31-Oct-02 14:12:00 | 15.38 | 31-Oct-02 16:30:00 | 15.35 | 31-Oct-02 17:50:00 | 15.44 |
| 29-Oct-02 13:03:00 | 15.05 | 31-Oct-02 14:17:00 | 15.43 | 31-Oct-02 16:35:00 | 15.39 | 31-Oct-02 17:55:00 | 15.38 |
| 29-Oct-02 13:08:00 | 15.03 | 31-Oct-02 14:22:00 | 15.47 | 31-Oct-02 16:40:00 | 15.43 | 31-Oct-02 18:00:00 | 15.47 |
| 29-Oct-02 13:13:00 | 15.03 | 31-Oct-02 14:27:00 | 15.38 | 31-Oct-02 16:45:00 | 15.45 | 31-Oct-02 18:05:00 | 15.48 |
| 29-Oct-02 13:18:00 | 15.03 | 31-Oct-02 14:32:00 | 15.40 | 31-Oct-02 16:50:00 | 15.42 | 31-Oct-02 18:10:00 | 15.47 |
| | | 31-Oct-02 14:37:00 | 15.45 | | | | |

| Fan Load (%) Run 1 | | Fan Load (%) Run 2 | | Fan Load (%) Run 3 | | Fan Load (%) Run 4 | |
|---|---|---|---|---|---|---|---|
| 29-Oct-02 12:18:00 | 84.7 | 31-Oct-02 13:32:00 | 85.5 | 31-Oct-02 15:50:00 | 85.3 | 31-Oct-02 17:10:00 | 85.9 |
| 29-Oct-02 12:23:00 | 84.6 | 31-Oct-02 13:37:00 | 85.7 | 31-Oct-02 15:55:00 | 85.4 | 31-Oct-02 17:15:00 | 85.7 |
| 29-Oct-02 12:28:00 | 84.4 | 31-Oct-02 13:42:00 | 85.6 | 31-Oct-02 16:00:00 | 85.4 | 31-Oct-02 17:20:00 | 85.8 |
| 29-Oct-02 12:33:00 | 84.0 | 31-Oct-02 13:47:00 | 85.5 | 31-Oct-02 16:05:00 | 85.4 | 31-Oct-02 17:25:00 | 85.9 |
| 29-Oct-02 12:38:00 | 83.8 | 31-Oct-02 13:52:00 | 85.5 | 31-Oct-02 16:10:00 | 85.4 | 31-Oct-02 17:30:00 | 85.8 |
| 29-Oct-02 12:43:00 | 83.6 | 31-Oct-02 13:57:00 | 85.4 | 31-Oct-02 16:15:00 | 85.4 | 31-Oct-02 17:35:00 | 85.4 |
| 29-Oct-02 12:48:00 | 83.8 | 31-Oct-02 14:02:00 | 85.3 | 31-Oct-02 16:20:00 | 85.2 | 31-Oct-02 17:40:00 | 85.8 |
| 29-Oct-02 12:53:00 | 83.9 | 31-Oct-02 14:07:00 | 85.1 | 31-Oct-02 16:25:00 | 85.5 | 31-Oct-02 17:45:00 | 85.8 |
| 29-Oct-02 12:58:00 | 83.8 | 31-Oct-02 14:12:00 | 85.4 | 31-Oct-02 16:30:00 | 85.2 | 31-Oct-02 17:50:00 | 85.7 |
| 29-Oct-02 13:03:00 | 83.6 | 31-Oct-02 14:17:00 | 85.6 | 31-Oct-02 16:35:00 | 85.4 | 31-Oct-02 17:55:00 | 85.4 |
| 29-Oct-02 13:08:00 | 83.4 | 31-Oct-02 14:22:00 | 85.9 | 31-Oct-02 16:40:00 | 85.6 | 31-Oct-02 18:00:00 | 85.9 |
| 29-Oct-02 13:13:00 | 83.4 | 31-Oct-02 14:27:00 | 85.4 | 31-Oct-02 16:45:00 | 85.8 | 31-Oct-02 18:05:00 | 85.9 |
| 29-Oct-02 13:18:00 | 83.4 | 31-Oct-02 14:32:00 | 85.5 | 31-Oct-02 16:50:00 | 85.6 | 31-Oct-02 18:10:00 | 85.9 |
| | | 31-Oct-02 14:37:00 | 85.7 | | | | |

# Attachment

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BUREAU OF AIR REGULATION

# SOURCE TEST REPORT

Georgia-Pacific Corporation
Palatka, Florida

## Bleach Plant

October 29-31, 2002



Prepared By:

AAS Inc.

Ambient Air Services, Inc.

106 Ambient Airway • Starke, FL 32091 • (904) 964-8440 • Fax (904) 964-6675

Ambient Air Services, Inc. of Starke, Florida, has completed the testing as described in this report for Georgia-Pacific Corporation's Palatka, Florida Bleach Plant. To the best of our knowledge and abilities, we certify that all information, facts, and test data are true and correct. Information supplied to AASI for use in this report from Georgia-Pacific Corporation is perceived to be accurate and is used as such where necessary. This report was prepared and certified by:

**Report Number: 504-02-09**

Prepared By:



Randy L Weston
19 November 2002

Reviewed By:



David Sholtes
19 November 2002

## EXECUTIVE SUMMARY:

On 29 and 31 October, 2002 Ambient Air Services, Inc. performed the FDEP required permit stack test at Georgia-Pacific Corporation's Palatka, Florida Bleach Plant. During this test all required stack testing parameters were met. Table I summarizes the results of the test.

TABLE I

| Georgia-Pacific Corporation<br>Palatka, Florida<br>29 & 31 October, 2002 | | | | | |
|---|---|---|---|---|---|
| **PARAMETER** | **TEST RESULTS** | | | | |
| **29 October** | | | | | |
| | Permit Limits | R 1 | R 2 | R 3 | Avg |
| Carbon Monoxide (CO) | N/A | 979.0 ppm | 788.7 ppm | N/A | 883.9 ppm |
| | 46 lb/hr | 58.0 lb/hr | 44.5 lb/hr | N/A | 51.2 lb/hr |
| Chlorinated HAP (Cl2) | 10 ppm | 0.233 ppm | 0.160 ppm | 0.164 ppm | 0.186 ppm |
| | N/A | 0.016 lb/hr | 0.011 lb/hr | 0.012 lb/hr | 0.013 lb/hr |
| **31 October** | | | | | |
| | Permit Limits | R 1 | R 2 | R 3 | Avg |
| Carbon Monoxide (CO) | N/A | 1155.1 ppm | 1212.2 ppm | 583.1 ppm | 983.5 ppm |
| | 46 lb/hr | 72.4 lb/hr | 74.6 lb.hr | 36.5 lb/hr | 61.1 lb/hr |
| Chlorinated HAP (Cl2) | 10 ppm | 0.073 ppm | 0.020 ppm | 0.032 ppm | 0.042 ppm |
| | N/A | 0.005 lb/hr | 0.001 lb/hr | 0.002 lb/hr | 0.003 lb/hr |

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| | |
|---|---|
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## 1.0 Introduction

Georgia-Pacific Corporation contracted with Ambient Air Services Inc. of Starke, Florida to perform the Chlorine and Carbon Monoxide compliance testing on the Bleach Plant located in Palatka, Florida.

This testing was conducted in order to satisfy testing requirements of Permit Number 1070005-010-AC for emission sources associated with the Palatka, Florida Bleach Plant. For the testing perspective the requirements of the permit associated with this facility was tested under one mobilization effort.

A summary of the testing performed is summarized in Table 2.

The testing was conducted on October 29 & 31, 2002. Florida DEP was notified of the test dates.

**Table 2**

| Georgia-Pacific Corporation<br>Palatka, Florida<br>29 & 31 October, 2002<br>Summary of Permit Requirements<br>Performance Emission Testing | | | | | |
|---|---|---|---|---|---|
| **Source Description** | **Approx. Stack Flow** | **Tests** | **EPA Method** | **No. of Runs** | **Min. hrs** |
| Bleach Plant | 13,135 scfmd | Cl | 40CFR60 AppA, Meth 26a | 6 | 1 hour |
| | | CO | 40CFR60 AppA, Meth 10 | 5 | 1 hour |

## 2.0 Summary and Discussion of Results

### 2.1 Summary of Results

The following is the summary table for the test conducted with all results in Parts per Million and lbs/hr:

Table 3

# Georgia Pacific - Palatka, Florida

## Bleach Plant Carbon Monoxide Test

## October 29, 2002

### *Carbon Monoxide Emission Summary*

| RUN NUMBER | START TIME | END TIME | Total Minutes Tested | Flow, SCFM-D | Carbon Monoxide, parts per million | Carbon Monoxide, pounds per hour |
|---|---|---|---|---|---|---|
| 1 | 12:25 | 13:24 | 60 | 12676 | 979.0 | 58.0 |
| 2 | 14:33 | 15:32 | 60 | 12068 | 788.7 | 44.5 |
| **Averages** | | | **120** | **12372** | **883.9** | **51.2** |

Table 4

# Georgia Pacific - Palatka, Florida

## Bleach Plant Carbon Monoxide Test

## October 31, 2002

### *Carbon Monoxide Emission Summary*

| RUN NUMBER | START TIME | END TIME | Total Minutes Tested | Flow, SCFM-D | Carbon Monoxide, parts per million | Carbon Monoxide, pounds per hour |
|---|---|---|---|---|---|---|
| 1 | 13:30 | 14:29 | 60 | 13401 | 1155.1 | 72.4 |
| 2 | 15:47 | 16:46 | 60 | 13171 | 1212.2 | 74.6 |
| 3 | 17:10 | 18:09 | 60 | 13375 | 583.1 | 36.5 |
| **Averages** | | | **180** | **13316** | **983.5** | **61.1** |

AASI

## Chlorine Emissions Summary

USEPA Method 26A (40 CFR Part 60 Appendix A)

**Georgia Pacific**

**Palatka, Fl.**

**October 29, 2002**

AASI USEPA Method 26A 12 Point Template - Rev 0/11-7-2002

| Run | | | Chlorine Emissions | | | Volumetric Flow Rates | | Stack | | Sample Volume | Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Number | Time (EDT) | GR/SCFD | PPM | LBS/HR | ACFM | SCFMD | Temp °F | Moisture % | SCFD | Isokinetic |
| 10/29/02 | 1 | 12:18<br>13:23 | 1.50E-04 | 0.233 | 0.016 | 16316 | 12775 | 144.3 | 10.7 | 34.421 | 104.7 |
| 10/29/02 | 2 | 14:33<br>15:38 | 1.03E-04 | 0.160 | 0.011 | 15336 | 12139 | 145.0 | 9.6 | 32.247 | 103.3 |
| 10/29/02 | 3 | 17:00<br>18:02 | 1.06E-04 | 0.164 | 0.012 | 16770 | 13454 | 142.2 | 8.8 | 36.523 | 105.5 |
| **Average** | | | **1.20E-04** | **0.186** | **0.013** | **16141** | **12789** | **143.8** | **9.7** | **34.397** | **104.5** |

Table 6

AASI

## Chlorine Emissions Summary

USEPA Method 26A (40 CFR Part 60 Appendix A)

**Georgia Pacific**

**Palatka, Fl.**

**October 31, 2002**

AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

| Run | | | Chlorine Emissions | | | Volumetric Flow Rates | | Stack | | Sample Volume | Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Number | Time (EDT) | GR/SCFD | PPM | LBS/HR | ACFM | SCFMD | Temp °F | Moisture % | SCFD | Isokinetic |
| 10/31/02 | 1 | 13:32<br>14:43 | 4.73E-05 | 0.073 | 0.005 | 16387 | 13401 | 142.0 | 7.4 | 35.830 | 103.9 |
| 10/31/02 | 2 | 15:50<br>16:56 | 1.29E-05 | 0.020 | 0.001 | 16475 | 13134 | 143.1 | 9.0 | 35.928 | 106.3 |
| 10/31/02 | 3 | 17:10<br>18:16 | 2.06E-05 | 0.032 | 0.002 | 16123 | 12870 | 140.3 | 9.3 | 35.118 | 106.1 |
| **Average** | | | **2.69E-05** | **0.042** | **0.003** | **16328** | **13135** | **141.8** | **8.6** | **35.625** | **105.4** |

## 3.0 Process Description

### 3.1 Source Operating Parameters

The following conditions were met and the required information was collected during the compliance test.

1. The Bleach Plant had been stabilized for one hour prior to testing.

2. The production rate, species, Kappa, and ClO2 application rates were recorded during the test.

### 3.2 Process Description

The absorbance of visible light by wood pulp fibers is caused mainly by lignin, one of the main constituents of wood. Residual lignin remaining after chemical pulping processes is highly colored. It also darkens with age. Most of the lignin is removed during the pulping process. Bleaching is a process whereby chemicals are applied to the pulp to increase its brightness by continuing the delignification process.

Bleaching increases the usefulness of the paper by enhancing its capacity for accepting printed or written images. It is also a means of purifying pulp, increasing its stability, and enhancing some of its properties.

The chemicals used in the Georgia-Pacific Palatka Mill include oxidants (chlorine dioxide, oxygen and peroxide) and an alkali (sodium hydroxide). The bleaching sequence is first a chlorine dioxide stage ($D_0$), followed by a caustic extraction stage enhanced with oxygen and peroxide ($E_{op}$), and finally another chlorine dioxide stage ($D_1$). These chemicals are mixed with pulp suspensions at prescribed pH, temperature, and concentration conditions for a specified time period. Bleaching chemicals are applied sequentially with intermediate washing between stages, because it is not possible to achieve sufficient delignification by the action of any one chemical in a single stage. Reaction times for bleaching chemicals range from a few minutes to several hours, requiring large towers to provide adequate retention time.

## 4.0 Sampling Point Location

**Sample Site Diagram**

Facility: Georgia Pacific

Location: Palatka, Florida

Source: Bleach Plant

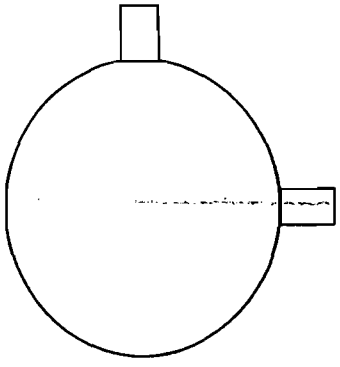
Drawing Date: 10/29/02

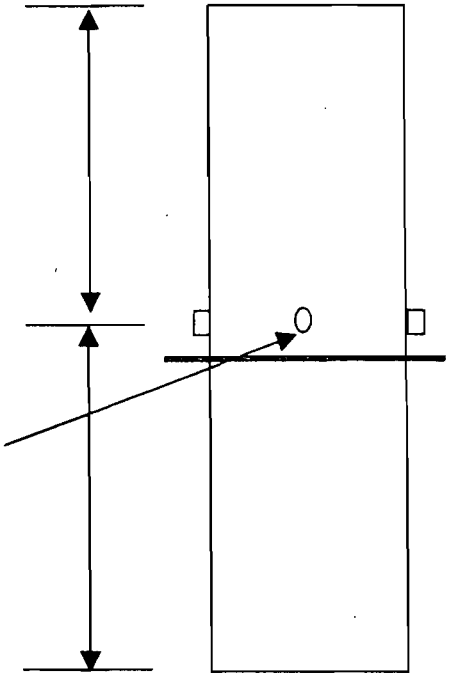
**NOT TO SCALE**

Stack Diameter: 42 Inches

Diameters Downstream: 8.0

Diameters Upstream: 5.7






**Chlorine**
Method 26a

| Sampling Points | |
|---|---|
| 1 | 1.8 |
| 2 | 6.1 |
| 3 | 12.4 |
| 4 | 29.6 |
| 5 | 35.9 |
| 6 | 40.2 |

Note: Two equal distances, ninety degree ports. Ports are 4 inches long. Two ports with 6 points per port, 12 total points.

Ambient Air Services, Inc
106 Ambient Air Way
Starke, Fl 32091
(904) 964-8440

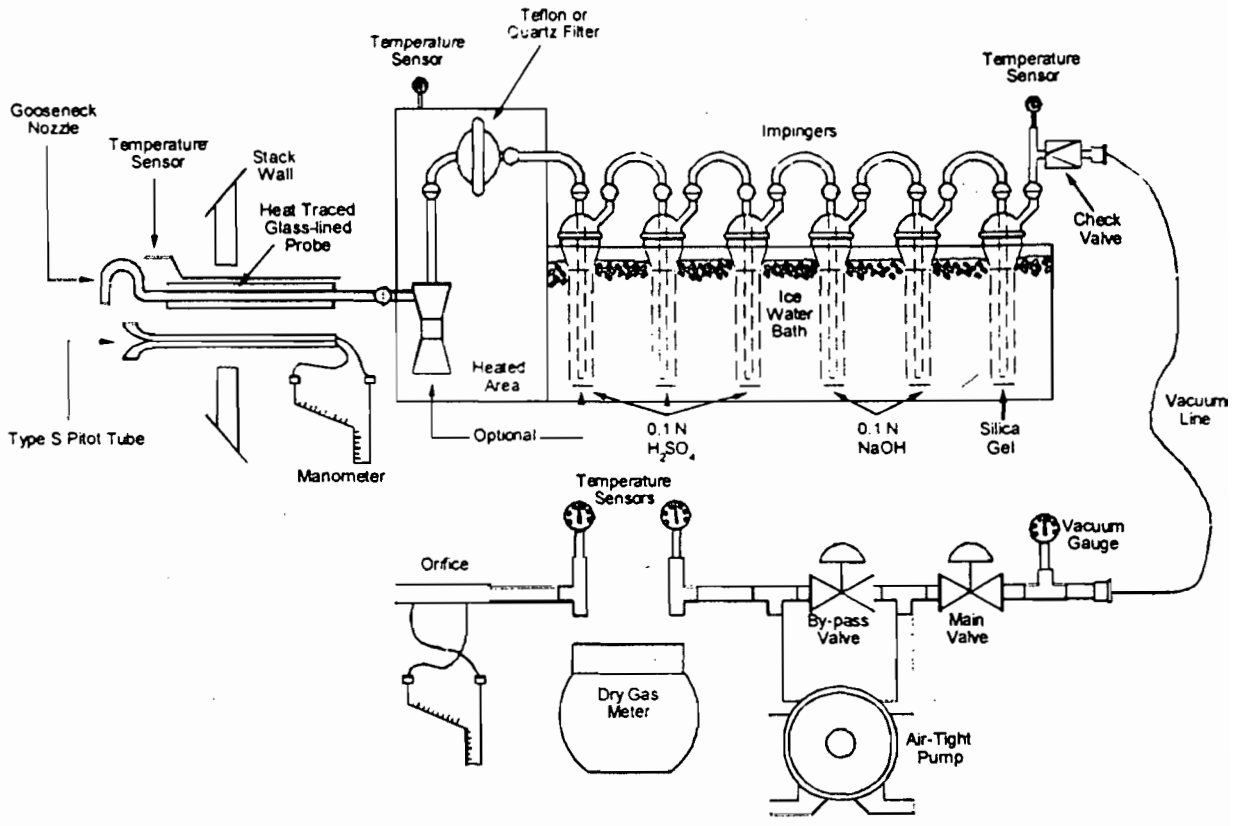
Figure 2-1

## 5.0 Testing Methodology and Procedures

### 5.1 Chlorine Testing (Method 26a)

USEPA method 26a was conducted on the Bleach Plant. The following is a synopsis of the method and a diagram illustrating the equipment in use.

Gaseous and particulate pollutants are withdrawn isokinetically from the source and collected in an optional cyclone, on a filter, and in absorbing solutions. The cyclone collects any liquid droplets and is not necessary if the source emissions do not contain them; however, it is preferable to include the cyclone in the sampling train to protect the filter from any liquid present. The filter collects particulate matter including halide salts but is not routinely recovered or analyzed. Acidic and alkaline absorbing solutions collect the gaseous hydrogen halides and halogens, respectively. Following sampling of emissions containing liquid droplets, any halides/halogens dissolved in the liquid in the cyclone and on the filter are vaporized to gas and collected in the impingers by pulling conditioned ambient air through the sampling train. The hydrogen halides are solubilized in the acidic solution and form chloride ($Cl^-$), bromide ($Br^-$), and fluoride ($F^-$) ions. The halogens have a very low solubility in the acidic solution and pass through to the alkaline solution where they are hydrolyzed to form a proton ($H^+$), the halide ion, and the hypohalous acid (HClO or HBrO). Sodium thiosulfate is added to the alkaline solution to assure reaction with the hypohalous acid to form a second halide ion such that 2 halide ions are formed for each molecule of halogen gas. The halide ions in the separate solutions are measured by ion chromatography (IC). If desired, the particulate matter recovered from the filter and the probe is analyzed following the procedures in Method 5.




## 5.2 Carbon Monoxide Testing (Method 10)

An integrated or continuous gas sample is extracted from a sampling point and analyzed for carbon monoxide (CO) content using a Luft-type nondispersive infrared analyzer (NDIR) or equivalent.

## APPENDICES


| | |
|---|---|
| Appendix A | Complete Emission Data<br>- Emissions Run Summaries<br>- Flow Calculation Data |
| Appendix B | Field Data Sheets<br>- Chlorine and Flow Data Sheets<br>- Carbon Monoxide Data |
| Appendix C | Laboratory Analysis |
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| Appendix E | Sample Chain of Custody |
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# APPENDIX – A

**Complete Emission Data**
**- Emissions Run Summaries**
**- Flow Calculation Data**

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**Environmental Consultants**

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AASI USEPA Method 5 24 Point Template - Rev 0/11-7-2002

## CI Summary Run 1

| | | | |
|---|---|---|---|
| **Facility** | Georgia Pacific | **Impinger Condensate** | 81.0 |
| **Location** | Palatka, Fl. | **Silica Gel Condensate** | 7.0 |
| **Stack** | Bleach Plant | **Volume Metered** | 37.030 |
| **Run Date** | 10/29/02 | **Meter Temp (Deg R)** | 572.0 |
| **Run Number** | 1 | **Carbon Dioxide, %** | 0.0 |
| **Start Time** | 12:18 | **Oxygen, %** | 20.9 |
| **Finish Time** | 13:23 | **Carbon Monoxide, %** | 0.0 |
| **Weather** | Clear, Warm | **Nitrogen, %** | 79.1 |
| **Total Time (minutes)** | 60 | **Condensate Volume** | 88.0 |
| **Barometric Pressure** | 30.03 | **Delta H (inches H2O)** | 1.2900 |
| **Stack Diameter (inches)** | 42.00 | **Stack Pressure** | 30.026 |
| **Stack Area square feet** | 9.621 | **Stack Temp (Rainkin Degrees)** | 604.3 |
| **Nozzle Area square feet** | 0.0004125 | **Laboratory Results (ug)** | 438.9 |
| **Number of Points** | 12 | **Blank Correction** | 104.3 |
| **Avg of SQRT of V.H.** | 0.4616 | **Total** | 334.6 |
| **Meter Correction (Y)** | 1.000 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

| | | |
|---|---|---|
| **Volume Water Vapor, SCF** | | 4.142 |
| **Gas Volume Sampled, STPD** | | 34.421 |
| **Total Volume, STP** | | 38.563 |
| **Moisture in stack gas, volume fraction** | | 0.107 |
| **Dry Stack Gas, volume fraction** | | 0.893 |
| **Molecular Weight of Stack Gas (Dry Basis)** | | 28.84 |
| **Molecular Weight of Stack Gas (Stack conditions)** | | 27.68 |
| **Specific gravity of Stack Gas Relative to Air** | | 0.955 |
| **Excess Air (%)** | | 14864.9 |
| **Average Stack Velocity, FPM** | | 1695.9 |
| **Actual Stack Gas Flow Rate, ACFM** | | 16316 |
| **Actual Stack Gas Flow Rate, ACFMD** | | 14570 |
| **Stack Gas Flow Rate, SCFMD** | | 12775 |
| **Stack Gas Flow Rate Wet, SCFMW** | | 14306 |
| **Percent Isokinetic** | | 105 |
| **Stack Emissions:** | **Grains per DSCF** | 0.00015 |
| | **Pounds per Hour** | 0.016 |

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## Cl Summary Run 2

| | | | |
|---|---|---|---|
| **Facility** | Georgia Pacific | **Impinger Condensate** | 66.0 |
| **Location** | Palatka, Fl. | **Silica Gel Condensate** | 6.9 |
| **Stack** | Bleach Plant | **Volume Metered** | 35.145 |
| **Run Date** | 10/29/02 | **Meter Temp (Deg R)** | 579.3 |
| **Run Number** | 2 | **Carbon Dioxide, %** | 0.0 |
| **Start Time** | 14:33 | **Oxygen, %** | 20.9 |
| **Finish Time** | 15:38 | **Carbon Monoxide, %** | 0.0 |
| **Weather** | Partial Clouds | **Nitrogen, %** | 79.1 |
| **Total Time (minutes)** | 60 | **Condensate Volume** | 72.9 |
| **Barometric Pressure** | 30.03 | **Delta H (inches H2O)** | 1.1530 |
| **Stack Diameter (inches)** | 42.00 | **Stack Pressure** | 30.018 |
| **Stack Area square feet** | 9.621 | **Stack Temp (Rainkin Degrees)** | 605.0 |
| **Nozzle Area square feet** | 0.0004125 | **Laboratory Results (ug)** | 320.0 |
| **Number of Points** | 12 | **Blank Correction** | 104.3 |
| **Avg of SQRT of V.H.** | 0.4345 | **Total** | 215.7 |
| **Meter Correction (Y)** | 1.000 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

| | | |
|---|---|---|
| **Volume Water Vapor, SCF** | | 3.431 |
| **Gas Volume Sampled, STPD** | | 32.247 |
| **Total Volume, STP** | | 35.678 |
| **Moisture in stack gas, volume fraction** | | 0.096 |
| **Dry Stack Gas, volume fraction** | | 0.904 |
| **Molecular Weight of Stack Gas (Dry Basis)** | | 28.84 |
| **Molecular Weight of Stack Gas (Stack conditions)** | | 27.8 |
| **Specific gravity of Stack Gas Relative to Air** | | 0.959 |
| **Excess Air (%)** | | 14864.9 |
| **Average Stack Velocity, FPM** | | 1594.0 |
| **Actual Stack Gas Flow Rate, ACFM** | | 15336 |
| **Actual Stack Gas Flow Rate, ACFMD** | | 13864 |
| **Stack Gas Flow Rate, SCFMD** | | 12139 |
| **Stack Gas Flow Rate Wet, SCFMW** | | 13428 |
| **Percent Isokinetic** | | 103 |
| **Stack Emissions:** | **Grains per DSCF** | 0.00010 |
| | **Pounds per Hour** | 0.011 |

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## Cl Summary Run 3

| | | | |
|---|---|---|---|
| **Facility** | Georgia Pacific | **Impinger Condensate** | 68.0 |
| **Location** | Palatka, Fl. | **Silica Gel Condensate** | 7.1 |
| **Stack** | Bleach Plant | **Volume Metered** | 38.870 |
| **Run Date** | 10/29/02 | **Meter Temp (Deg R)** | 566.0 |
| **Run Number** | 3 | **Carbon Dioxide, %** | 0.0 |
| **Start Time** | 17:00 | **Oxygen, %** | 20.9 |
| **Finish Time** | 18:02 | **Carbon Monoxide, %** | 0.0 |
| **Weather** | Partial Clouds | **Nitrogen, %** | 79.1 |
| **Total Time (minutes)** | 60 | **Condensate Volume** | 75.1 |
| **Barometric Pressure** | 30.03 | **Delta H (inches H2O)** | 1.3840 |
| **Stack Diameter (inches)** | 42.00 | **Stack Pressure** | 30.019 |
| **Stack Area square feet** | 9.621 | **Stack Temp (Rainkin Degrees)** | 602.2 |
| **Nozzle Area square feet** | 0.0004125 | **Laboratory Results (ug)** | 354.6 |
| **Number of Points** | 12 | **Blank Correction** | 104.3 |
| **Avg of SQRT of V.H.** | 0.4770 | **Total** | 250.3 |
| **Meter Correction (Y)** | 1.000 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

| | | |
|---|---|---|
| **Volume Water Vapor, SCF** | | 3.535 |
| **Gas Volume Sampled, STPD** | | 36.523 |
| **Total Volume, STP** | | 40.058 |
| **Moisture in stack gas, volume fraction** | | 0.088 |
| **Dry Stack Gas, volume fraction** | | 0.912 |
| **Molecular Weight of Stack Gas (Dry Basis)** | | 28.84 |
| **Molecular Weight of Stack Gas (Stack conditions)** | | 27.89 |
| **Specific gravity of Stack Gas Relative to Air** | | 0.962 |
| **Excess Air (%)** | | 14864.9 |
| **Average Stack Velocity, FPM** | | 1743.1 |
| **Actual Stack Gas Flow Rate, ACFM** | | 16770 |
| **Actual Stack Gas Flow Rate, ACFMD** | | 15294 |
| **Stack Gas Flow Rate, SCFMD** | | 13454 |
| **Stack Gas Flow Rate Wet, SCFMW** | | 14752 |
| **Percent Isokinetic** | | 106 |
| **Stack Emissions:** | **Grains per DSCF** | 0.00011 |
| | **Pounds per Hour** | 0.012 |

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## CI Summary Run 1

| | | | |
|---|---|---|---|
| **Facility** | Georgia Pacific | **Impinger Condensate** | 54.0 |
| **Location** | Palatka, Fl. | **Silica Gel Condensate** | 7.0 |
| **Stack** | Bleach Plant | **Volume Metered** | 37.945 |
| **Run Date** | 10/31/02 | **Meter Temp (Deg R)** | 564.1 |
| **Run Number** | 1 | **Carbon Dioxide, %** | 0.0 |
| **Start Time** | 13:32 | **Oxygen, %** | 20.9 |
| **Finish Time** | 14:43 | **Carbon Monoxide, %** | 0.0 |
| **Weather** | Cloudy | **Nitrogen, %** | 79.1 |
| **Total Time (minutes)** | 60 | **Condensate Volume** | 61.0 |
| **Barometric Pressure** | 30.14 | **Delta H (inches H2O)** | 1.3530 |
| **Stack Diameter (inches)** | 42.00 | **Stack Pressure** | 30.128 |
| **Stack Area square feet** | 9.621 | **Stack Temp (Rainkin Degrees)** | 602.0 |
| **Nozzle Area square feet** | 0.0004125 | **Laboratory Results (ug)** | 214.2 |
| **Number of Points** | 12 | **Blank Correction** | 104.3 |
| **Avg of SQRT of V.H.** | 0.4683 | **Total** | 109.9 |
| **Meter Correction (Y)** | 0.998 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

| | | |
|---|---|---|
| **Volume Water Vapor, SCF** | | 2.871 |
| **Gas Volume Sampled, STPD** | | 35.830 |
| **Total Volume, STP** | | 38.701 |
| **Moisture in stack gas, volume fraction** | | 0.074 |
| **Dry Stack Gas, volume fraction** | | 0.926 |
| **Molecular Weight of Stack Gas (Dry Basis)** | | 28.84 |
| **Molecular Weight of Stack Gas (Stack conditions)** | | 28.04 |
| **Specific gravity of Stack Gas Relative to Air** | | 0.967 |
| **Excess Air (%)** | | 14864.9 |
| **Average Stack Velocity, FPM** | | 1703.3 |
| **Actual Stack Gas Flow Rate, ACFM** | | 16387 |
| **Actual Stack Gas Flow Rate, ACFMD** | | 15174 |
| **Stack Gas Flow Rate, SCFMD** | | 13401 |
| **Stack Gas Flow Rate Wet, SCFMW** | | 14472 |
| **Percent Isokinetic** | | 104 |
| **Stack Emissions:** | **Grains per DSCF** | 0.00005 |
| | **Pounds per Hour** | 0.005 |

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## Cl Summary Run 2

| | | | |
|---|---|---|---|
| **Facility** | Georgia Pacific | **Impinger Condensate** | 68.0 |
| **Location** | Palatka, Fl. | **Silica Gel Condensate** | 7.1 |
| **Stack** | Bleach Plant | **Volume Metered** | 38.025 |
| **Run Date** | 10/31/02 | **Meter Temp (Deg R)** | 560.2 |
| **Run Number** | 2 | **Carbon Dioxide, %** | 0.0 |
| **Start Time** | 15:50 | **Oxygen, %** | 20.9 |
| **Finish Time** | 16:56 | **Carbon Monoxide, %** | 0.0 |
| **Weather** | Partial Clouds | **Nitrogen, %** | 79.1 |
| **Total Time (minutes)** | 60 | **Condensate Volume** | 75.1 |
| **Barometric Pressure** | 29.95 | **Delta H (inches H2O)** | 1.3480 |
| **Stack Diameter (inches)** | 42.00 | **Stack Pressure** | 29.940 |
| **Stack Area square feet** | 9.621 | **Stack Temp (Rainkin Degrees)** | 603.1 |
| **Nozzle Area square feet** | 0.0004125 | **Laboratory Results (ug)** | 134.3 |
| **Number of Points** | 12 | **Blank Correction** | 104.3 |
| **Avg of SQRT of V.H.** | 0.4674 | **Total** | 30.0 |
| **Meter Correction (Y)** | 0.998 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

| | | |
|---|---|---|
| **Volume Water Vapor, SCF** | | 3.535 |
| **Gas Volume Sampled, STPD** | | 35.928 |
| **Total Volume, STP** | | 39.463 |
| **Moisture in stack gas, volume fraction** | | 0.090 |
| **Dry Stack Gas, volume fraction** | | 0.91 |
| **Molecular Weight of Stack Gas (Dry Basis)** | | 28.84 |
| **Molecular Weight of Stack Gas (Stack conditions)** | | 27.86 |
| **Specific gravity of Stack Gas Relative to Air** | | 0.961 |
| **Excess Air (%)** | | 14864.9 |
| **Average Stack Velocity, FPM** | | 1712.4 |
| **Actual Stack Gas Flow Rate, ACFM** | | 16475 |
| **Actual Stack Gas Flow Rate, ACFMD** | | 14992 |
| **Stack Gas Flow Rate, SCFMD** | | 13134 |
| **Stack Gas Flow Rate Wet, SCFMW** | | 14433 |
| **Percent Isokinetic** | | 106 |
| **Stack Emissions:** | **Grains per DSCF** | 0.00001 |
| | **Pounds per Hour** | 0.001 |

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## CI Summary Run 3

| | | | |
|---|---|---|---|
| **Facility** | Georgia Pacific | **Impinger Condensate** | 70.0 |
| **Location** | Palatka, Fl. | **Silica Gel Condensate** | 6.9 |
| **Stack** | Bleach Plant | **Volume Metered** | 37.000 |
| **Run Date** | 10/31/02 | **Meter Temp (Deg R)** | 557.6 |
| **Run Number** | 3 | **Carbon Dioxide, %** | 0.0 |
| **Start Time** | 17:10 | **Oxygen, %** | 20.9 |
| **Finish Time** | 18:16 | **Carbon Monoxide, %** | 0.0 |
| **Weather** | Partial Clouds | **Nitrogen, %** | 79.1 |
| **Total Time (minutes)** | 60 | **Condensate Volume** | 76.9 |
| **Barometric Pressure** | 29.95 | **Delta H (inches H2O)** | 1.2970 |
| **Stack Diameter (inches)** | 42.00 | **Stack Pressure** | 29.938 |
| **Stack Area square feet** | 9.621 | **Stack Temp (Rainkin Degrees)** | 600.3 |
| **Nozzle Area square feet** | 0.0004125 | **Laboratory Results (ug)** | 151.1 |
| **Number of Points** | 12 | **Blank Correction** | 104.3 |
| **Avg of SQRT of V.H.** | 0.4582 | **Total** | 46.8 |
| **Meter Correction (Y)** | 0.998 | | |
| **Nozzle Diameter** | 0.275 | | |
| **Pitot Correction Factor** | 0.84 | | |

| | | |
|---|---|---|
| **Volume Water Vapor, SCF** | | 3.620 |
| **Gas Volume Sampled, STPD** | | 35.118 |
| **Total Volume, STP** | | 38.738 |
| **Moisture in stack gas, volume fraction** | | 0.093 |
| **Dry Stack Gas, volume fraction** | | 0.907 |
| **Molecular Weight of Stack Gas (Dry Basis)** | | 28.84 |
| **Molecular Weight of Stack Gas (Stack conditions)** | | 27.83 |
| **Specific gravity of Stack Gas Relative to Air** | | 0.960 |
| **Excess Air (%)** | | 14864.9 |
| **Average Stack Velocity, FPM** | | 1675.8 |
| **Actual Stack Gas Flow Rate, ACFM** | | 16123 |
| **Actual Stack Gas Flow Rate, ACFMD** | | 14624 |
| **Stack Gas Flow Rate, SCFMD** | | 12870 |
| **Stack Gas Flow Rate Wet, SCFMW** | | 14190 |
| **Percent Isokinetic** | | 106 |
| **Stack Emissions:** | **Grains per DSCF** | 0.00002 |
| | **Pounds per Hour** | 0.002 |

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## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 1 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/29/02 |
| Run Number | 1 |
| Start Time | 12:18 |
| Finish Time | 13:23 |
| Weather | Clear, Warm |
| Total Time (minutes) | 60.00 |
| Number of Points | 12 |
| Barometric Pressure | 30.03 |
| Static Pressure (inches of water) | -0.05 |
| Stack Diameter (inches) | 42.000 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 1.000 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 193.480 |
| Initial Meter Reading (cubic feet) | 156.450 |
| Condensate (ml) | 81 |
| Silica Gel Weight (grams) | 7.0 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | 0.0 |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 438.9 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.00 |

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| Field Data Points - CI Run 1 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.26 | 1.56 | 142 | 106 | 106 | 0.51 |
| | 2 | 0.26 | 1.56 | 142 | 107 | 107 | 0.51 |
| | 3 | 0.23 | 1.38 | 145 | 107 | 107 | 0.48 |
| | 4 | 0.22 | 1.32 | 145 | 108 | 108 | 0.47 |
| | 5 | 0.18 | 1.08 | 143 | 110 | 110 | 0.42 |
| | 6 | 0.16 | 0.96 | 141 | 111 | 111 | 0.40 |
| 2 | 7 | 0.26 | 1.56 | 144 | 113 | 113 | 0.51 |
| | 8 | 0.27 | 1.62 | 145 | 114 | 114 | 0.52 |
| | 9 | 0.22 | 1.32 | 148 | 115 | 115 | 0.47 |
| | 10 | 0.18 | 1.08 | 148 | 117 | 117 | 0.42 |
| | 11 | 0.18 | 1.08 | 145 | 118 | 118 | 0.42 |
| | 12 | 0.16 | 0.96 | 143 | 118 | 118 | 0.40 |

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## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 2 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/29/02 |
| Run Number | 2 |
| Start Time | 14:33 |
| Finish Time | 15:38 |
| Weather | Partial Clouds |
| Total Time (minutes) | 60.0 |
| Number of Points | 12 |
| Barometric Pressure | 30.03 |
| Static Pressure (inches of water) | -0.16 |
| Stack Diameter (inches) | 42.00 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 1.000 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 230.200 |
| Initial Meter Reading (cubic feet) | 195.055 |
| Condensate (ml) | 66 |
| Silica Gel Weight (grams) | 6.9 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 320.0 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.04 |

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| Field Data Points - CI Run 2 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.21 | 1.27 | 145 | 115 | 115 | 0.46 |
| | 2 | 0.2 | 1.21 | 145 | 117 | 117 | 0.45 |
| | 3 | 0.16 | 0.97 | 146 | 118 | 118 | 0.40 |
| | 4 | 0.16 | 0.97 | 147 | 118 | 118 | 0.40 |
| | 5 | 0.16 | 0.97 | 145 | 119 | 119 | 0.40 |
| | 6 | 0.12 | 0.72 | 139 | 120 | 120 | 0.35 |
| 2 | 7 | 0.25 | 1.51 | 146 | 120 | 120 | 0.50 |
| | 8 | 0.25 | 1.51 | 146 | 120 | 120 | 0.50 |
| | 9 | 0.22 | 1.33 | 147 | 121 | 121 | 0.47 |
| | 10 | 0.22 | 1.33 | 147 | 121 | 121 | 0.47 |
| | 11 | 0.18 | 1.09 | 144 | 121 | 121 | 0.42 |
| | 12 | 0.16 | 0.97 | 143 | 121 | 121 | 0.40 |

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## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 3 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/29/02 |
| Run Number | 3 |
| Start Time | 17:00 |
| Finish Time | 18:02 |
| Weather | Partial Clouds |
| Total Time (minutes) | 60.0 |
| Number of Points | 12 |
| Barometric Pressure | 30.03 |
| Static Pressure (inches of water) | -0.15 |
| Stack Diameter (inches) | 42.00 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 1.000 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 269.620 |
| Initial Meter Reading (cubic feet) | 230.750 |
| Condensate (ml) | 68 |
| Silica Gel Weight (grams) | 7.1 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 354.6 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.04 |

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| Field Data Points - CI Run 3 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.26 | 1.57 | 144 | 109 | 109 | 0.51 |
| | 2 | 0.28 | 1.69 | 142 | 102 | 102 | 0.53 |
| | 3 | 0.26 | 1.57 | 144 | 107 | 107 | 0.51 |
| | 4 | 0.25 | 1.51 | 143 | 107 | 107 | 0.50 |
| | 5 | 0.2 | 1.21 | 141 | 107 | 107 | 0.45 |
| | 6 | 0.18 | 1.09 | 140 | 107 | 107 | 0.42 |
| 2 | 7 | 0.26 | 1.57 | 141 | 106 | 106 | 0.51 |
| | 8 | 0.28 | 1.69 | 143 | 106 | 106 | 0.53 |
| | 9 | 0.22 | 1.33 | 144 | 106 | 106 | 0.47 |
| | 10 | 0.2 | 1.21 | 142 | 105 | 105 | 0.45 |
| | 11 | 0.18 | 1.09 | 142 | 105 | 105 | 0.42 |
| | 12 | 0.18 | 1.09 | 140 | 105 | 105 | 0.42 |

**Ambient Air Services, Inc.**
**Environmental Consultants**

**106 Ambient Air Way**
**Starke, FL. 32091**
**(904) 964-8440**

AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 1 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/31/02 |
| Run Number | 1 |
| Start Time | 13:32 |
| Finish Time | 14:43 |
| Weather | Cloudy |
| Total Time (minutes) | 60.00 |
| Number of Points | 12 |
| Barometric Pressure | 30.14 |
| Static Pressure (inches of water) | -0.17 |
| Stack Diameter (inches) | 42.000 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 0.998 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 313.155 |
| Initial Meter Reading (cubic feet) | 275.210 |
| Condensate (ml) | 54 |
| Silica Gel Weight (grams) | 7.0 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | 0.0 |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 214.2 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.08 |

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AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

| Field Data Points - CI Run 1 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.28 | 1.70 | 142 | 100 | 101 | 0.53 |
| | 2 | 0.26 | 1.58 | 144 | 102 | 100 | 0.51 |
| | 3 | 0.24 | 1.46 | 141 | 103 | 99 | 0.49 |
| | 4 | 0.18 | 1.09 | 141 | 105 | 100 | 0.42 |
| | 5 | 0.16 | 0.97 | 141 | 108 | 101 | 0.40 |
| | 6 | 0.14 | 0.85 | 142 | 108 | 102 | 0.37 |
| 2 | 7 | 0.27 | 1.64 | 141 | 109 | 103 | 0.52 |
| | 8 | 0.29 | 1.76 | 141 | 109 | 103 | 0.54 |
| | 9 | 0.27 | 1.64 | 142 | 109 | 103 | 0.52 |
| | 10 | 0.24 | 1.46 | 142 | 109 | 102 | 0.49 |
| | 11 | 0.18 | 1.09 | 144 | 109 | 102 | 0.42 |
| | 12 | 0.16 | 0.97 | 143 | 109 | 102 | 0.40 |

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AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 2 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/31/02 |
| Run Number | 2 |
| Start Time | 15:50 |
| Finish Time | 16:56 |
| Weather | Partial Clouds |
| Total Time (minutes) | 60.0 |
| Number of Points | 12 |
| Barometric Pressure | 29.95 |
| Static Pressure (inches of water) | -0.14 |
| Stack Diameter (inches) | 42.00 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 0.998 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 359.105 |
| Initial Meter Reading (cubic feet) | 321.080 |
| Condensate (ml) | 68 |
| Silica Gel Weight (grams) | 7.1 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 134.3 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.08 |

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**106 Ambient Air Way**
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AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

| Field Data Points - Cl Run 2 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.27 | 1.64 | 140 | 94 | 93 | 0.52 |
| | 2 | 0.28 | 1.70 | 141 | 95 | 92 | 0.53 |
| | 3 | 0.24 | 1.46 | 143 | 103 | 96 | 0.49 |
| | 4 | 0.22 | 1.34 | 145 | 103 | 96 | 0.47 |
| | 5 | 0.18 | 1.09 | 144 | 105 | 97 | 0.42 |
| | 6 | 0.16 | 0.97 | 144 | 105 | 97 | 0.40 |
| 2 | 7 | 0.29 | 1.76 | 141 | 105 | 97 | 0.54 |
| | 8 | 0.3 | 1.82 | 142 | 105 | 97 | 0.55 |
| | 9 | 0.22 | 1.34 | 144 | 108 | 99 | 0.47 |
| | 10 | 0.2 | 1.22 | 145 | 108 | 98 | 0.45 |
| | 11 | 0.16 | 0.97 | 144 | 108 | 98 | 0.40 |
| | 12 | 0.14 | 0.85 | 144 | 108 | 97 | 0.37 |

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AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

## Volumetric Flow Calculations Worksheet

| Data Request Entry Area | CI Run 3 |
|---|---|
| Facility | Georgia Pacific |
| Location | Palatka, Fl. |
| Source | Bleach Plant |
| Date | 10/31/02 |
| Run Number | 3 |
| Start Time | 17:10 |
| Finish Time | 18:16 |
| Weather | Partial Clouds |
| Total Time (minutes) | 60.0 |
| Number of Points | 12 |
| Barometric Pressure | 29.95 |
| Static Pressure (inches of water) | -0.16 |
| Stack Diameter (inches) | 42.00 |
| Nozzle Diameter (inches) | 0.275 |
| Meter Y Factor | 0.998 |
| Pitot Factor | 0.84 |
| Final Meter Reading (cubic feet) | 396.405 |
| Initial Meter Reading (cubic feet) | 359.405 |
| Condensate (ml) | 70 |
| Silica Gel Weight (grams) | 6.9 |
| Carbon Dioxide (percent) | 0.0 |
| Oxygen (percent) | 20.9 |
| Carbon Monoxide (percent) | |
| Nitrogen (percent) | 79.1 |
| Laboratory Results (ug) | 151.1 |
| Blank Correction | 104.3 |
| Isokinetic Rate Factor | 6.08 |

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**106 Ambient Air Way**
**Starke, FL. 32091**
**(904) 964-8440**

AASI USEPA Method 26A 12 Point Template - Rev 0/11-14-2002

| Field Data Points - CI Run 3 | | | | Georgia Pacific | | Bleach Plant | |
|---|---|---|---|---|---|---|---|
| Port | Traverse Point | Velocity Head | Meter Orifice | Stack Temp. (°F) | Meter Inlet Temp. (°F) | Meter Outlet Temp. (°F) | Square Root of Velocity Head |
| 1 | 1 | 0.28 | 1.70 | 138 | 97 | 95 | 0.53 |
| | 2 | 0.26 | 1.58 | 140 | 100 | 96 | 0.51 |
| | 3 | 0.22 | 1.34 | 142 | 98 | 95 | 0.47 |
| | 4 | 0.2 | 1.22 | 140 | 100 | 93 | 0.45 |
| | 5 | 0.16 | 0.97 | 139 | 101 | 93 | 0.40 |
| | 6 | 0.14 | 0.85 | 142 | 102 | 94 | 0.37 |
| 2 | 7 | 0.3 | 1.82 | 142 | 102 | 94 | 0.55 |
| | 8 | 0.26 | 1.58 | 141 | 102 | 94 | 0.51 |
| | 9 | 0.24 | 1.46 | 140 | 102 | 94 | 0.49 |
| | 10 | 0.2 | 1.22 | 140 | 102 | 94 | 0.45 |
| | 11 | 0.16 | 0.97 | 139 | 103 | 95 | 0.40 |
| | 12 | 0.14 | 0.85 | 140 | 102 | 95 | 0.37 |

# APPENDIX – B

**Field Data Sheets**
**- Chlorine and Flow Data Sheets**
**- Carbon Monoxide Data**

M CTM-027

HCl

AMBIENT AIR SERVICES
106 AMBIENT AIR WAY
STARKE FL. 32091 (904) 964-8440

**SOURCE SAMPLING FIELD DATA SHEET**

FACILITY: GP Palatka
SOURCE: Bleach
WEATHER: Partial Clouds
TYPE TEST: 027
TESTERS: RW, R
12 PTS. @ 5 MIN/PT = _____ MIN F.D.A. = .94
Y meter = .998 Filter No. = _____
COMMENTS: Nozzle .275, .275, .273 Avg .275

RUN No. 1
DATE: 10/29/02

BAROMETRIC PRESS. 30.03
METER BOX ID: ~~RS1~~ #10
METER DELTA H: 2.050
PROBE ID: 6B
PITOT CORR. FACTOR 0.84
NOZZLE DIA. 0.275 in.
PROBE TEMP. N/A
STACK ID (IN.)= 42
UP/DOWN STREAM 28 72

PRE-TEST.
Ts = 142 602
Tm = 105 565

CO2 _____
O2 20.9
CO _____

| | | | |
|---|---|---|---|
| TIME | START 1218 | START VOLUME 156.450 | -1.9 |
| TIME | END | END VOLUME 193.480 | |

PORT LENGTH (IN) 7" Factors: F = 6.01

9188.69
1529.08

LEAK CHECK: PRE.TEST 0 CFM@15". POST: _____ " Hg.
PITOT LEAK CHECK = _____ AT 3"
VOL. WATER COLLECTED = ML ~~206~~ 81
WEIGHT MOIS. SILICA GEL = _____ GR
STAT.PRESS= -1.9

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORRIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGER TEMP. | VACUUM INCHES Hg. | PROBE GAS TEMP. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1- | 0 ~~2.5~~ | 156.450 | .26 | 1.6 | 142 | 106 | 240 | 76 | 5 | N/A | a) .005053 |
| 2 | 5 5 | 159.8 | .26 | 1.6 | 142 | 107 | 247 | 70 | 5.5 | | b) 1529.08 |
| 3 ~~2~~ | 10 ~~7.5~~ | 162.9 | .23 | 1.4 | 145 | 107 | 255 | 66 | 5 | | c) 1158.25 |
| 4 | 15 ~~10~~ | 166.0 | .22 | ~~1.4~~ 1.3 | 145 | 108 | 222 | ~~59~~ 66 | 5 | | |
| 5 3 | ~~20~~ ~~12.5~~ | 169.2 | .18 | 1.1 | 143 | 110 | 220 | 60 | 5 | | |
| 6 | 25 ~~15~~ | 172.1 | .16 | .96 | 141 | 111 | 260 | 61 | 4.5 | | |
| 2-1 ~~4~~ | 30 ~~17.5~~ | 174.98 | .26 | 1.6 | 144 | 113 | 220 | 64 | 5.5 | | |
| 2 | 35 ~~20~~ | 178.0 | .~~27~~ 24 | 1.6 | 145 | 114 | 274 | 62 | 5.5 | | |
| 3 ~~5~~ | 40 ~~22.5~~ | 181.6 | .22 | 1.3 | 148 | 115 | 247 | 62 | 5.5 | | |
| 4 | 45 ~~25~~ | ~~184.6~~ 184.6 | .18 | 1.1 | 148 | 117 | 208 | 63 | 5.5 | | |
| 5 ~~6~~ | 50 ~~27.5~~ | 187.7 | .18 | 1.1 | 145 | 118 | 264 | 63 | 5.5 | | |
| 6 | 55 ~~30~~ | 190.7 | .16 | .96 | 143 | 118 | 229 | 64 | 5 | | |
| | 60 | 193.480 | — | — | — | — | — | — | — | | |

CTM-027 HCL

206
406

AMBIENT AIR SERVICES
106 AMBIENT AIR WAY
STARKE FL. 32091 (904) 964-8440

**SOURCE SAMPLING FIELD DATA SHEET**

FACILITY: GP Palatka
SOURCE: Bleach Plant
WEATHER: Partial Clouds
TYPE TEST: CTM-027
TESTERS: RW, RD
12 PTS. @ 5 MIN/PT = 60 MIN F.D.A. = .94
Y meter = 0.998 Filter No. =
COMMENTS:

RUN No. 2
DATE: 10/29/02

BAROMETRIC PRESS. 30.03
METER BOX ID: ~~RS1~~ 10
METER DELTA H: 2.050
PROBE ID: 6B
PITOT CORR. FACTOR 0.84
NOZZLE DIA. 0.275 in.
PROBE TEMP. N/A
STACK ID (IN.)= 42"
UP/DOWN STREAM 28 22

PRE-TEST
Ts = ~~140~~ 193 ~~600~~ 605
Tm = ~~105~~ 111 ~~565~~ 571

CO2
O2 20.9
CO

9286.22
1570 X 1170.55 X 0.0050
1536.7

| | | | | |
|---|---|---|---|---|
| TIME | START | 1733 | START VOLUME | 195,055 |
| TIME | END | 1538 | END VOLUME | |

Static -.16

PORT LENGTH (IN) 7" Factors: 6.04

LEAK CHECK: PRE.TEST 0 CFM@15". POST: .015 8 " Hg.
PITOT LEAK CHECK = OK AT 3"
VOL. WATER COLLECTED = 66 ML
WEIGHT MOIS. SILICA GEL = GR
STAT.PRESS= -.16

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORRIFICE PRESS. DROP | STACK GAS TEMP | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGER TEMP. | VACUUM INCHES Hg. | PROBE GAS TEMP. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 ~~1~~ | 0 ~~2.5~~ | 195,055 | .21 | 1.3 | ~~145~~ HSR | 115 | 125 | 76 | ~~20~~ 5 | N/A | a) $(.275^2 \times .94)^2$ |
| 2 | 5 ~~5~~ | 197.7 | .2 | 1.2 | 145 | 117 | 274 | 60 | 6 | | b) $(1.6 \times .94)605$ |
| 3 ~~2~~ | 10 ~~7.5~~ | 201.1 | .16 | .96 | 146 | 118 | 254 | 59 | 4.5 | | c) $571 \times 2.05$ |
| 4 | 15 ~~10~~ | 205.8 | .16 | .96 | 147 | 118 | 220 | 60 | 4.5 | | |
| 5 ~~3~~ | 20 ~~12.5~~ | 206.5 | .16 | .96 | 145 | 119 | 263 | 56 | 4.5 | | |
| 6 | 25 ~~15~~ | 209.2 | .12 | .72 | 139 | 120 | 245 | 54 | 4 | | |
| 2-1 ~~4~~ | 30 ~~17.5~~ | ~~3~~ 211.665 | .25 | 1.5 | 146 | 120 | 274 | 54 | 5 | | |
| 2 | 35 ~~20~~ | 214.7 | .25 | 1.5 | 146 | 120 | 238 | 50 | 5 | | |
| 3 ~~5~~ | 40 ~~22.5~~ | 218.0 | .22 | 1.3 | 147 | 121 | 284 | 52 | 5 | | |
| 4 | 45 ~~25~~ | 221.2 | .22 | 1.3 | 147 | 121 | 272 | 52 | 5 | | |
| 5 ~~6~~ | 50 ~~27.5~~ | 224.4 | .18 | 1.1 | 144 | 121 | 221 | 54 | 5 | | |
| 6 | 55 ~~30~~ | 227.4 | .16 | .96 | 143 | 121 | 259 | 55 | 4.5 | | |
| | 60 | 230.2 | — | — | — | — | — | — | — | | |

AMBIENT AIR SERVICES
106 AMBIENT AIR WAY
STARKE FL. 32091 (904) 964-8440

# SOURCE SAMPLING FIELD DATA SHEET

FACILITY: GP Palatka
SOURCE: Bleach Plant
WEATHER: Partial Clouds PRE-TEST.
TYPE TEST: CTM-027 HCl Ts = 745 605
TESTERS: RW Tm = ~~745~~ 115 585
12 PTS. @ 5 MIN/PT = 60 MIN F.D.A. = .94
Y meter = 0.998 Filter No. =
COMMENTS:

RUN No. 3
DATE: 10/29/02
CO2
O2
CO

BAROMETRIC PRESS. 30.03
METER BOX ID: ~~RS1~~ ~~#10~~
METER DELTA H: 2.05
PROBE ID: 613
PITOT CORR. FACTOR 0.84
NOZZLE DIA. 0.275 in.
PROBE TEMP. N/A
STACK ID (IN.)= 42
UP/DOWN STREAM >8 >2

| | | | | |
|---|---|---|---|---|
| TIME | START | 1700 | START VOLUME | 230.750 |
| TIME | END | 1802 | END VOLUME | 269.62 |

-.15

PORT LENGTH (IN) 7" Factors: 6.04

LEAK CHECK: PRE.TEST 0 CFM@15". POST: " Hg.
PITOT LEAK CHECK = OK AT 3"
VOL. WATER COLLECTED = 68 ML
WEIGHT MOIS. SILICA GEL = GR
STAT.PRESS= -.15

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORRIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGER TEMP. | VACUUM INCHES Hg. | PROBE GAS TEMP. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 ~~1~~ | 0 ~~2.5~~ | 230.750 | .26 | 1.6 | 144 | 109 | 250 | 63 | 5.5 | N/A | |
| 2 | 5 ~~5~~ | 234.0 | .28 | 1.7 | 142 | 102 | 243 | 52 | 5.5 | | |
| 3 ~~2~~ | 10 ~~7.5~~ | 237.5 | .26 | 1.6 | 144 | 107 | 278 | 51 | 5.5 | | |
| 4 | 15 ~~10~~ | 240.9 | .25 | 1.6 | 143 | 107 | 240 | 50 | 5.5 | | |
| 5 ~~3~~ | 20 ~~12.5~~ | 244.3 | .2 | 1.2 | 141 | 107 | 237 | 50 | 5.5 | | |
| 6 | 25 ~~15~~ | 247.5 | .18 | 1.1 | 140 | 107 | 291 | 50 | 5 | | |
| 2-1 ~~4~~ | 30 ~~17.5~~ | 250.56 | .26 | 1.6 | 141 | 106 | 222 | 52 | 7 | | |
| 2 | 35 ~~20~~ | 254.2 | .28 | 1.7 | 143 | 106 | 278 | 50 | 7 | | |
| 3 ~~5~~ | 40 ~~22.5~~ | 257.8 | .22 | 1.3 | 144 | 106 | 263 | 50 | 6 | | |
| 4 | 45 ~~25~~ | 261.0 | .2 | 1.2 | 142 | 105 | 225 | 50 | 5 | | |
| 5 ~~6~~ | 50 ~~27.5~~ | 264.2 | .18 | 1.1 | 142 | 105 | 225 | 50 | 5 | | |
| 6 | 55 ~~30~~ | 266.9 | .18 | 1.1 | 140 | 105 | 242 | 50 | 5 | | |
| | 60 | 269.620 | — | — | — | — | — | — | — | | |

**Best Available Copy**

AMBIENT AIR SERVICES, INC.
STARKE, FL
(904)964-8440

**SOURCE SAMPLING FIELD DATA SHEET**

FACILITY: Georgia-Pacific, Palatka
SOURCE: Bleach Plant
WEATHER: p. cloudy
TYPE TEST: HCl method 26A
TESTERS:
__12_ PTS. @ _5___ MIN/PT = _60__ MIN
Y meter = 0.998
COMMENTS:

RUN No. 1
DATE: 10/31/02

BAROMETRIC PRESS _____
METER BOX ID 10
METER DELTA Ha 2.05
PROBE ID _____
PITOT CORR. FACTOR 0.84
NOZZLE DIA. 0.275 in.
PROBE TEMP. ~250
STACK ID (IN): 42"
PORT LENGTH 6"

PRE-TES
Ts = _____
Tm = 94 - 85d
F.D.A. = 0.94
Filter No. = _____

ORSAT:
CO2 _____
O2 _____
CO _____

| | | | |
|---|---|---|---|
| TIME START | 1332 | START VOLUME | 275.210 |
| TIME END | 1443 | END VOLUME | |

Factors: _____

F=1570(aXc)/b
a = (Dn^2XFDA)^2
b= (1.6+FDA)Ts
c= Tm X DHa

LEAK CHECK: PRE.TEST 0.012 CFM@15". POS 0.016/0 " Hg.

PITOT LEAK CHECK = OK AT 3"

VOL.WATER COLLECT = 68 ML
WT. MOIS. SILICA GE = GR

STAT.PRESS=

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | METER - TEMP (F) | FILTER TEMP. (F) | LAST IMPINGE TEMP. | VACUUM INCHES Hg. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 0 | 275.210 | 0.28 | 1.70 | 142 | 100 | 101 | 246 | 64 | <5 | A) 0.0051 b) 254 Ts C) 1088 = 1164 T(144) = 6.08 |
| 2 | 5 | 78.64 | 0.26 | 1.58 | 144 | 102 | 100 | 256 | 56 | <6 | |
| 3 | 10 | 82.01 | 0.24 | 1.45 | 141 | 103 | 99 | 258 | 56 | <5 | |
| 4 | 15 | 85.32 | 0.18 | 1.09 | 141 | 105 | 100 | 259 | 55 | <5 | |
| 5 | 20 | 88.35 | 0.16 | 0.97 | 141 | 108 | 101 | 260 | 56 | <5 | |
| 6 | 25 | 91.11 | 0.14 | 0.85 | 142 | 108 | 102 | 258 | 56 | <5 | |
| 2-1 | 30 | 94.185 | 0.27 | 1.64 | 141 | 109 | 103 | 261 | 57 | <6 | |
| 2 | 35 | 97.45 | 0.29 | 1.76 | 141 | 109 | 103 | 260 | 55 | <5 | |
| 3 | 40 | 300.74 | 0.27 | 1.64 | 142 | 109 | 103 | 262 | 55 | <6 | |
| 4 | 45 | 04.18 | 0.24 | 1.45 | 142 | 109 | 102 | 259 | 56 | <6 | |
| 5 | 50 | 07.71 | 0.18 | 1.09 | 144 | 109 | 102 | 261 | 56 | <5 | |
| 6 | 55 | 10.44 | 0.16 | 0.97 | 143 | 109 | 102 | 258 | 56 | <5 | |
| | 60 | 313.155 | --- | --- | --- | --- | --- | --- | --- | --- | |

1-1 0
2 5
3 10.4
4 20.0
5 36.0
6 49.2
2 90

AMBIENT AIR SERVICES, INC.
STARKE, FL
(904)964-8440

**SOURCE SAMPLING FIELD DATA SHEET**

FACILITY: **Georgia-Pacific, Palatka**

SOURCE: **Bleach Plant**

WEATHER: cloudy

TYPE TEST: HCl method 26A

TESTERS: _____

__12_ PTS. @ _5___ MIN/PT = _60__ MIN

Y meter = 0.998 Filter No. = _____

COMMENTS: _____

RUN No. 2

DATE: 10/31/02

PRE-TES

Ts = _____

Tm = _____

F.D.A. = _____

ORSAT:

CO2 _____

O2 _____

CO _____

BAROMETRIC PRESS _____

METER BOX ID 10

METER DELTA Ha 2.050

PROBE ID _____

PITOT CORR. FACTOR 0.84

NOZZLE DIA. 0.275 in.

PROBE TEMP. ~250

STACK ID (IN): 42

PORT LENGTH 6

| | | | |
|---|---|---|---|
| TIME START | 1550 | START VOLUME | 321.080 |
| TIME END | 1656 | END VOLUME | 359.105 |

Factors: _____

F=1570(aXc)/b

a = (Dn^2XFDA)^2

b= (1.6+FDA)Ts

c= Tm X DHa

LEAK CHECK:
PRE.TEST 0.014 CFM@15". POS 0.009 " Hg.

PITOT LEAK CHECK = ok AT 3"

VOL.WATER COLLECT = 68 ML
WT. MOIS. SILICA GEL = GR

STAT.PRESS= -0.14

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGE TEMP. | VACUUM INCHES Hg. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 0 | 321.080 | 0.27 | 1.64 | 140 | 94 | 93 | 243 | 61 | <5 | |
| 2 | 5 | 24.27 | 0.28 | 1.70 | 141 | 95 | 93 | 256 | 55 | <6 | |
| 3 | 10 | 28.91 | 0.24 | 1.45 | 143 | 103 | 96 | 258 | 56 | <6 | |
| 4 | 15 | 31.16 | 0.22 | 1.34 | 145 | 103 | 96 | 260 | 56 | <6 | |
| 5 | 20 | 34.18 | 0.18 | 1.09 | 144 | 105 | 97 | 262 | 56 | <5 | |
| 6 | 25 | 37.14 | 0.16 | 0.97 | 144 | 105 | 97 | 259 | 56 | <5 | |
| 2-1 | 30 | 339.69 | 0.29 | 1.76 | 141 | 105 | 97 | 262 | 55 | <6 | |
| 2 | 35 | 43.12 | 0.30 | 1.82 | 142 | 105 | 97 | 260 | 56 | <6 | |
| 3 | 40 | 47.32 | 0.22 | 1.34 | 144 | 108 | 99 | 258 | 56 | <6 | |
| 4 | 45 | 50.51 | 0.20 | 1.22 | 145 | 108 | 98 | 260 | 57 | <6 | |
| 5 | 50 | 53.54 | 0.16 | 0.97 | 144 | 108 | 98 | 261 | 56 | <5 | |
| 6 | 55 | 56.52 | 0.14 | 0.85 | 144 | 108 | 97 | 259 | 56 | <5 | |
| | 60 | 359.105 | --- | --- | --- | --- | --- | --- | --- | --- | |

AMBIENT AIR SERVICES, INC.
STARKE, FL
(904)964-8440

**SOURCE SAMPLING FIELD DATA SHEET**

FACILITY: Georgia-Pacific, Palatka
SOURCE: Bleach Plant
WEATHER: cloudy
TYPE TEST: HCl method 26A
TESTERS: GH, RB
__12_ PTS. @ _5___ MIN/PT = _60__ MIN
Y meter = 0.998
COMMENTS:

RUN No. 3
DATE: 10/31/03
PRE-TES
Ts = _____
Tm = _____
F.D.A. = _____
Filter No. = _____

ORSAT:
CO2 _____
O2 _____
CO _____

BAROMETRIC PRESS _____
METER BOX ID 10
METER DELTA Ha 2.050
PROBE ID _____
PITOT CORR. FACTOR 0.84
NOZZLE DIA. 0.275 in.
PROBE TEMP. ~250
STACK ID (IN): 43
PORT LENGTH 6"

| | | | |
|---|---|---|---|
| TIME START | ~~1710~~ 1710 | START VOLUME | 359.405 |
| TIME END | 1816 | END VOLUME | 396.405 |

Factors: _____

F=1570(aXc)/b
a = (Dn^2XFDA)^2
b= (1.6+FDA)Ts
c= Tm X DHa

LEAK CHECK:
PRE.TEST 0.008 CFM@15". POS 0.006/7 " Hg.

PITOT LEAK CHECK = OK AT 3"

VOL.WATER COLLECT = 70 ML
WT. MOIS. SILICA GEL = _____ GR

STAT.PRESS= -0.16

| PORT & SAMPLE POINT | CLOCK TIME | GAS METER READING | STACK VELOCITY Dp | ORIFICE PRESS. DROP | STACK GAS TEMP. | METER TEMP (F) | METER TEMP (F) | FILTER TEMP. (F) | LAST IMPINGE TEMP. | VACUUM INCHES Hg. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-1 | 0 | 359.405 | 0.30 | 1.70 | 138 | 97 | 95 | 243 | 59 | <6 | |
| 2 | 5 | 62.62 | 0.26 | 1.58 | 140 | 100 | 96 | 257 | 54 | <6 | |
| 3 | 10 | 66.36 | 0.22 | 1.34 | 142 | 98 | 95 | 260 | 54 | <6 | |
| 4 | 15 | 69.28 | 0.20 | 1.21 | 140 | 100 | 93 | 257 | 54 | <6 | |
| 5 | 20 | 72.31 | 0.16 | 0.97 | 139 | 101 | 93 | 259 | 54 | <6 | |
| 6 | 25 | 77.50 | 0.14 | 0.85 | 142 | 103 | 94 | 260 | 54 | <6 | |
| 2-1 | 30 | 77.92 | 0.30 | 1.82 | 142 | 102 | 94 | 258 | 54 | <6 | |
| 2 | 35 | 81.40 | 0.26 | 1.58 | 141 | 102 | 94 | 259 | 55 | <6 | |
| 3 | 40 | 84.84 | 0.24 | 1.46 | 140 | 102 | 94 | 262 | 55 | <6 | |
| 4 | 45 | 88.22 | 0.20 | 1.21 | 140 | 102 | 94 | 263 | 55 | <6 | |
| 5 | 50 | 91.11 | 0.16 | 0.97 | 139 | 103 | 95 | 264 | 56 | <6 | |
| 6 | 55 | 93.91 | 0.14 | 0.85 | 140 | 102 | 95 | 263 | 55 | <6 | |
| | 60 | 396.405 | --- | --- | --- | --- | --- | --- | --- | --- | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 29, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/29/02 12:01 | 1982.2 | | 1994 CO Cal | | | | | | |
| 10/29/02 12:02 | 1929.0 | | | | | | | | |
| 10/29/02 12:03 | 982.2 | | | | | | | | |
| 10/29/02 12:04 | 995.6 | | 991 CO Cal | | | | | | |
| 10/29/02 12:05 | 995.1 | | 991 CO Cal | | | | | | |
| 10/29/02 12:06 | 621.1 | | | | | | | | |
| 10/29/02 12:07 | 580.7 | | | | | | | | |
| 10/29/02 12:08 | 588.0 | | 594.4 CO Cal | | | | | | |
| 10/29/02 12:09 | 588.0 | | 594.4 CO Cal | | | | | | |
| 10/29/02 12:10 | 588.0 | | 594.4 CO Cal | | | | | | |
| 10/29/02 12:11 | 572.3 | | | | | | | | |
| 10/29/02 12:12 | 279.5 | | | | | | | | |
| 10/29/02 12:13 | 299.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 12:14 | 299.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 12:15 | 299.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 12:16 | 299.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 12:17 | 299.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 12:18 | 234.7 | | | | | | | | |
| 10/29/02 12:19 | 10.2 | | | | | | | | |
| 10/29/02 12:20 | 4.0 | | 0 CO Cal | | | | | | |
| 10/29/02 12:21 | 4.6 | | | | | | | | |
| 10/29/02 12:22 | 454.3 | | | | | | | | |
| 10/29/02 12:23 | 917.7 | | | | | | | | |
| 10/29/02 12:24 | 994.3 | | | | | | | | |
| 10/29/02 12:25 | 969.3 | 1 | | 4.80 | 996.85 | 991.00 | 963.5 | 12068 | 54.35 |
| 10/29/02 12:26 | 984.3 | 1 | | 4.80 | 996.85 | 991.00 | 978.5 | 12676 | 57.97 |
| 10/29/02 12:27 | 1002.7 | 1 | | 4.80 | 996.85 | 991.00 | 996.8 | 12676 | 59.06 |
| 10/29/02 12:28 | 987.7 | 1 | | 4.80 | 996.85 | 991.00 | 981.8 | 12676 | 58.17 |
| 10/29/02 12:29 | 981.0 | 1 | | 4.80 | 996.85 | 991.00 | 975.2 | 12676 | 57.78 |
| 10/29/02 12:30 | 996.0 | 1 | | 4.80 | 996.85 | 991.00 | 990.2 | 12676 | 58.67 |
| 10/29/02 12:31 | 1009.3 | 1 | | 4.80 | 996.85 | 991.00 | 1003.5 | 12676 | 59.45 |
| 10/29/02 12:32 | 987.7 | 1 | | 4.80 | 996.85 | 991.00 | 981.8 | 12676 | 58.17 |
| 10/29/02 12:33 | 997.7 | 1 | | 4.80 | 996.85 | 991.00 | 991.8 | 12676 | 58.76 |
| 10/29/02 12:34 | 1004.3 | 1 | | 4.80 | 996.85 | 991.00 | 998.5 | 12676 | 59.16 |
| 10/29/02 12:35 | 996.0 | 1 | | 4.80 | 996.85 | 991.00 | 990.2 | 12676 | 58.67 |
| 10/29/02 12:36 | 992.7 | 1 | | 4.80 | 996.85 | 991.00 | 986.8 | 12676 | 58.47 |
| 10/29/02 12:37 | 976.0 | 1 | | 4.80 | 996.85 | 991.00 | 970.2 | 12676 | 57.48 |
| 10/29/02 12:38 | 961.0 | 1 | | 4.80 | 996.85 | 991.00 | 955.2 | 12676 | 56.59 |
| 10/29/02 12:39 | 954.3 | 1 | | 4.80 | 996.85 | 991.00 | 948.5 | 12676 | 56.20 |
| 10/29/02 12:40 | 972.7 | 1 | | 4.80 | 996.85 | 991.00 | 966.8 | 12676 | 57.28 |
| 10/29/02 12:41 | 959.3 | 1 | | 4.80 | 996.85 | 991.00 | 953.5 | 12676 | 56.50 |
| 10/29/02 12:42 | 949.3 | 1 | | 4.80 | 996.85 | 991.00 | 943.5 | 12676 | 55.90 |
| 10/29/02 12:43 | 977.7 | 1 | | 4.80 | 996.85 | 991.00 | 971.8 | 12676 | 57.58 |
| 10/29/02 12:44 | 971.0 | 1 | | 4.80 | 996.85 | 991.00 | 965.2 | 12676 | 57.19 |
| 10/29/02 12:45 | 974.3 | 1 | | 4.80 | 996.85 | 991.00 | 968.5 | 12676 | 57.38 |
| 10/29/02 12:46 | 981.0 | 1 | | 4.80 | 996.85 | 991.00 | 975.2 | 12676 | 57.78 |
| 10/29/02 12:47 | 956.0 | 1 | | 4.80 | 996.85 | 991.00 | 950.2 | 12676 | 56.30 |
| 10/29/02 12:48 | 966.0 | 1 | | 4.80 | 996.85 | 991.00 | 960.2 | 12676 | 56.89 |
| 10/29/02 12:49 | 957.7 | 1 | | 4.80 | 996.85 | 991.00 | 951.9 | 12676 | 56.40 |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 29, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/29/02 12:50 | 926.0 | 1 | | 4.80 | 996.85 | 991.00 | 920.2 | 12676 | 54.52 |
| 10/29/02 12:51 | 937.7 | 1 | | 4.80 | 996.85 | 991.00 | 931.9 | 12676 | 55.21 |
| 10/29/02 12:52 | 906.0 | 1 | | 4.80 | 996.85 | 991.00 | 900.2 | 12676 | 53.34 |
| 10/29/02 12:53 | 934.3 | 1 | | 4.80 | 996.85 | 991.00 | 928.5 | 12676 | 55.02 |
| 10/29/02 12:54 | 926.0 | 1 | | 4.80 | 996.85 | 991.00 | 920.2 | 12676 | 54.52 |
| 10/29/02 12:55 | 887.7 | 1 | | 4.80 | 996.85 | 991.00 | 881.9 | 12676 | 52.25 |
| 10/29/02 12:56 | 912.7 | 1 | | 4.80 | 996.85 | 991.00 | 906.9 | 12676 | 53.73 |
| 10/29/02 12:57 | 921.0 | 1 | | 4.80 | 996.85 | 991.00 | 915.2 | 12676 | 54.23 |
| 10/29/02 12:58 | 929.3 | 1 | | 4.80 | 996.85 | 991.00 | 923.6 | 12676 | 54.72 |
| 10/29/02 12:59 | 962.7 | 1 | | 4.80 | 996.85 | 991.00 | 956.9 | 12676 | 56.69 |
| 10/29/02 13:00 | 956.0 | 1 | | 4.80 | 996.85 | 991.00 | 950.2 | 12676 | 56.30 |
| 10/29/02 13:01 | 979.3 | 1 | | 4.80 | 996.85 | 991.00 | 973.5 | 12676 | 57.68 |
| 10/29/02 13:02 | 979.3 | 1 | | 4.80 | 996.85 | 991.00 | 973.5 | 12676 | 57.68 |
| 10/29/02 13:03 | 1002.7 | 1 | | 4.80 | 996.85 | 991.00 | 996.8 | 12676 | 59.06 |
| 10/29/02 13:04 | 1026.0 | 1 | | 4.80 | 996.85 | 991.00 | 1020.1 | 12676 | 60.44 |
| 10/29/02 13:05 | 1011.0 | 1 | | 4.80 | 996.85 | 991.00 | 1005.1 | 12676 | 59.55 |
| 10/29/02 13:06 | 1012.7 | 1 | | 4.80 | 996.85 | 991.00 | 1006.8 | 12676 | 59.65 |
| 10/29/02 13:07 | 1014.3 | 1 | | 4.80 | 996.85 | 991.00 | 1008.5 | 12676 | 59.75 |
| 10/29/02 13:08 | 996.0 | 1 | | 4.80 | 996.85 | 991.00 | 990.2 | 12676 | 58.67 |
| 10/29/02 13:09 | 1014.3 | 1 | | 4.80 | 996.85 | 991.00 | 1008.5 | 12676 | 59.75 |
| 10/29/02 13:10 | 1026.0 | 1 | | 4.80 | 996.85 | 991.00 | 1020.1 | 12676 | 60.44 |
| 10/29/02 13:11 | 1007.7 | 1 | | 4.80 | 996.85 | 991.00 | 1001.8 | 12676 | 59.36 |
| 10/29/02 13:12 | 1036.0 | 1 | | 4.80 | 996.85 | 991.00 | 1030.1 | 12676 | 61.03 |
| 10/29/02 13:13 | 1024.3 | 1 | | 4.80 | 996.85 | 991.00 | 1018.5 | 12676 | 60.34 |
| 10/29/02 13:14 | 1001.0 | 1 | | 4.80 | 996.85 | 991.00 | 995.1 | 12676 | 58.96 |
| 10/29/02 13:15 | 1017.7 | 1 | | 4.80 | 996.85 | 991.00 | 1011.8 | 12676 | 59.95 |
| 10/29/02 13:16 | 1032.7 | 1 | | 4.80 | 996.85 | 991.00 | 1026.8 | 12676 | 60.84 |
| 10/29/02 13:17 | 1027.7 | 1 | | 4.80 | 996.85 | 991.00 | 1021.8 | 12676 | 60.54 |
| 10/29/02 13:18 | 1011.0 | 1 | | 4.80 | 996.85 | 991.00 | 1005.1 | 12676 | 59.55 |
| 10/29/02 13:19 | 1024.3 | 1 | | 4.80 | 996.85 | 991.00 | 1018.5 | 12676 | 60.34 |
| 10/29/02 13:20 | 1026.0 | 1 | | 4.80 | 996.85 | 991.00 | 1020.1 | 12676 | 60.44 |
| 10/29/02 13:21 | 1036.0 | 1 | | 4.80 | 996.85 | 991.00 | 1030.1 | 12676 | 61.03 |
| 10/29/02 13:22 | 1051.0 | 1 | | 4.80 | 996.85 | 991.00 | 1045.1 | 12676 | 61.92 |
| 10/29/02 13:23 | 1034.3 | 1 | | 4.80 | 996.85 | 991.00 | 1028.4 | 12676 | 60.93 |
| 10/29/02 13:24 | 1034.3 | 1 | | 4.80 | 996.85 | 991.00 | 1028.4 | 12676 | 60.93 |
| 10/29/02 13:25 | 1037.7 | | | ***Run 1 Average*** | | | ***979.0*** | | **57.96** |
| 10/29/02 13:26 | 771.0 | | | | | | | | |
| 10/29/02 13:27 | 54.0 | | | | | | | | |
| 10/29/02 13:28 | 13.8 | | | | | | | | |
| 10/29/02 13:29 | 13.8 | | | | | | | | |
| 10/29/02 13:30 | 5.6 | | 0 CO Cal | | | | | | |
| 10/29/02 13:31 | 723.3 | | | | | | | | |
| 10/29/02 13:32 | 1990.0 | | | | | | | | |
| 10/29/02 13:33 | 1993.1 | | 1994 CO Cal | | | | | | |
| 10/29/02 13:34 | 1993.1 | | 1994 CO Cal | | | | | | |
| 10/29/02 13:35 | 1993.1 | | 1994 CO Cal | | | | | | |
| 10/29/02 13:36 | 1521.4 | | | | | | | | |
| 10/29/02 13:37 | 978.7 | | | | | | | | |
| 10/29/02 13:38 | 998.3 | | 991 CO Cal | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 29, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/29/02 13:39 | 645.1 | | | | | | | | |
| 10/29/02 13:40 | 587.4 | | 594.4 CO Cal | | | | | | |
| 10/29/02 13:41 | 464.9 | | | | | | | | |
| 10/29/02 13:42 | 282.6 | | | | | | | | |
| 10/29/02 13:43 | 300.1 | | 301.9 CO Cal | | | | | | |
| 10/29/02 13:44 | 204.3 | | | | | | | | |
| 10/29/02 13:45 | 212.6 | | | | | | | | |
| 10/29/02 13:46 | 1138.3 | | | | | | | | |
| 10/29/02 13:47 | 1186.7 | | | | | | | | |
| 10/29/02 13:48 | 1184.7 | | | | | | | | |
| 10/29/02 13:49 | 1186.7 | | | | | | | | |
| 10/29/02 13:50 | 1190.9 | | | | | | | | |
| 10/29/02 13:51 | 1201.2 | | | | | | | | |
| 10/29/02 13:52 | 1212.5 | | | | | | | | |
| 10/29/02 13:53 | 1192.9 | | | | | | | | |
| 10/29/02 13:54 | 1207.3 | | | | | | | | |
| 10/29/02 13:55 | 1193.9 | | | | | | | | |
| 10/29/02 13:56 | 1187.8 | | | | | | | | |
| 10/29/02 13:57 | 1191.9 | | | | | | | | |
| 10/29/02 13:58 | 1190.9 | | | | | | | | |
| 10/29/02 13:59 | 1208.4 | | | | | | | | |
| 10/29/02 14:00 | 1241.3 | | | | | | | | |
| 10/29/02 14:01 | 1223.8 | | | | | | | | |
| 10/29/02 14:02 | 1219.7 | | | | | | | | |
| 10/29/02 14:03 | 1213.5 | | | | | | | | |
| 10/29/02 14:04 | 1212.5 | | | | | | | | |
| 10/29/02 14:05 | 1235.1 | | | | | | | | |
| 10/29/02 14:06 | 1251.6 | | | | | | | | |
| 10/29/02 14:07 | 1234.1 | | | | | | | | |
| 10/29/02 14:08 | 1223.8 | | | | | | | | |
| 10/29/02 14:09 | 1224.8 | | | | | | | | |
| 10/29/02 14:10 | 1227.9 | | | | | | | | |
| 10/29/02 14:11 | 1269.1 | | | | | | | | |
| 10/29/02 14:12 | 1271.2 | | | | | | | | |
| 10/29/02 14:13 | 1253.7 | | | | | | | | |
| 10/29/02 14:14 | 1269.1 | | | | | | | | |
| 10/29/02 14:15 | 1250.6 | | | | | | | | |
| 10/29/02 14:16 | 1227.9 | | | | | | | | |
| 10/29/02 14:17 | 1246.5 | | | | | | | | |
| 10/29/02 14:18 | 1245.4 | | | | | | | | |
| 10/29/02 14:19 | 1193.9 | | | | | | | | |
| 10/29/02 14:20 | 1220.7 | | | | | | | | |
| 10/29/02 14:21 | 1215.6 | | | | | | | | |
| 10/29/02 14:22 | 1155.8 | | | | | | | | |
| 10/29/02 14:23 | 1162.0 | | | | | | | | |
| 10/29/02 14:24 | 1153.8 | | | | | | | | |
| 10/29/02 14:25 | 1111.6 | | | | | | | | |
| 10/29/02 14:26 | 1081.7 | | | | | | | | |
| 10/29/02 14:27 | 1051.8 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 29, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/29/02 14:28 | 1024.0 | | | | | | | | |
| 10/29/02 14:29 | 1026.1 | | | | | | | | |
| 10/29/02 14:30 | 1002.4 | | | | | | | | |
| 10/29/02 14:31 | 1007.6 | | | | | | | | |
| 10/29/02 14:32 | 978.7 | | | | | | | | |
| 10/29/02 14:33 | 961.2 | 2 | | 4.05 | 997.8 | 991 | 954.5 | 12068 | 53.84 |
| 10/29/02 14:34 | 960.2 | 2 | | 4.05 | 997.8 | 991 | 953.5 | 12068 | 53.78 |
| 10/29/02 14:35 | 933.4 | 2 | | 4.05 | 997.8 | 991 | 926.8 | 12068 | 52.28 |
| 10/29/02 14:36 | 940.6 | 2 | | 4.05 | 997.8 | 991 | 934.0 | 12068 | 52.68 |
| 10/29/02 14:37 | 930.3 | 2 | | 4.05 | 997.8 | 991 | 923.7 | 12068 | 52.10 |
| 10/29/02 14:38 | 905.6 | 2 | | 4.05 | 997.8 | 991 | 899.1 | 12068 | 50.71 |
| 10/29/02 14:39 | 923.1 | 2 | | 4.05 | 997.8 | 991 | 916.5 | 12068 | 51.70 |
| 10/29/02 14:40 | 895.3 | 2 | | 4.05 | 997.8 | 991 | 888.8 | 12068 | 50.13 |
| 10/29/02 14:41 | 897.4 | 2 | | 4.05 | 997.8 | 991 | 890.8 | 12068 | 50.25 |
| 10/29/02 14:42 | 901.5 | 2 | | 4.05 | 997.8 | 991 | 894.9 | 12068 | 50.48 |
| 10/29/02 14:43 | 890.2 | 2 | | 4.05 | 997.8 | 991 | 883.7 | 12068 | 49.84 |
| 10/29/02 14:44 | 897.4 | 2 | | 4.05 | 997.8 | 991 | 890.8 | 12068 | 50.25 |
| 10/29/02 14:45 | 880.9 | 2 | | 4.05 | 997.8 | 991 | 874.4 | 12068 | 49.32 |
| 10/29/02 14:46 | 887.1 | 2 | | 4.05 | 997.8 | 991 | 880.6 | 12068 | 49.67 |
| 10/29/02 14:47 | 853.1 | 2 | | 4.05 | 997.8 | 991 | 846.7 | 12068 | 47.76 |
| 10/29/02 14:48 | 857.2 | 2 | | 4.05 | 997.8 | 991 | 850.8 | 12068 | 47.99 |
| 10/29/02 14:49 | 862.4 | 2 | | 4.05 | 997.8 | 991 | 855.9 | 12068 | 48.28 |
| 10/29/02 14:50 | 840.7 | 2 | | 4.05 | 997.8 | 991 | 834.4 | 12068 | 47.06 |
| 10/29/02 14:51 | 856.2 | 2 | | 4.05 | 997.8 | 991 | 849.8 | 12068 | 47.93 |
| 10/29/02 14:52 | 834.5 | 2 | | 4.05 | 997.8 | 991 | 828.2 | 12068 | 46.72 |
| 10/29/02 14:53 | 811.9 | 2 | | 4.05 | 997.8 | 991 | 805.6 | 12068 | 45.44 |
| 10/29/02 14:54 | 821.2 | 2 | | 4.05 | 997.8 | 991 | 814.8 | 12068 | 45.96 |
| 10/29/02 14:55 | 807.8 | 2 | | 4.05 | 997.8 | 991 | 801.5 | 12068 | 45.21 |
| 10/29/02 14:56 | 802.6 | 2 | | 4.05 | 997.8 | 991 | 796.4 | 12068 | 44.92 |
| 10/29/02 14:57 | 789.2 | 2 | | 4.05 | 997.8 | 991 | 783.0 | 12068 | 44.17 |
| 10/29/02 14:58 | 765.6 | 2 | | 4.05 | 997.8 | 991 | 759.4 | 12068 | 42.84 |
| 10/29/02 14:59 | 768.6 | 2 | | 4.05 | 997.8 | 991 | 762.5 | 12068 | 43.01 |
| 10/29/02 15:00 | 756.3 | 2 | | 4.05 | 997.8 | 991 | 750.2 | 12068 | 42.31 |
| 10/29/02 15:01 | 778.9 | 2 | | 4.05 | 997.8 | 991 | 772.7 | 12068 | 43.59 |
| 10/29/02 15:02 | 772.8 | 2 | | 4.05 | 997.8 | 991 | 766.6 | 12068 | 43.24 |
| 10/29/02 15:03 | 763.5 | 2 | | 4.05 | 997.8 | 991 | 757.3 | 12068 | 42.72 |
| 10/29/02 15:04 | 749.1 | 2 | | 4.05 | 997.8 | 991 | 743.0 | 12068 | 41.91 |
| 10/29/02 15:05 | 728.5 | 2 | | 4.05 | 997.8 | 991 | 722.4 | 12068 | 40.75 |
| 10/29/02 15:06 | 730.5 | 2 | | 4.05 | 997.8 | 991 | 724.5 | 12068 | 40.87 |
| 10/29/02 15:07 | 732.6 | 2 | | 4.05 | 997.8 | 991 | 726.5 | 12068 | 40.98 |
| 10/29/02 15:08 | 722.3 | 2 | | 4.05 | 997.8 | 991 | 716.3 | 12068 | 40.40 |
| 10/29/02 15:09 | 736.7 | 2 | | 4.05 | 997.8 | 991 | 730.6 | 12068 | 41.21 |
| 10/29/02 15:10 | 731.6 | 2 | | 4.05 | 997.8 | 991 | 725.5 | 12068 | 40.92 |
| 10/29/02 15:11 | 742.9 | 2 | | 4.05 | 997.8 | 991 | 736.8 | 12068 | 41.56 |
| 10/29/02 15:12 | 727.4 | 2 | | 4.05 | 997.8 | 991 | 721.4 | 12068 | 40.69 |
| 10/29/02 15:13 | 735.7 | 2 | | 4.05 | 997.8 | 991 | 729.6 | 12068 | 41.16 |
| 10/29/02 15:14 | 742.9 | 2 | | 4.05 | 997.8 | 991 | 736.8 | 12068 | 41.56 |
| 10/29/02 15:15 | 735.7 | 2 | | 4.05 | 997.8 | 991 | 729.6 | 12068 | 41.16 |
| 10/29/02 15:16 | 737.7 | 2 | | 4.05 | 997.8 | 991 | 731.7 | 12068 | 41.27 |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 29, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/29/02 15:17 | 730.5 | 2 | | 4.05 | 997.8 | 991 | 724.5 | 12068 | 40.87 |
| 10/29/02 15:18 | 715.1 | 2 | | 4.05 | 997.8 | 991 | 709.1 | 12068 | 40.00 |
| 10/29/02 15:19 | 731.6 | 2 | | 4.05 | 997.8 | 991 | 725.5 | 12068 | 40.92 |
| 10/29/02 15:20 | 739.8 | 2 | | 4.05 | 997.8 | 991 | 733.7 | 12068 | 41.39 |
| 10/29/02 15:21 | 732.6 | 2 | | 4.05 | 997.8 | 991 | 726.5 | 12068 | 40.98 |
| 10/29/02 15:22 | 730.5 | 2 | | 4.05 | 997.8 | 991 | 724.5 | 12068 | 40.87 |
| 10/29/02 15:23 | 720.2 | 2 | | 4.05 | 997.8 | 991 | 714.2 | 12068 | 40.29 |
| 10/29/02 15:24 | 708.9 | 2 | | 4.05 | 997.8 | 991 | 702.9 | 12068 | 39.65 |
| 10/29/02 15:25 | 723.3 | 2 | | 4.05 | 997.8 | 991 | 717.3 | 12068 | 40.46 |
| 10/29/02 15:26 | 732.6 | 2 | | 4.05 | 997.8 | 991 | 726.5 | 12068 | 40.98 |
| 10/29/02 15:27 | 713.0 | 2 | | 4.05 | 997.8 | 991 | 707.0 | 12068 | 39.88 |
| 10/29/02 15:28 | 706.9 | 2 | | 4.05 | 997.8 | 991 | 700.9 | 12068 | 39.53 |
| 10/29/02 15:29 | 714.1 | 2 | | 4.05 | 997.8 | 991 | 708.0 | 12068 | 39.94 |
| 10/29/02 15:30 | 704.8 | 2 | | 4.05 | 997.8 | 991 | 698.8 | 12068 | 39.42 |
| 10/29/02 15:31 | 740.8 | 2 | | 4.05 | 997.8 | 991 | 734.7 | 12068 | 41.44 |
| 10/29/02 15:32 | 749.1 | 2 | | 4.05 | 997.8 | 991 | 743.0 | 12068 | 41.91 |
| 10/29/02 15:33 | 737.7 | | | ***Run 2 Average*** | | | ***788.7*** | | ***44.49*** |
| 10/29/02 15:34 | 739.8 | | | | | | | | |
| 10/29/02 15:35 | 731.6 | | | | | | | | |
| 10/29/02 15:36 | 720.2 | | | | | | | | |
| 10/29/02 15:37 | 726.4 | | | | | | | | |
| 10/29/02 15:38 | 723.3 | | | | | | | | |
| 10/29/02 15:39 | 500.9 | | | | | | | | |
| 10/29/02 15:40 | 6.6 | | | | | | | | |
| 10/29/02 15:41 | 2.5 | | 0 CO Cal | | | | | | |
| 10/29/02 15:42 | 2.5 | | 0 CO Cal | | | | | | |
| 10/29/02 15:43 | 2.5 | | 0 CO Cal | | | | | | |
| 10/29/02 15:44 | 8.7 | | | | | | | | |
| 10/29/02 15:45 | 758.3 | | | | | | | | |
| 10/29/02 15:46 | 996.2 | | 991 CO Cal | | | | | | |
| 10/29/02 15:47 | 998.3 | | 991 CO Cal | | | | | | |
| 10/29/02 15:48 | 850.0 | | | | | | | | |
| 10/29/02 15:49 | 731.6 | | | | | | | | |
| 10/29/02 15:50 | 716.1 | | | | | | | | |
| 10/29/02 15:51 | 716.1 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 7:13 | 684.2 | | | | | | | | |
| 10/31/02 7:14 | 691.4 | | | | | | | | |
| 10/31/02 7:15 | 698.6 | | | | | | | | |
| 10/31/02 7:16 | 687.3 | | | | | | | | |
| 10/31/02 7:17 | 679.0 | | | | | | | | |
| 10/31/02 7:18 | 229.0 | | | | | | | | |
| 10/31/02 7:19 | 15.9 | | | | | | | | |
| 10/31/02 7:20 | 8.7 | | 0 cal | | | | | | |
| 10/31/02 7:21 | 8.7 | | | | | | | | |
| 10/31/02 7:22 | 111.6 | | | | | | | | |
| 10/31/02 7:23 | 896.3 | | | | | | | | |
| 10/31/02 7:24 | 1019.9 | | | | | | | | |
| 10/31/02 7:25 | 1022.0 | | 991 cal | | | | | | |
| 10/31/02 7:26 | 1022.0 | | 991 cal | | | | | | |
| 10/31/02 7:27 | 1022.0 | | 991 cal | | | | | | |
| 10/31/02 7:28 | 1022.0 | | 991 cal | | | | | | |
| 10/31/02 7:29 | 1022.0 | | 991 cal | | | | | | |
| 10/31/02 7:30 | 1730.5 | | | | | | | | |
| 10/31/02 7:31 | 1993.1 | | 1994 cal | | | | | | |
| 10/31/02 7:32 | 1993.1 | | 1994 cal | | | | | | |
| 10/31/02 7:33 | 1993.1 | | 1994 cal | | | | | | |
| 10/31/02 7:34 | 1993.1 | | 1994 cal | | | | | | |
| 10/31/02 7:35 | 1993.1 | | 1994 cal | | | | | | |
| 10/31/02 7:36 | 1971.4 | | | | | | | | |
| 10/31/02 7:37 | 1009.6 | | | | | | | | |
| 10/31/02 7:38 | 610.1 | | | | | | | | |
| 10/31/02 7:39 | 602.8 | | 594 cal | | | | | | |
| 10/31/02 7:40 | 602.8 | | | | | | | | |
| 10/31/02 7:41 | 599.8 | | | | | | | | |
| 10/31/02 7:42 | 657.4 | | | | | | | | |
| 10/31/02 7:43 | 558.6 | | | | | | | | |
| 10/31/02 7:44 | 322.7 | | | | | | | | |
| 10/31/02 7:45 | 309.4 | | 301 cal | | | | | | |
| 10/31/02 7:46 | 309.4 | | | | | | | | |
| 10/31/02 7:47 | 315.5 | | | | | | | | |
| 10/31/02 7:48 | 583.3 | | | | | | #DIV/0! | | #DIV/0! |
| 10/31/02 7:49 | 679.0 | | | | | | | | |
| 10/31/02 7:50 | 680.1 | | | | | | | | |
| 10/31/02 7:51 | 688.3 | | | | | | | | |
| 10/31/02 7:52 | 679.0 | | | | | | | | |
| 10/31/02 7:53 | 673.9 | | | | | | | | |
| 10/31/02 7:54 | 676.0 | | | | | | | | |
| 10/31/02 7:55 | 661.5 | | | | | | | | |
| 10/31/02 7:56 | 670.8 | | | | | | | | |
| 10/31/02 7:57 | 682.1 | | | | | | | | |
| 10/31/02 7:58 | 687.3 | | | | | | | | |
| 10/31/02 7:59 | 683.2 | | | | | | | | |
| 10/31/02 8:00 | 666.7 | | | | | | | | |
| 10/31/02 8:01 | 683.2 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 8:02 | 678.0 | | | | | | | | |
| 10/31/02 8:03 | 673.9 | | | | | | | | |
| 10/31/02 8:04 | 681.1 | | | | | | | | |
| 10/31/02 8:05 | 692.4 | | | | | | | | |
| 10/31/02 8:06 | 672.9 | | | | | | | | |
| 10/31/02 8:07 | 692.4 | | | | | | | | |
| 10/31/02 8:08 | 698.6 | | | | | | | | |
| 10/31/02 8:09 | 680.1 | | | | | | | | |
| 10/31/02 8:10 | 687.3 | | | | | | | | |
| 10/31/02 8:11 | 685.2 | | | | | | | | |
| 10/31/02 8:12 | 680.1 | | | | | | | | |
| 10/31/02 8:13 | 689.3 | | | | | | | | |
| 10/31/02 8:14 | 691.4 | | | | | | | | |
| 10/31/02 8:15 | 682.1 | | | | | | | | |
| 10/31/02 8:16 | 690.4 | | | | | | | | |
| 10/31/02 8:17 | 688.3 | | | | | | | | |
| 10/31/02 8:18 | 690.4 | | | | | | | | |
| 10/31/02 8:19 | 688.3 | | | | | | | | |
| 10/31/02 8:20 | 674.9 | | | | | | | | |
| 10/31/02 8:21 | 682.1 | | | | | | | | |
| 10/31/02 8:22 | 697.6 | | | | | | | | |
| 10/31/02 8:23 | 682.1 | | | | | | | | |
| 10/31/02 8:24 | 682.1 | | | | | | | | |
| 10/31/02 8:25 | 693.5 | | | | | | | | |
| 10/31/02 8:26 | 687.3 | | | | | | | | |
| 10/31/02 8:27 | 692.4 | | | | | | | | |
| 10/31/02 8:28 | 680.1 | | | | | | | | |
| 10/31/02 8:29 | 689.3 | | | | | | | | |
| 10/31/02 8:30 | 694.5 | | | | | | | | |
| 10/31/02 8:31 | 681.1 | | | | | | | | |
| 10/31/02 8:32 | 687.3 | | | | | | | | |
| 10/31/02 8:33 | 687.3 | | | | | | | | |
| 10/31/02 8:34 | 667.7 | | | | | | | | |
| 10/31/02 8:35 | 664.6 | | | | | | | | |
| 10/31/02 8:36 | 667.7 | | | | | | | | |
| 10/31/02 8:37 | 655.4 | | | | | | | | |
| 10/31/02 8:38 | 670.8 | | | | | | | | |
| 10/31/02 8:39 | 667.7 | | | | | | | | |
| 10/31/02 8:40 | 674.9 | | | | | | | | |
| 10/31/02 8:41 | 691.4 | | | | | | | | |
| 10/31/02 8:42 | 693.5 | | | | | | | | |
| 10/31/02 8:43 | 704.8 | | | | | | | | |
| 10/31/02 8:44 | 717.2 | | | | | | | | |
| 10/31/02 8:45 | 717.2 | | | | | | | | |
| 10/31/02 8:46 | 728.5 | | | | | | | | |
| 10/31/02 8:47 | 721.3 | | | | | | | | |
| 10/31/02 8:48 | 720.2 | | | | | | | | |
| 10/31/02 8:49 | 719.2 | | | | | | | | |
| 10/31/02 8:50 | 719.2 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 8:51 | 714.1 | | | | | | | | |
| 10/31/02 8:52 | 708.9 | | | | | | | | |
| 10/31/02 8:53 | 699.6 | | | | | | | | |
| 10/31/02 8:54 | 702.7 | | | | | | | | |
| 10/31/02 8:55 | 688.3 | | | | | | | | |
| 10/31/02 8:56 | 698.6 | | | | | | | | |
| 10/31/02 8:57 | 700.7 | | | | | | | | |
| 10/31/02 8:58 | 695.5 | | | | | | | | |
| 10/31/02 8:59 | 705.8 | | | | | | | | |
| 10/31/02 9:00 | 707.9 | | | | | | | | |
| 10/31/02 9:01 | 701.7 | | | | | | | | |
| 10/31/02 9:02 | 711.0 | | | | | | | | |
| 10/31/02 9:03 | 709.9 | | | | | | | | |
| 10/31/02 9:04 | 705.8 | | | | | | | | |
| 10/31/02 9:05 | 721.3 | | | | | | | | |
| 10/31/02 9:06 | 681.1 | | | | | | | | |
| 10/31/02 9:07 | 678.0 | | | | | | | | |
| 10/31/02 9:08 | 681.1 | | | | | | | | |
| 10/31/02 9:09 | 679.0 | | | | | | | | |
| 10/31/02 9:10 | 679.0 | | | | | | | | |
| 10/31/02 9:11 | 680.1 | | | | | | | | |
| 10/31/02 9:12 | 673.9 | | | | | | | | |
| 10/31/02 9:13 | 680.1 | | | | | | | | |
| 10/31/02 9:14 | 674.9 | | | | | | | | |
| 10/31/02 9:15 | 673.9 | | | | | | | | |
| 10/31/02 9:16 | 676.0 | | | | | | | | |
| 10/31/02 9:17 | 663.6 | | | | | | | | |
| 10/31/02 9:18 | 667.7 | | | | | | | | |
| 10/31/02 9:19 | 664.6 | | | | | | | | |
| 10/31/02 9:20 | 648.2 | | | | | | | | |
| 10/31/02 9:21 | 642.0 | | | | | | | | |
| 10/31/02 9:22 | 633.7 | | | | | | | | |
| 10/31/02 9:23 | 618.3 | | | | | | | | |
| 10/31/02 9:24 | 616.2 | | | | | | | | |
| 10/31/02 9:25 | 609.0 | | | | | | | | |
| 10/31/02 9:26 | 597.7 | | | | | | | | |
| 10/31/02 9:27 | 566.8 | | | | | | | | |
| 10/31/02 9:28 | 553.4 | | | | | | | | |
| 10/31/02 9:29 | 78.7 | | | | | | | | |
| 10/31/02 9:30 | 6.6 | | | | | | | | |
| 10/31/02 9:31 | 16.9 | | | | | | | | |
| 10/31/02 9:32 | 263.0 | | | | | | | | |
| 10/31/02 9:33 | 614.2 | | | | | | | | |
| 10/31/02 9:34 | 685.2 | | | | | | | | |
| 10/31/02 9:35 | 680.1 | | | | | | | | |
| 10/31/02 9:36 | 689.3 | | | | | | | | |
| 10/31/02 9:37 | 685.2 | | | | | | | | |
| 10/31/02 9:38 | 673.9 | | | | | | | | |
| 10/31/02 9:39 | 699.6 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 9:40 | 700.7 | | | | | | | | |
| 10/31/02 9:41 | 686.3 | | | | | | | | |
| 10/31/02 9:42 | 686.3 | | | | | | | | |
| 10/31/02 9:43 | 690.4 | | | | | | | | |
| 10/31/02 9:44 | 673.9 | | | | | | | | |
| 10/31/02 9:45 | 679.0 | | | | | | | | |
| 10/31/02 9:46 | 691.4 | | | | | | | | |
| 10/31/02 9:47 | 680.1 | | | | | | | | |
| 10/31/02 9:48 | 696.6 | | | | | | | | |
| 10/31/02 9:49 | 689.3 | | | | | | | | |
| 10/31/02 9:50 | 680.1 | | | | | | | | |
| 10/31/02 9:51 | 679.0 | | | | | | | | |
| 10/31/02 9:52 | 676.0 | | | | | | | | |
| 10/31/02 9:53 | 671.8 | | | | | | | | |
| 10/31/02 9:54 | 681.1 | | | | | | | | |
| 10/31/02 9:55 | 670.8 | | | | | | | | |
| 10/31/02 9:56 | 678.0 | | | | | | | | |
| 10/31/02 9:57 | 668.8 | | | | | | | | |
| 10/31/02 9:58 | 661.5 | | | | | | | | |
| 10/31/02 9:59 | 661.5 | | | | | | | | |
| 10/31/02 10:00 | 660.5 | | | | | | | | |
| 10/31/02 10:01 | 654.3 | | | | | | | | |
| 10/31/02 10:02 | 666.7 | | | | | | | | |
| 10/31/02 10:03 | 664.6 | | | | | | | | |
| 10/31/02 10:04 | 658.5 | | | | | | | | |
| 10/31/02 10:05 | 674.9 | | | | | | | | |
| 10/31/02 10:06 | 671.8 | | | | | | | | |
| 10/31/02 10:07 | 666.7 | | | | | | | | |
| 10/31/02 10:08 | 677.0 | | | | | | | | |
| 10/31/02 10:09 | 685.2 | | | | | | | | |
| 10/31/02 10:10 | 673.9 | | | | | | | | |
| 10/31/02 10:11 | 671.8 | | | | | | | | |
| 10/31/02 10:12 | 659.5 | | | | | | | | |
| 10/31/02 10:13 | 662.6 | | | | | | | | |
| 10/31/02 10:14 | 666.7 | | | | | | | | |
| 10/31/02 10:15 | 650.2 | | | | | | | | |
| 10/31/02 10:16 | 656.4 | | | | | | | | |
| 10/31/02 10:17 | 660.5 | | | | | | | | |
| 10/31/02 10:18 | 649.2 | | | | | | | | |
| 10/31/02 10:19 | 658.5 | | | | | | | | |
| 10/31/02 10:20 | 661.5 | | | | | | | | |
| 10/31/02 10:21 | 654.3 | | | | | | | | |
| 10/31/02 10:22 | 663.6 | | | | | | | | |
| 10/31/02 10:23 | 662.6 | | | | | | | | |
| 10/31/02 10:24 | 659.5 | | | | | | | | |
| 10/31/02 10:25 | 678.0 | | | | | | | | |
| 10/31/02 10:26 | 672.9 | | | | | | | | |
| 10/31/02 10:27 | 667.7 | | | | | | | | |
| 10/31/02 10:28 | 671.8 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 10:29 | 670.8 | | | | | | | | |
| 10/31/02 10:30 | 676.0 | | | | | | | | |
| 10/31/02 10:31 | 680.1 | | | | | | | | |
| 10/31/02 10:32 | 670.8 | | | | | | | | |
| 10/31/02 10:33 | 660.5 | | | | | | | | |
| 10/31/02 10:34 | 664.6 | | | | | | | | |
| 10/31/02 10:35 | 658.5 | | | | | | | | |
| 10/31/02 10:36 | 664.6 | | | | | | | | |
| 10/31/02 10:37 | 662.6 | | | | | | | | |
| 10/31/02 10:38 | 658.5 | | | | | | | | |
| 10/31/02 10:39 | 672.9 | | | | | | | | |
| 10/31/02 10:40 | 662.6 | | | | | | | | |
| 10/31/02 10:41 | 653.3 | | | | | | | | |
| 10/31/02 10:42 | 666.7 | | | | | | | | |
| 10/31/02 10:43 | 664.6 | | | | | | | | |
| 10/31/02 10:44 | 678.0 | | | | | | | | |
| 10/31/02 10:45 | 678.0 | | | | | | | | |
| 10/31/02 10:46 | 671.8 | | | | | | | | |
| 10/31/02 10:47 | 680.1 | | | | | | | | |
| 10/31/02 10:48 | 684.2 | | | | | | | | |
| 10/31/02 10:49 | 672.9 | | | | | | | | |
| 10/31/02 10:50 | 681.1 | | | | | | | | |
| 10/31/02 10:51 | 677.0 | | | | | | | | |
| 10/31/02 10:52 | 666.7 | | | | | | | | |
| 10/31/02 10:53 | 667.7 | | | | | | | | |
| 10/31/02 10:54 | 661.5 | | | | | | | | |
| 10/31/02 10:55 | 656.4 | | | | | | | | |
| 10/31/02 10:56 | 655.4 | | | | | | | | |
| 10/31/02 10:57 | 652.3 | | | | | | | | |
| 10/31/02 10:58 | 662.6 | | | | | | | | |
| 10/31/02 10:59 | 649.2 | | | | | | | | |
| 10/31/02 11:00 | 657.4 | | | | | | | | |
| 10/31/02 11:01 | 661.5 | | | | | | | | |
| 10/31/02 11:02 | 661.5 | | | | | | | | |
| 10/31/02 11:03 | 678.0 | | | | | | | | |
| 10/31/02 11:04 | 666.7 | | | | | | | | |
| 10/31/02 11:05 | 654.3 | | | | | | | | |
| 10/31/02 11:06 | 673.9 | | | | | | | | |
| 10/31/02 11:07 | 672.9 | | | | | | | | |
| 10/31/02 11:08 | 669.8 | | | | | | | | |
| 10/31/02 11:09 | 676.0 | | | | | | | | |
| 10/31/02 11:10 | 666.7 | | | | | | | | |
| 10/31/02 11:11 | 680.1 | | | | | | | | |
| 10/31/02 11:12 | 674.9 | | | | | | | | |
| 10/31/02 11:13 | 666.7 | | | | | | | | |
| 10/31/02 11:14 | 679.0 | | | | | | | | |
| 10/31/02 11:15 | 680.1 | | | | | | | | |
| 10/31/02 11:16 | 672.9 | | | | | | | | |
| 10/31/02 11:17 | 682.1 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drft Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 11:18 | 673.9 | | | | | | | | |
| 10/31/02 11:19 | 687.3 | | | | | | | | |
| 10/31/02 11:20 | 691.4 | | | | | | | | |
| 10/31/02 11:21 | 679.0 | | | | | | | | |
| 10/31/02 11:22 | 690.4 | | | | | | | | |
| 10/31/02 11:23 | 686.3 | | | | | | | | |
| 10/31/02 11:24 | 681.1 | | | | | | | | |
| 10/31/02 11:25 | 691.4 | | | | | | | | |
| 10/31/02 11:26 | 693.5 | | | | | | | | |
| 10/31/02 11:27 | 699.6 | | | | | | | | |
| 10/31/02 11:28 | 704.8 | | | | | | | | |
| 10/31/02 11:29 | 700.7 | | | | | | | | |
| 10/31/02 11:30 | 695.5 | | | | | | | | |
| 10/31/02 11:31 | 700.7 | | | | | | | | |
| 10/31/02 11:32 | 694.5 | | | | | | | | |
| 10/31/02 11:33 | 697.6 | | | | | | | | |
| 10/31/02 11:34 | 697.6 | | | | | | | | |
| 10/31/02 11:35 | 701.7 | | | | | | | | |
| 10/31/02 11:36 | 699.6 | | | | | | | | |
| 10/31/02 11:37 | 687.3 | | | | | | | | |
| 10/31/02 11:38 | 680.1 | | | | | | | | |
| 10/31/02 11:39 | 688.3 | | | | | | | | |
| 10/31/02 11:40 | 686.3 | | | | | | | | |
| 10/31/02 11:41 | 689.3 | | | | | | | | |
| 10/31/02 11:42 | 700.7 | | | | | | | | |
| 10/31/02 11:43 | 695.5 | | | | | | | | |
| 10/31/02 11:44 | 699.6 | | | | | | | | |
| 10/31/02 11:45 | 695.5 | | | | | | | | |
| 10/31/02 11:46 | 703.8 | | | | | | | | |
| 10/31/02 11:47 | 701.7 | | | | | | | | |
| 10/31/02 11:48 | 706.9 | | | | | | | | |
| 10/31/02 11:49 | 700.7 | | | | | | | | |
| 10/31/02 11:50 | 705.8 | | | | | | | | |
| 10/31/02 11:51 | 697.6 | | | | | | | | |
| 10/31/02 11:52 | 701.7 | | | | | | | | |
| 10/31/02 11:53 | 704.8 | | | | | | | | |
| 10/31/02 11:54 | 698.6 | | | | | | | | |
| 10/31/02 11:55 | 695.5 | | | | | | | | |
| 10/31/02 11:56 | 704.8 | | | | | | | | |
| 10/31/02 11:57 | 693.5 | | | | | | | | |
| 10/31/02 11:58 | 694.5 | | | | | | | | |
| 10/31/02 11:59 | 698.6 | | | | | | | | |
| 10/31/02 12:00 | 686.3 | | | | | | | | |
| 10/31/02 12:01 | 694.5 | | | | | | | | |
| 10/31/02 12:02 | 699.6 | | | | | | | | |
| 10/31/02 12:03 | 689.3 | | | | | | | | |
| 10/31/02 12:04 | 703.8 | | | | | | | | |
| 10/31/02 12:05 | 699.6 | | | | | | | | |
| 10/31/02 12:06 | 699.6 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 12:07 | 704.8 | | | | | | | | |
| 10/31/02 12:08 | 711.0 | | | | | | | | |
| 10/31/02 12:09 | 697.6 | | | | | | | | |
| 10/31/02 12:10 | 706.9 | | | | | | | | |
| 10/31/02 12:11 | 715.1 | | | | | | | | |
| 10/31/02 12:12 | 709.9 | | | | | | | | |
| 10/31/02 12:13 | 693.5 | | | | | | | | |
| 10/31/02 12:14 | 708.9 | | | | | | | | |
| 10/31/02 12:15 | 712.0 | | | | | | | | |
| 10/31/02 12:16 | 702.7 | | | | | | | | |
| 10/31/02 12:17 | 708.9 | | | | | | | | |
| 10/31/02 12:18 | 701.7 | | | | | | | | |
| 10/31/02 12:19 | 760.4 | | | | | | | | |
| 10/31/02 12:20 | 988.0 | | | | | | | | |
| 10/31/02 12:21 | 1000.3 | | Interim Cal 991 | | | | | | |
| 10/31/02 12:22 | 1000.3 | | | | | | | | |
| 10/31/02 12:23 | 789.2 | | | | | | | | |
| 10/31/02 12:24 | 56.0 | | | | | | | | |
| 10/31/02 12:25 | 4.5 | | Interim Cal 0 | | | | | | |
| 10/31/02 12:26 | 3.5 | | | | | | | | |
| 10/31/02 12:27 | 103.4 | | | | | | | | |
| 10/31/02 12:28 | 628.6 | | | | | | | | |
| 10/31/02 12:29 | 717.2 | | | | | | | | |
| 10/31/02 12:30 | 702.7 | | | | | | | | |
| 10/31/02 12:31 | 705.8 | | | | | | | | |
| 10/31/02 12:32 | 708.9 | | | | | | | | |
| 10/31/02 12:33 | 708.9 | | | | | | | | |
| 10/31/02 12:34 | 696.6 | | | | | | | | |
| 10/31/02 12:35 | 702.7 | | | | | | | | |
| 10/31/02 12:36 | 700.7 | | | | | | | | |
| 10/31/02 12:37 | 699.6 | | | | | | | | |
| 10/31/02 12:38 | 695.5 | | | | | | | | |
| 10/31/02 12:39 | 702.7 | | | | | | | | |
| 10/31/02 12:40 | 706.9 | | | | | | | | |
| 10/31/02 12:41 | 703.8 | | | | | | | | |
| 10/31/02 12:42 | 699.6 | | | | | | | | |
| 10/31/02 12:43 | 700.7 | | | | | | | | |
| 10/31/02 12:44 | 692.4 | | | | | | | | |
| 10/31/02 12:45 | 701.7 | | | | | | | | |
| 10/31/02 12:46 | 714.1 | | | | | | | | |
| 10/31/02 12:47 | 706.9 | | | | | | | | |
| 10/31/02 12:48 | 730.5 | | | | | | | | |
| 10/31/02 12:49 | 719.2 | | | | | | | | |
| 10/31/02 12:50 | 719.2 | | | | | | | | |
| 10/31/02 12:51 | 735.7 | | | | | | | | |
| 10/31/02 12:52 | 729.5 | | | | | | | | |
| 10/31/02 12:53 | 723.3 | | | | | | | | |
| 10/31/02 12:54 | 738.8 | | | | | | | | |
| 10/31/02 12:55 | 753.2 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 12:56 | 764.5 | | | | | | | | |
| 10/31/02 12:57 | 791.3 | | | | | | | | |
| 10/31/02 12:58 | 805.7 | | | | | | | | |
| 10/31/02 12:59 | 824.2 | | | | | | | | |
| 10/31/02 13:00 | 852.1 | | | | | | | | |
| 10/31/02 13:01 | 875.7 | | | | | | | | |
| 10/31/02 13:02 | 887.1 | | | | | | | | |
| 10/31/02 13:03 | 900.5 | | | | | | | | |
| 10/31/02 13:04 | 941.6 | | | | | | | | |
| 10/31/02 13:05 | 969.4 | | | | | | | | |
| 10/31/02 13:06 | 981.8 | | | | | | | | |
| 10/31/02 13:07 | 1003.4 | | | | | | | | |
| 10/31/02 13:08 | 1006.5 | | | | | | | | |
| 10/31/02 13:09 | 1008.6 | | | | | | | | |
| 10/31/02 13:10 | 1039.5 | | | | | | | | |
| 10/31/02 13:11 | 1036.4 | | | | | | | | |
| 10/31/02 13:12 | 1032.3 | | | | | | | | |
| 10/31/02 13:13 | 1035.4 | | | | | | | | |
| 10/31/02 13:14 | 1015.8 | | | | | | | | |
| 10/31/02 13:15 | 1006.5 | | | | | | | | |
| 10/31/02 13:16 | 1027.1 | | | | | | | | |
| 10/31/02 13:17 | 1038.4 | | | | | | | | |
| 10/31/02 13:18 | 1039.5 | | | | | | | | |
| 10/31/02 13:19 | 1047.7 | | | | | | | | |
| 10/31/02 13:20 | 1064.2 | | | | | | | | |
| 10/31/02 13:21 | 1057.0 | | | | | | | | |
| 10/31/02 13:22 | 1073.5 | | | | | | | | |
| 10/31/02 13:23 | 1094.1 | | | | | | | | |
| 10/31/02 13:24 | 1092.0 | | | | | | | | |
| 10/31/02 13:25 | 1104.4 | | | | | | | | |
| 10/31/02 13:26 | 1106.4 | | | | | | | | |
| 10/31/02 13:27 | 1111.56 | | | | | | | | |
| 10/31/02 13:28 | 1142.453 | | | | | | | | |
| 10/31/02 13:29 | 1165.109 | | ***Begin Run 1*** | | | | | | |
| 10/31/02 13:30 | 1159.96 | 1 | | 6.25 | 1008 | 991 | 1141.3 | 13401 | 71.49 |
| 10/31/02 13:31 | 1182.615 | 1 | | 6.25 | 1008 | 991 | 1163.7 | 13401 | 72.89 |
| 10/31/02 13:32 | 1194.973 | 1 | | 6.25 | 1008 | 991 | 1176.0 | 13401 | 73.66 |
| 10/31/02 13:33 | 1188.794 | 1 | | 6.25 | 1008 | 991 | 1169.9 | 13401 | 73.28 |
| 10/31/02 13:34 | 1167.168 | 1 | | 6.25 | 1008 | 991 | 1148.5 | 13401 | 71.94 |
| 10/31/02 13:35 | 1166.139 | 1 | | 6.25 | 1008 | 991 | 1147.4 | 13401 | 71.87 |
| 10/31/02 13:36 | 1157.9 | 1 | | 6.25 | 1008 | 991 | 1139.3 | 13401 | 71.36 |
| 10/31/02 13:37 | 1151.722 | 1 | | 6.25 | 1008 | 991 | 1133.2 | 13401 | 70.98 |
| 10/31/02 13:38 | 1162.02 | 1 | | 6.25 | 1008 | 991 | 1143.4 | 13401 | 71.62 |
| 10/31/02 13:39 | 1171.288 | 1 | | 6.25 | 1008 | 991 | 1152.5 | 13401 | 72.19 |
| 10/31/02 13:40 | 1135.245 | 1 | | 6.25 | 1008 | 991 | 1116.9 | 13401 | 69.96 |
| 10/31/02 13:41 | 1149.662 | 1 | | 6.25 | 1008 | 991 | 1131.1 | 13401 | 70.85 |
| 10/31/02 13:42 | 1164.079 | 1 | | 6.25 | 1008 | 991 | 1145.4 | 13401 | 71.75 |
| 10/31/02 13:43 | 1155.841 | 1 | | 6.25 | 1008 | 991 | 1137.3 | 13401 | 71.24 |
| 10/31/02 13:44 | 1170.258 | 1 | | 6.25 | 1008 | 991 | 1151.5 | 13401 | 72.13 |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 13:45 | 1171.288 | 1 | | 6.25 | 1008 | 991 | 1152.5 | 13401 | 72.19 |
| 10/31/02 13:46 | 1153.781 | 1 | | 6.25 | 1008 | 991 | 1135.2 | 13401 | 71.11 |
| 10/31/02 13:47 | 1178.496 | 1 | | 6.25 | 1008 | 991 | 1159.7 | 13401 | 72.64 |
| 10/31/02 13:48 | 1194.973 | 1 | | 6.25 | 1008 | 991 | 1176.0 | 13401 | 73.66 |
| 10/31/02 13:49 | 1194.973 | 1 | | 6.25 | 1008 | 991 | 1176.0 | 13401 | 73.66 |
| 10/31/02 13:50 | 1215.569 | 1 | | 6.25 | 1008 | 991 | 1196.3 | 13401 | 74.94 |
| 10/31/02 13:51 | 1181.585 | 1 | | 6.25 | 1008 | 991 | 1162.7 | 13401 | 72.83 |
| 10/31/02 13:52 | 1190.854 | 1 | | 6.25 | 1008 | 991 | 1171.9 | 13401 | 73.40 |
| 10/31/02 13:53 | 1165.109 | 1 | | 6.25 | 1008 | 991 | 1146.4 | 13401 | 71.81 |
| 10/31/02 13:54 | 1147.602 | 1 | | 6.25 | 1008 | 991 | 1129.1 | 13401 | 70.72 |
| 10/31/02 13:55 | 1141.424 | 1 | | 6.25 | 1008 | 991 | 1123.0 | 13401 | 70.34 |
| 10/31/02 13:56 | 1135.245 | 1 | | 6.25 | 1008 | 991 | 1116.9 | 13401 | 69.96 |
| 10/31/02 13:57 | 1142.453 | 1 | | 6.25 | 1008 | 991 | 1124.0 | 13401 | 70.41 |
| 10/31/02 13:58 | 1144.513 | 1 | | 6.25 | 1008 | 991 | 1126.0 | 13401 | 70.53 |
| 10/31/02 13:59 | 1130.096 | 1 | | 6.25 | 1008 | 991 | 1111.8 | 13401 | 69.64 |
| 10/31/02 14:00 | 1141.424 | 1 | | 6.25 | 1008 | 991 | 1123.0 | 13401 | 70.34 |
| 10/31/02 14:01 | 1115.679 | 1 | | 6.25 | 1008 | 991 | 1097.5 | 13401 | 68.75 |
| 10/31/02 14:02 | 1139.364 | 1 | | 6.25 | 1008 | 991 | 1121.0 | 13401 | 70.21 |
| 10/31/02 14:03 | 1142.453 | 1 | | 6.25 | 1008 | 991 | 1124.0 | 13401 | 70.41 |
| 10/31/02 14:04 | 1132.156 | 1 | | 6.25 | 1008 | 991 | 1113.8 | 13401 | 69.77 |
| 10/31/02 14:05 | 1147.602 | 1 | | 6.25 | 1008 | 991 | 1129.1 | 13401 | 70.72 |
| 10/31/02 14:06 | 1182.615 | 1 | | 6.25 | 1008 | 991 | 1163.7 | 13401 | 72.89 |
| 10/31/02 14:07 | 1173.347 | 1 | | 6.25 | 1008 | 991 | 1154.6 | 13401 | 72.32 |
| 10/31/02 14:08 | 1190.854 | 1 | | 6.25 | 1008 | 991 | 1171.9 | 13401 | 73.40 |
| 10/31/02 14:09 | 1227.926 | 1 | | 6.25 | 1008 | 991 | 1208.6 | 13401 | 75.70 |
| 10/31/02 14:10 | 1205.271 | 1 | | 6.25 | 1008 | 991 | 1186.2 | 13401 | 74.30 |
| 10/31/02 14:11 | 1191.883 | 1 | | 6.25 | 1008 | 991 | 1172.9 | 13401 | 73.47 |
| 10/31/02 14:12 | 1225.866 | 1 | | 6.25 | 1008 | 991 | 1206.5 | 13401 | 75.57 |
| 10/31/02 14:13 | 1212.479 | 1 | | 6.25 | 1008 | 991 | 1193.3 | 13401 | 74.74 |
| 10/31/02 14:14 | 1186.734 | 1 | | 6.25 | 1008 | 991 | 1167.8 | 13401 | 73.15 |
| 10/31/02 14:15 | 1221.747 | 1 | | 6.25 | 1008 | 991 | 1202.5 | 13401 | 75.32 |
| 10/31/02 14:16 | 1196.003 | 1 | | 6.25 | 1008 | 991 | 1177.0 | 13401 | 73.72 |
| 10/31/02 14:17 | 1157.9 | 1 | | 6.25 | 1008 | 991 | 1139.3 | 13401 | 71.36 |
| 10/31/02 14:18 | 1186.734 | 1 | | 6.25 | 1008 | 991 | 1167.8 | 13401 | 73.15 |
| 10/31/02 14:19 | 1186.734 | 1 | | 6.25 | 1008 | 991 | 1167.8 | 13401 | 73.15 |
| 10/31/02 14:20 | 1178.496 | 1 | | 6.25 | 1008 | 991 | 1159.7 | 13401 | 72.64 |
| 10/31/02 14:21 | 1200.122 | 1 | | 6.25 | 1008 | 991 | 1181.1 | 13401 | 73.98 |
| 10/31/02 14:22 | 1172.317 | 1 | | 6.25 | 1008 | 991 | 1153.6 | 13401 | 72.26 |
| 10/31/02 14:23 | 1178.496 | 1 | | 6.25 | 1008 | 991 | 1159.7 | 13401 | 72.64 |
| 10/31/02 14:24 | 1200.122 | 1 | | 6.25 | 1008 | 991 | 1181.1 | 13401 | 73.98 |
| 10/31/02 14:25 | 1184.675 | 1 | | 6.25 | 1008 | 991 | 1165.8 | 13401 | 73.02 |
| 10/31/02 14:26 | 1194.973 | 1 | | 6.25 | 1008 | 991 | 1176.0 | 13401 | 73.66 |
| 10/31/02 14:27 | 1186.734 | 1 | | 6.25 | 1008 | 991 | 1167.8 | 13401 | 73.15 |
| 10/31/02 14:28 | 1185.705 | 1 | | 6.25 | 1008 | 991 | 1166.8 | 13401 | 73.09 |
| 10/31/02 14:29 | 1218.658 | 1 | | 6.25 | 1008 | 991 | 1199.4 | 13401 | 75.13 |
| 10/31/02 14:30 | 1220.718 | | | ***Run 1 Average*** | | | ***1155.1*** | | ***72.35*** |
| 10/31/02 14:31 | 1206.3 | | | | | | | | |
| 10/31/02 14:32 | 1236.164 | | | | | | | | |
| 10/31/02 14:33 | 1118.768 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 14:34 | 159.004 | | | | | | | | |
| 10/31/02 14:35 | 6.5951 | | | | | | | | |
| 10/31/02 14:36 | 3.5057 | | Zero CO Cal | | | | | | |
| 10/31/02 14:37 | 3.5057 | | Zero CO Cal | | | | | | |
| 10/31/02 14:38 | 8.6546 | | | | | | | | |
| 10/31/02 14:39 | 656.3926 | | | | | | | | |
| 10/31/02 14:40 | 989.0148 | | | | | | | | |
| 10/31/02 14:41 | 995.1935 | | 991 CO Cal | | | | | | |
| 10/31/02 14:42 | 995.1935 | | 991 CO Cal | | | | | | |
| 10/31/02 14:43 | 1068.309 | | | | | | | | |
| 10/31/02 14:44 | 1213.509 | | | | | | | | |
| 10/31/02 14:45 | 1194.973 | | | | | | | | |
| 10/31/02 14:46 | 1191.883 | | | | | | | | |
| 10/31/02 14:47 | 1166.139 | | | | | | | | |
| 10/31/02 14:48 | 1138.334 | | | | | | | | |
| 10/31/02 14:49 | 1182.615 | | | | | | | | |
| 10/31/02 14:50 | 1179.526 | | | | | | | | |
| 10/31/02 14:51 | 1163.049 | | | | | | | | |
| 10/31/02 14:52 | 1172.317 | | | | | | | | |
| 10/31/02 14:53 | 1160.99 | | | | | | | | |
| 10/31/02 14:54 | 1174.377 | | | | | | | | |
| 10/31/02 14:55 | 1160.99 | | | | | | | | |
| 10/31/02 14:56 | 1171.288 | | | | | | | | |
| 10/31/02 14:57 | 1190.854 | | | | | | | | |
| 10/31/02 14:58 | 1191.883 | | | | | | | | |
| 10/31/02 14:59 | 1176.437 | | | | | | | | |
| 10/31/02 15:00 | 1190.854 | | | | | | | | |
| 10/31/02 15:01 | 1192.913 | | | | | | | | |
| 10/31/02 15:02 | 1191.883 | | | | | | | | |
| 10/31/02 15:03 | 1215.569 | | | | | | | | |
| 10/31/02 15:04 | 1186.734 | | | | | | | | |
| 10/31/02 15:05 | 1169.228 | | | | | | | | |
| 10/31/02 15:06 | 1178.496 | | | | | | | | |
| 10/31/02 15:07 | 1181.585 | | | | | | | | |
| 10/31/02 15:08 | 1187.764 | | | | | | | | |
| 10/31/02 15:09 | 1217.628 | | | | | | | | |
| 10/31/02 15:10 | 1228.956 | | | | | | | | |
| 10/31/02 15:11 | 1193.943 | | | | | | | | |
| 10/31/02 15:12 | 1201.151 | | | | | | | | |
| 10/31/02 15:13 | 1210.42 | | | | | | | | |
| 10/31/02 15:14 | 1228.956 | | | | | | | | |
| 10/31/02 15:15 | 1200.122 | | | | | | | | |
| 10/31/02 15:16 | 1233.075 | | | | | | | | |
| 10/31/02 15:17 | 1228.956 | | | | | | | | |
| 10/31/02 15:18 | 1199.092 | | | | | | | | |
| 10/31/02 15:19 | 1219.688 | | | | | | | | |
| 10/31/02 15:20 | 1237.194 | | | | | | | | |
| 10/31/02 15:21 | 1208.36 | | | | | | | | |
| 10/31/02 15:22 | 1221.747 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 15:23 | 1214.539 | | | | | | | | |
| 10/31/02 15:24 | 1203.211 | | | | | | | | |
| 10/31/02 15:25 | 1205.271 | | | | | | | | |
| 10/31/02 15:26 | 1229.986 | | | | | | | | |
| 10/31/02 15:27 | 1212.479 | | | | | | | | |
| 10/31/02 15:28 | 1200.122 | | | | | | | | |
| 10/31/02 15:29 | 1242.343 | | | | | | | | |
| 10/31/02 15:30 | 1227.926 | | | | | | | | |
| 10/31/02 15:31 | 1227.926 | | | | | | | | |
| 10/31/02 15:32 | 1243.373 | | | | | | | | |
| 10/31/02 15:33 | 1216.598 | | | | | | | | |
| 10/31/02 15:34 | 1221.747 | | | | | | | | |
| 10/31/02 15:35 | 1202.181 | | | | | | | | |
| 10/31/02 15:36 | 1218.658 | | | | | | | | |
| 10/31/02 15:37 | 1213.509 | | | | | | | | |
| 10/31/02 15:38 | 1211.449 | | | | | | | | |
| 10/31/02 15:39 | 1221.747 | | | | | | | | |
| 10/31/02 15:40 | 1209.39 | | | | | | | | |
| 10/31/02 15:41 | 1217.628 | | | | | | | | |
| 10/31/02 15:42 | 1234.105 | | | | | | | | |
| 10/31/02 15:43 | 1216.598 | | | | | | | | |
| 10/31/02 15:44 | 1205.271 | | | | | | | | |
| 10/31/02 15:45 | 1209.39 | | | | | | | | |
| 10/31/02 15:46 | 1194.973 | | ***Begin Run 2*** | | | | | | |
| 10/31/02 15:47 | 1190.854 | 2 | | 4 | 995.5 | 991 | 1186.3 | 13171 | 73.03 |
| 10/31/02 15:48 | 1209.39 | 2 | | 4 | 995.5 | 991 | 1204.8 | 13171 | 74.17 |
| 10/31/02 15:49 | 1221.747 | 2 | | 4 | 995.5 | 991 | 1217.1 | 13171 | 74.93 |
| 10/31/02 15:50 | 1209.39 | 2 | | 4 | 995.5 | 991 | 1204.8 | 13171 | 74.17 |
| 10/31/02 15:51 | 1240.284 | 2 | | 4 | 995.5 | 991 | 1235.7 | 13171 | 76.07 |
| 10/31/02 15:52 | 1235.135 | 2 | | 4 | 995.5 | 991 | 1230.5 | 13171 | 75.75 |
| 10/31/02 15:53 | 1231.015 | 2 | | 4 | 995.5 | 991 | 1226.4 | 13171 | 75.50 |
| 10/31/02 15:54 | 1245.432 | 2 | | 4 | 995.5 | 991 | 1240.8 | 13171 | 76.39 |
| 10/31/02 15:55 | 1211.449 | 2 | | 4 | 995.5 | 991 | 1206.8 | 13171 | 74.30 |
| 10/31/02 15:56 | 1201.151 | 2 | | 4 | 995.5 | 991 | 1196.5 | 13171 | 73.66 |
| 10/31/02 15:57 | 1229.986 | 2 | | 4 | 995.5 | 991 | 1225.4 | 13171 | 75.44 |
| 10/31/02 15:58 | 1215.569 | 2 | | 4 | 995.5 | 991 | 1211.0 | 13171 | 74.55 |
| 10/31/02 15:59 | 1216.598 | 2 | | 4 | 995.5 | 991 | 1212.0 | 13171 | 74.61 |
| 10/31/02 16:00 | 1223.807 | 2 | | 4 | 995.5 | 991 | 1219.2 | 13171 | 75.06 |
| 10/31/02 16:01 | 1196.003 | 2 | | 4 | 995.5 | 991 | 1191.4 | 13171 | 73.35 |
| 10/31/02 16:02 | 1197.032 | 2 | | 4 | 995.5 | 991 | 1192.4 | 13171 | 73.41 |
| 10/31/02 16:03 | 1182.615 | 2 | | 4 | 995.5 | 991 | 1178.0 | 13171 | 72.52 |
| 10/31/02 16:04 | 1170.258 | 2 | | 4 | 995.5 | 991 | 1165.7 | 13171 | 71.76 |
| 10/31/02 16:05 | 1185.705 | 2 | | 4 | 995.5 | 991 | 1181.1 | 13171 | 72.71 |
| 10/31/02 16:06 | 1177.466 | 2 | | 4 | 995.5 | 991 | 1172.9 | 13171 | 72.21 |
| 10/31/02 16:07 | 1186.734 | 2 | | 4 | 995.5 | 991 | 1182.1 | 13171 | 72.78 |
| 10/31/02 16:08 | 1192.913 | 2 | | 4 | 995.5 | 991 | 1188.3 | 13171 | 73.16 |
| 10/31/02 16:09 | 1198.062 | 2 | | 4 | 995.5 | 991 | 1193.5 | 13171 | 73.47 |
| 10/31/02 16:10 | 1226.896 | 2 | | 4 | 995.5 | 991 | 1222.3 | 13171 | 75.25 |
| 10/31/02 16:11 | 1211.449 | 2 | | 4 | 995.5 | 991 | 1206.8 | 13171 | 74.30 |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_{al}$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 16:12 | 1214.539 | 2 | | 4 | 995.5 | 991 | 1209.9 | 13171 | 74.49 |
| 10/31/02 16:13 | 1219.688 | 2 | | 4 | 995.5 | 991 | 1215.1 | 13171 | 74.80 |
| 10/31/02 16:14 | 1215.569 | 2 | | 4 | 995.5 | 991 | 1211.0 | 13171 | 74.55 |
| 10/31/02 16:15 | 1200.122 | 2 | | 4 | 995.5 | 991 | 1195.5 | 13171 | 73.60 |
| 10/31/02 16:16 | 1198.062 | 2 | | 4 | 995.5 | 991 | 1193.5 | 13171 | 73.47 |
| 10/31/02 16:17 | 1194.973 | 2 | | 4 | 995.5 | 991 | 1190.4 | 13171 | 73.28 |
| 10/31/02 16:18 | 1206.3 | 2 | | 4 | 995.5 | 991 | 1201.7 | 13171 | 73.98 |
| 10/31/02 16:19 | 1210.42 | 2 | | 4 | 995.5 | 991 | 1205.8 | 13171 | 74.23 |
| 10/31/02 16:20 | 1221.747 | 2 | | 4 | 995.5 | 991 | 1217.1 | 13171 | 74.93 |
| 10/31/02 16:21 | 1216.598 | 2 | | 4 | 995.5 | 991 | 1212.0 | 13171 | 74.61 |
| 10/31/02 16:22 | 1208.36 | 2 | | 4 | 995.5 | 991 | 1203.8 | 13171 | 74.11 |
| 10/31/02 16:23 | 1199.092 | 2 | | 4 | 995.5 | 991 | 1194.5 | 13171 | 73.54 |
| 10/31/02 16:24 | 1219.688 | 2 | | 4 | 995.5 | 991 | 1215.1 | 13171 | 74.80 |
| 10/31/02 16:25 | 1216.598 | 2 | | 4 | 995.5 | 991 | 1212.0 | 13171 | 74.61 |
| 10/31/02 16:26 | 1207.33 | 2 | | 4 | 995.5 | 991 | 1202.7 | 13171 | 74.04 |
| 10/31/02 16:27 | 1217.628 | 2 | | 4 | 995.5 | 991 | 1213.0 | 13171 | 74.68 |
| 10/31/02 16:28 | 1211.449 | 2 | | 4 | 995.5 | 991 | 1206.8 | 13171 | 74.30 |
| 10/31/02 16:29 | 1224.837 | 2 | | 4 | 995.5 | 991 | 1220.2 | 13171 | 75.12 |
| 10/31/02 16:30 | 1244.403 | 2 | | 4 | 995.5 | 991 | 1239.8 | 13171 | 76.32 |
| 10/31/02 16:31 | 1240.284 | 2 | | 4 | 995.5 | 991 | 1235.7 | 13171 | 76.07 |
| 10/31/02 16:32 | 1235.135 | 2 | | 4 | 995.5 | 991 | 1230.5 | 13171 | 75.75 |
| 10/31/02 16:33 | 1241.313 | 2 | | 4 | 995.5 | 991 | 1236.7 | 13171 | 76.13 |
| 10/31/02 16:34 | 1231.015 | 2 | | 4 | 995.5 | 991 | 1226.4 | 13171 | 75.50 |
| 10/31/02 16:35 | 1238.224 | 2 | | 4 | 995.5 | 991 | 1233.6 | 13171 | 75.94 |
| 10/31/02 16:36 | 1251.611 | 2 | | 4 | 995.5 | 991 | 1247.0 | 13171 | 76.77 |
| 10/31/02 16:37 | 1236.164 | 2 | | 4 | 995.5 | 991 | 1231.5 | 13171 | 75.82 |
| 10/31/02 16:38 | 1234.105 | 2 | | 4 | 995.5 | 991 | 1229.5 | 13171 | 75.69 |
| 10/31/02 16:39 | 1234.105 | 2 | | 4 | 995.5 | 991 | 1229.5 | 13171 | 75.69 |
| 10/31/02 16:40 | 1232.045 | 2 | | 4 | 995.5 | 991 | 1227.4 | 13171 | 75.56 |
| 10/31/02 16:41 | 1222.777 | 2 | | 4 | 995.5 | 991 | 1218.2 | 13171 | 74.99 |
| 10/31/02 16:42 | 1225.866 | 2 | | 4 | 995.5 | 991 | 1221.2 | 13171 | 75.18 |
| 10/31/02 16:43 | 1233.075 | 2 | | 4 | 995.5 | 991 | 1228.5 | 13171 | 75.63 |
| 10/31/02 16:44 | 1225.866 | 2 | | 4 | 995.5 | 991 | 1221.2 | 13171 | 75.18 |
| 10/31/02 16:45 | 1233.075 | 2 | | 4 | 995.5 | 991 | 1228.5 | 13171 | 75.63 |
| 10/31/02 16:46 | 1241.313 | 2 | | 4 | 995.5 | 991 | 1236.7 | 13171 | 76.13 |
| 10/31/02 16:47 | 1240.284 | | | ***Run 2 Average*** | | | ***1212.2*** | | ***74.6*** |
| 10/31/02 16:48 | 1232.045 | | | | | | | | |
| 10/31/02 16:49 | 1254.701 | | | | | | | | |
| 10/31/02 16:50 | 1280.445 | | | | | | | | |
| 10/31/02 16:51 | 1276.326 | | | | | | | | |
| 10/31/02 16:52 | 1218.658 | | | | | | | | |
| 10/31/02 16:53 | 982.836 | | | | | | | | |
| 10/31/02 16:54 | 996.2233 | | 991 CO Cal | | | | | | |
| 10/31/02 16:55 | 996.2233 | | | | | | | | |
| 10/31/02 16:56 | 862.3506 | | | | | | | | |
| 10/31/02 16:57 | 81.7697 | | | | | | | | |
| 10/31/02 16:58 | 4.5355 | | | | | | | | |
| 10/31/02 16:59 | 4.5355 | | 0 CO Cal | | | | | | |
| 10/31/02 17:00 | 4.5355 | | | | | | | | |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 17:01 | 4.5355 | | | | | | | | |
| 10/31/02 17:02 | 4.5355 | | | | | | | | |
| 10/31/02 17:03 | 713.031 | | | | | | | | |
| 10/31/02 17:04 | 1258.82 | | | | | | | | |
| 10/31/02 17:05 | 1270.147 | | | | | | | | |
| 10/31/02 17:06 | 1279.416 | | | | | | | | |
| 10/31/02 17:07 | 1303.101 | | | | | | | | |
| 10/31/02 17:08 | 1293.833 | | | | | | | | |
| 10/31/02 17:09 | 1296.922 | | ***Begin Run 3*** | | | | | | |
| 10/31/02 17:10 | 1322.667 | 3 | | 4.5 | 996.5 | 991 | 1316.8 | 12999 | 80.01 |
| 10/31/02 17:11 | 1314.428 | 3 | | 4.5 | 996.5 | 991 | 1308.6 | 12999 | 79.51 |
| 10/31/02 17:12 | 1292.803 | 3 | | 4.5 | 996.5 | 991 | 1287.0 | 12999 | 78.20 |
| 10/31/02 17:13 | 1296.922 | 3 | | 4.5 | 996.5 | 991 | 1291.1 | 12999 | 78.45 |
| 10/31/02 17:14 | 1282.505 | 3 | | 4.5 | 996.5 | 991 | 1276.7 | 12999 | 77.57 |
| 10/31/02 17:15 | 1256.76 | 3 | | 4.5 | 996.5 | 991 | 1251.0 | 12999 | 76.01 |
| 10/31/02 17:16 | 1223.807 | 3 | | 4.5 | 996.5 | 991 | 1218.1 | 12999 | 74.01 |
| 10/31/02 17:17 | 1246.462 | 3 | | 4.5 | 996.5 | 991 | 1240.7 | 12999 | 75.38 |
| 10/31/02 17:18 | 1213.509 | 3 | | 4.5 | 996.5 | 991 | 1207.8 | 12999 | 73.38 |
| 10/31/02 17:19 | 1224.837 | 3 | | 4.5 | 996.5 | 991 | 1219.1 | 12999 | 74.07 |
| 10/31/02 17:20 | 1255.73 | 3 | | 4.5 | 996.5 | 991 | 1250.0 | 12999 | 75.95 |
| 10/31/02 17:21 | 1256.76 | 3 | | 4.5 | 996.5 | 991 | 1251.0 | 12999 | 76.01 |
| 10/31/02 17:22 | 1245.432 | 3 | | 4.5 | 996.5 | 991 | 1239.7 | 12999 | 75.32 |
| 10/31/02 17:23 | 1259.849 | 3 | | 4.5 | 996.5 | 991 | 1254.1 | 12999 | 76.20 |
| 10/31/02 17:24 | 1260.879 | 3 | | 4.5 | 996.5 | 991 | 1255.1 | 12999 | 76.26 |
| 10/31/02 17:25 | 1267.058 | 3 | | 4.5 | 996.5 | 991 | 1261.3 | 12999 | 76.63 |
| 10/31/02 17:26 | 1287.654 | 3 | | 4.5 | 996.5 | 991 | 1281.9 | 12999 | 77.88 |
| 10/31/02 17:27 | 1280.445 | 3 | | 4.5 | 996.5 | 991 | 1274.7 | 12999 | 77.45 |
| 10/31/02 17:28 | 1263.969 | 3 | | 4.5 | 996.5 | 991 | 1258.2 | 12999 | 76.45 |
| 10/31/02 17:29 | 1277.356 | 3 | | 4.5 | 996.5 | 991 | 1271.6 | 12999 | 77.26 |
| 10/31/02 17:30 | 1294.862 | 3 | | 4.5 | 996.5 | 991 | 1289.1 | 12999 | 78.32 |
| 10/31/02 17:31 | 1281.475 | 3 | | 4.5 | 996.5 | 991 | 1275.7 | 12999 | 77.51 |
| 10/31/02 17:32 | 1269.118 | 3 | | 4.5 | 996.5 | 991 | 1263.3 | 12999 | 76.76 |
| 10/31/02 17:33 | 1268.088 | 3 | | 4.5 | 996.5 | 991 | 1262.3 | 12999 | 76.70 |
| 10/31/02 17:34 | 1252.641 | 3 | | 4.5 | 996.5 | 991 | 1246.9 | 12999 | 75.76 |
| 10/31/02 17:35 | 1231.015 | 3 | | 4.5 | 996.5 | 991 | 1225.3 | 12999 | 74.45 |
| 10/31/02 17:36 | 1248.522 | 3 | | 4.5 | 996.5 | 991 | 1242.8 | 12999 | 75.51 |
| 10/31/02 17:37 | 1234.105 | 3 | | 4.5 | 996.5 | 991 | 1228.4 | 12999 | 74.63 |
| 10/31/02 17:38 | 1242.343 | 3 | | 4.5 | 996.5 | 991 | 1236.6 | 12999 | 75.13 |
| 10/31/02 17:39 | 1253.671 | 3 | | 4.5 | 996.5 | 991 | 1247.9 | 12999 | 75.82 |
| 10/31/02 17:40 | 1234.105 | 3 | | 4.5 | 996.5 | 991 | 1228.4 | 12999 | 74.63 |
| 10/31/02 17:41 | 1227.926 | 3 | | 4.5 | 996.5 | 991 | 1222.2 | 12999 | 74.26 |
| 10/31/02 17:42 | 1250.581 | 3 | | 4.5 | 996.5 | 991 | 1244.8 | 12999 | 75.63 |
| 10/31/02 17:43 | 1240.284 | 3 | | 4.5 | 996.5 | 991 | 1234.5 | 12999 | 75.01 |
| 10/31/02 17:44 | 1247.492 | 3 | | 4.5 | 996.5 | 991 | 1241.7 | 12999 | 75.45 |
| 10/31/02 17:45 | 1254.701 | 3 | | 4.5 | 996.5 | 991 | 1248.9 | 12999 | 75.88 |
| 10/31/02 17:46 | 1238.224 | 3 | | 4.5 | 996.5 | 991 | 1232.5 | 12999 | 74.88 |
| 10/31/02 17:47 | 1240.284 | 3 | | 4.5 | 996.5 | 991 | 1234.5 | 12999 | 75.01 |
| 10/31/02 17:48 | 1256.76 | 3 | | 4.5 | 996.5 | 991 | 1251.0 | 12999 | 76.01 |
| 10/31/02 17:49 | 1249.552 | 3 | | 4.5 | 996.5 | 991 | 1243.8 | 12999 | 75.57 |

**Georgia Pacific - Palatka, Florida**

**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**

***DATA RECORDER PRINTOUT and TEST SUMMARY***

| Time | CO, ppm | Run Number | COMMENTS | CO $C_o$ | CO $C_M$ | CO $C_{MA}$ | CO, ppm Drift Corrected | Flow, SCFM-Dry | CO, pounds per hour |
|---|---|---|---|---|---|---|---|---|---|
| 10/31/02 17:50 | 1278.386 | 3 | | 4.5 | 996.5 | 991 | 1272.6 | 12999 | 77.32 |
| 10/31/02 17:51 | 1292.803 | 3 | | 4.5 | 996.5 | 991 | 1287.0 | 12999 | 78.20 |
| 10/31/02 17:52 | 1252.641 | 3 | | 4.5 | 996.5 | 991 | 1246.9 | 12999 | 75.76 |
| 10/31/02 17:53 | 1244.403 | 3 | | 4.5 | 996.5 | 991 | 1238.7 | 12999 | 75.26 |
| 10/31/02 17:54 | 1267.058 | 3 | | 4.5 | 996.5 | 991 | 1261.3 | 12999 | 76.63 |
| 10/31/02 17:55 | 1237.194 | 3 | | 4.5 | 996.5 | 991 | 1231.5 | 12999 | 74.82 |
| 10/31/02 17:56 | 1227.926 | 3 | | 4.5 | 996.5 | 991 | 1222.2 | 12999 | 74.26 |
| 10/31/02 17:57 | 1244.403 | 3 | | 4.5 | 996.5 | 991 | 1238.7 | 12999 | 75.26 |
| 10/31/02 17:58 | 1236.164 | 3 | | 4.5 | 996.5 | 991 | 1230.4 | 12999 | 74.76 |
| 10/31/02 17:59 | 1232.045 | 3 | | 4.5 | 996.5 | 991 | 1226.3 | 12999 | 74.51 |
| 10/31/02 18:00 | 1203.211 | 3 | | 4.5 | 996.5 | 991 | 1197.5 | 12999 | 72.76 |
| 10/31/02 18:01 | 1145.543 | 3 | | 4.5 | 996.5 | 991 | 1139.9 | 12999 | 69.26 |
| 10/31/02 18:02 | 1080.666 | 3 | | 4.5 | 996.5 | 991 | 1075.1 | 12999 | 65.32 |
| 10/31/02 18:03 | 1049.772 | 3 | | 4.5 | 996.5 | 991 | 1044.2 | 12999 | 63.45 |
| 10/31/02 18:04 | 1069.338 | 3 | | 4.5 | 996.5 | 991 | 1063.8 | 12999 | 64.63 |
| 10/31/02 18:05 | 1129.066 | 3 | | 4.5 | 996.5 | 991 | 1123.4 | 12999 | 68.26 |
| 10/31/02 18:06 | 1173.347 | 3 | | 4.5 | 996.5 | 991 | 1167.7 | 12999 | 70.95 |
| 10/31/02 18:07 | 1174.377 | 3 | | 4.5 | 996.5 | 991 | 1168.7 | 12999 | 71.01 |
| 10/31/02 18:08 | 1167.168 | 3 | | 4.5 | 996.5 | 991 | 1161.5 | 12999 | 70.57 |
| 10/31/02 18:09 | 1150.692 | 3 | | 4.5 | 996.5 | 991 | 1145.0 | 12999 | 69.57 |
| 10/31/02 18:10 | 1134.215 | | | ***Run 3 Average*** | | | ***1231.0*** | | ***74.8*** |
| 10/31/02 18:11 | 1163.049 | | | | | | | | |
| 10/31/02 18:12 | 350.5449 | | | | | | | | |
| 10/31/02 18:13 | 17.9228 | | | | | | | | |
| 10/31/02 18:14 | 4.5355 | | 0 CO Cal | | | | | | |
| 10/31/02 18:15 | 4.5355 | | | | | | | | |
| 10/31/02 18:16 | 149.7359 | | | | | | | | |
| 10/31/02 18:17 | 894.274 | | | | | | | | |
| 10/31/02 18:18 | 997.2531 | | 991 CO Cal | | | | | | |
| 10/31/02 18:19 | 998.2829 | | | | | | | | |
| 10/31/02 18:20 | 968.4189 | | | | | | | | |

# APPENDIX – C

## Laboratory Analysis

# TECHNICAL SERVICES, INC.
## ENVIRONMENTAL CONSULTANTS

For Ambient Air Services, Inc.
106 AMBIENT AIR WAY
STARKE, FL 32091
Contact: Joe Cooksey

*Report Date 11-Nov-02*
Date Received 11/01/2002 @ 16:15
Purchase Order #:

## CERTIFICATE OF ANALYSIS

| LAB | MATRIX | SAMPLE DATE | SAMPLE TIME | SAMPLED BY |
|---|---|---|---|---|
| SAMPLE DESCRIPTION | | | | |
| 02110037 | IMP. CATCH | 10/31/2002 | UNKNOWN | |
| GP/PALATKA, BLEACH PLANT, RUN 1 | | | | |
| 02110038 | IMP. CATCH | 10/31/2002 | UNKNOWN | |
| GP/PALATKA, BLEACH PLANT, RUN 2 | | | | |
| 02110039 | IMP. CATCH | 10/31/2002 | UNKNOWN | |
| GP/PALATKA, BLEACH PLANT, RUN 3 | | | | |
| 02110040 | IMP. CATCH | 10/29/2002 | UNKNOWN | |
| GP/PALATKA, BLEACH PLANT, RUN 1 | | | | |
| 02110041 | IMP. CATCH | 10/29/2002 | UNKNOWN | |
| GP/PALATKA, BLEACH PLANT, RUN 2 | | | | |
| 02110042 | IMP. CATCH | 10/29/2002 | UNKNOWN | |
| GP/PALATKA, BLEACH PLANT, RUN 3 | | | | |
| 02110043 | | UNKNOWN | UNKNOWN | |
| GP/PALATKA, BLEACH PLANT, FIELD BLANK | | | | |

Respectfully submitted,
Technical Services, Inc.

Ambient Air Services, Inc.

| Lab No. | Parameter | Result | | Code | Method | Detection Limit |
|---|---|---|---|---|---|---|
| 02110037 | Chloride in base | 214.2 | ug/ml Cl- | A | Method 26A | 0.02 |
| 02110038 | Chloride in base | 134.3 | ug/ml Cl- | | Method 26A | 0.02 |
| 02110039 | Chloride in base | 151.1 | TOTAL UG | | Method 26A | 0.02 |
| 02110040 | Chloride in base | 438.9 | TOTAL UG | | Method 26A | 0.02 |
| 02110041 | Chloride in base | 320.0 | TOTAL UG | | Method 26A | 0.02 |
| 02110042 | Chloride in base | 354.6 | TOTAL UG | | Method 26A | 0.02 |
| 02110043 | Chloride in base | 104.3 | TOTAL UG | A | Method 26A | 0.02 |

Ambient Air Services, Inc.

| Lab No. | Parameter | Date of Analysis | Analysis Time | Analyst | Prep Date |
|---|---|---|---|---|---|
| 02110037 | Chloride in base | 11/11/2002 | | CRB | |
| 02110038 | Chloride in base | 11/11/2002 | | CRB | |
| 02110039 | Chloride in base | 11/11/2002 | | CRB | |
| 02110040 | Chloride in base | 11/11/2002 | | CRB | |
| 02110041 | Chloride in base | 11/11/2002 | | CRB | |
| 02110042 | Chloride in base | 11/11/2002 | | CRB | |
| 02110043 | Chloride in base | 11/11/2002 | | CRB | |

## APPENDIX – D

**Equipment Calibration Data**
**- Carbon Monoxide Analyzer Calibration**
**- Annual Meter Calibration**
**- Post Test Meter Calibration**
**- Pitot Tube Calibration**
**- Thermocouple Calibration**

**Georgia Pacific - Palatka, Florida**
**Bleach Plant Carbon Monoxide Test**

**October 29, 2002**
***Equipment List***

**Carbon Monoxide Instrument:** **Manufacturer -** Thermo Environmental Instruments **Model -** 48 CHL
**Serial Number -** 63892-341
**CO Range -** zero to 2000 ppm

| Calibration Gas Standards | | Concentration | Manufacturer | Cylinder Number | Expiration Date | PSI |
|---|---|---|---|---|---|---|
| Zero | Zero | 0.00 | Air Products | Nitrogen | N/A | 1200 |
| Low | CO | 991.00 | Air Liquide | CC121974 | Jul-04 | 800 |
| | CO | 1994.00 | Air Liquide | CC70989 | Jul-04 | 900 |
| Mid | CO | 594.40 | Praxair | SA12251 | Jan-04 | 1200 |
| High | CO | 301.90 | Air Liquide | CC121974 | Jul-04 | 1100 |

**Description of Sampling System :**
6', 1/4" SS probe to valve to $H_2O$ condenser to 200 feet 3/8 Teflon sample line to SS pump to instruments
all calibration gases injected direct to probe valve location
Sampling probe located nominally mid of 42" stack

**Test Participants :**
CO Testing - Joe Cooksey, Ambient Air Services, Inc.
Joe Taylor - Georgia-Pacific Representitive

**Other Comments :**

Georgia Pacific - Palatka, Florida
Bleach Plant Carbon Monoxide Test
0
October 29, 2002

***Calibration Sheet***

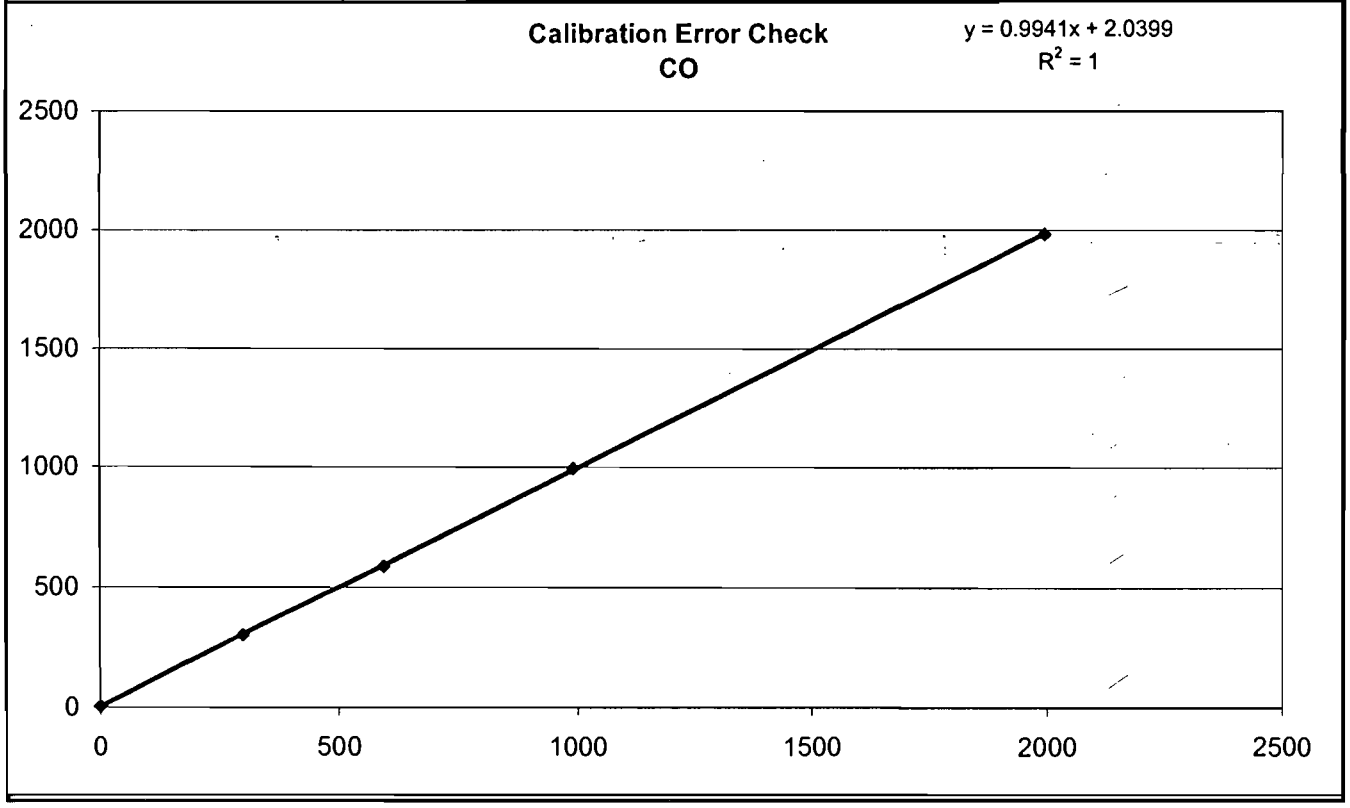
## Initial Calibration

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 12:00 | 4 |
| CO | 991 | 12:00 | 995.4 |
| CO | 1994 | 12:00 | 1982.2 |
| CO | 594.4 | 12:00 | 588 |
| CO | 301.9 | 12:00 | 299.1 |

### % Error of Range Table

| Inject (ppm) | | Time | % Error of Range |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 12:00 | 0.20% |
| CO | 991 | 12:00 | 0.22% |
| CO | 1994 | 12:00 | -0.59% |
| CO | 594.4 | 12:00 | -0.32% |
| CO | 301.9 | 12:00 | -0.14% |



Georgia Pacific - Palatka, Florida
Bleach Plant Carbon Monoxide Test
0
October 29, 2002

*Calibration Sheet*

## Calibration - Post Run 1

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 13:30 | 5.6 |
| CO | 991 | 13:30 | 998.3 |

### Drift Analysis From Initial Calibrations to the End of Run 1

| Inject (ppm) | | Time | Drift Analysis (%) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 13:30 | 0.08% |
| CO | 991 | 13:30 | 0.14% |

### Drift Variables for Run 1

| Variable | CO | |
|---|---|---|
| Co | 4.80 | |
| Cm | 996.85 | |
| Cma | 991.00 | |

## Calibration - Post Run 2

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | | 2.5 |
| CO | 991 | | 997.3 |

### Drift Analysis From Initial Calibrations to the End of Run 2

| Inject (ppm) | | Time | Drift Analysis (%) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 0:00 | -0.08% |
| CO | 991 | 0:00 | 0.09% |

### Drift Variables for Run 2

| Variable | CO | |
|---|---|---|
| Co | 4.05 | |
| Cm | 997.80 | |
| Cma | 991 | |

## Calibration - Post Run 3

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | | |
| CO | 991 | | |

### Drift Analysis From Initial Calibrations to the End of Run 3

| Inject (ppm) | Time | Drift Analysis (%) |
|---|---|---|

**Georgia Pacific - Palatka, Florida**
**Bleach Plant Carbon Monoxide Test**
**0**
**October 29, 2002**
***Calibration Sheet***

| Gas | Conc. | | CO |
|---|---|---|---|
| Zero | 0 | 0:00 | -0.20% |
| CO | 991 | 0:00 | -49.77% |

**Drift Variables for Run 3**

| Variable | CO | |
|---|---|---|
| Co | 1.25 | |
| Cm | 498.65 | |
| Cma | 991 | |

**Georgia Pacific - Palatka, Florida**
**Bleach Plant Carbon Monoxide Test**

**October 31, 2002**
***Equipment List***

**Carbon Monoxide Instrument:** **Manufacturer -** Thermo Environmental Instruments **Model -** 48 CHL
**Serial Number -** 63892-341
**CO Range -** zero to 2000 ppm

| Calibration Gas Standards | | Concentration | Manufacturer | Cylinder Number | Expiration Date | PSI |
|---|---|---|---|---|---|---|
| Zero | Zero | 0.00 | Air Products | Nitrogen | N/A | 1200 |
| Low | CO | 991.00 | Air Liquide | CC121974 | Jul-04 | 800 |
| | CO | 1994.00 | Air Liquide | CC70989 | Jul-04 | 900 |
| Mid | CO | 594.40 | Praxair | SA12251 | Jan-04 | 1200 |
| High | CO | 301.90 | Air Liquide | CC121974 | Jul-04 | 1100 |

**Description of Sampling System :**
6', 1/4" SS probe to valve to $H_2O$ condenser to 200 feet 3/8 Teflon sample line to SS pump to instruments
all calibration gases injected direct to probe valve location
Sampling probe located nominally mid of 42" stack

**Test Participants :**
CO Testing - Randy Weston, Ambient Air Services, Inc.
Joe Taylor, Georgia Pacific Palatka Environmental contact

**Other Comments :**

Georgia Pacific - Palatka, Florida
Bleach Plant Carbon Monoxide Test
0
October 31, 2002
*Calibration Sheet*

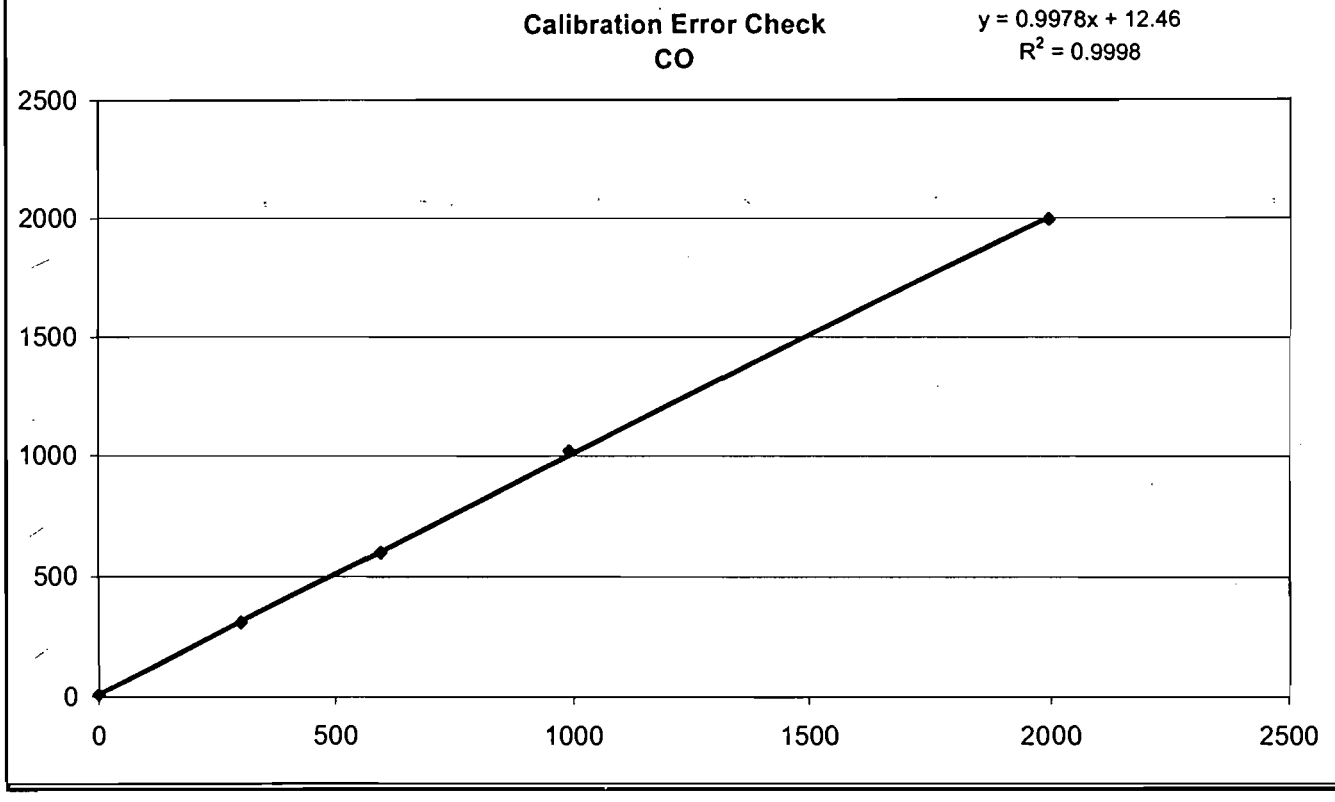
## Initial Calibration

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 12:00 | 9 |
| CO | 991 | 12:00 | 1021 |
| CO | 1994 | 12:00 | 1994 |
| CO | 594.4 | 12:00 | 602 |
| CO | 301.9 | 12:00 | 309 |

### % Error of Range Table

| Inject (ppm) | | Time | % Error of Range |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 12:00 | 0.45% |
| CO | 991 | 12:00 | 1.50% |
| CO | 1994 | 12:00 | 0.00% |
| CO | 594.4 | 12:00 | 0.38% |
| CO | 301.9 | 12:00 | 0.36% |



Georgia Pacific - Palatka, Florida
Bleach Plant Carbon Monoxide Test
0
October 31, 2002
*Calibration Sheet*

## Calibration - Post Run 1

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 14:36 | 3.5 |
| CO | 991 | 14:42 | 995 |

### Drift Analysis From Initial Calibrations to the End of Run 1

| Inject (ppm) | | Time | Drift Analysis (%) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 14:36 | -0.28% |
| CO | 991 | 14:42 | -1.30% |

### Drift Variables for Run 1

| Variable | CO | |
|---|---|---|
| Co | 6.25 | |
| Cm | 1008.00 | |
| Cma | 991.00 | |

## Calibration - Post Run 2

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 16:59 | 4.5 |
| CO | 991 | 16:54 | 996 |

### Drift Analysis From Initial Calibrations to the End of Run 2

| Inject (ppm) | | Time | Drift Analysis (%) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 16:59 | -0.23% |
| CO | 991 | 16:54 | -1.25% |

### Drift Variables for Run 2

| Variable | CO | |
|---|---|---|
| Co | 4 | |
| Cm | 995.50 | |
| Cma | 991 | |

## Calibration - Post Run 3

### Response Table

| Inject (ppm) | | Time | Response (ppm) |
|---|---|---|---|
| Gas | Conc. | | CO |
| Zero | 0 | 18:14 | 4.5 |
| CO | 991 | 18:18 | 997 |

### Drift Analysis From Initial Calibrations to the End of Run 3

| Inject (ppm) | Time | Drift Analysis (%) |
|---|---|---|

**Georgia Pacific - Palatka, Florida**
**Bleach Plant Carbon Monoxide Test**
**0**
**October 31, 2002**
***Calibration Sheet***

| Gas | Conc. | | CO |
|---|---|---|---|
| Zero | 0 | 18:14 | -0.23% |
| CO | 991 | 18:18 | -1.20% |

**Drift Variables for Run 3**

| Variable | CO | |
|---|---|---|
| Co | 4.5 | |
| Cm | 996.50 | |
| Cma | 991 | |

## Ambient Air Services, Inc. - Method 5 Dry Gas Meter Annual Calibration

## USING CALIBRATED CRITICAL ORIFICES

## 5-POINT ENGLISH UNITS

| Meter Console Information | |
|---|---|
| Console Model Number | AASI |
| Console Serial Number | Box 10 |
| DGM Model Number | 6947372 |
| DGM Serial Number | |

| Calibration Conditions | | | |
|---|---|---|---|
| Date | Time | 5-Sep-02 | 10:00 |
| Barometric Pressure | | 29.8 | in Hg |
| Theoretical Critical Vacuum[1] | | 14.1 | in Hg |
| Calibration Technician | | JOE ELLIOTT | |

| Factors/Conversions | | |
|---|---|---|
| Std Temp | 528 | °R |
| Std Press | 29.92 | in Hg |
| $K_1$ | 17.647 | °R/in Hg |

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3 * °R^{1/2})/(in.Hg * min)$.

**Calibration Data**

| Run Time | Metering Console | | | | | Critical Orifice | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed | DGM Orifice ΔH | Volume Initial | Volume Final | Outlet Temp Initial | Outlet Temp Final | Serial Number | Coefficient | Amb Temp Initial | Amb Temp Final | Actual Vacuum |
| (Θ) | ($P_m$) | ($V_m$) | ($V_{mf}$) | ($t_m$) | ($t_{mf}$) | | K' | ($t_{amb}$) | ($t_{amb}$) | |
| min | in $H_2O$ | cubic feet | cubic feet | °F | °F | | see above2 | °F | °F | in Hg |
| 14.1 | 2.8 | 55.603 | 67.154 | 92 | 92 | 63 | 0.6213 | 89 | 89 | 21 |
| 6.0 | 4.6 | 67.154 | 75.011 | 98 | 98 | 73 | 0.8486 | 83 | 80 | 19 |
| 11.7 | 1.4 | 75.011 | 82.876 | 99 | 98 | 55 | 0.4793 | 81 | 79 | 22 |
| 13.4 | 0.8 | 82.876 | 88.974 | 98 | 99 | 48 | 0.3740 | 79 | 77 | 24 |
| 18.4 | 0.4 | 88.974 | 95.110 | 99 | 99 | 40 | 0.2511 | 77 | 77 | 24 |

**Results**

| *Standardized Data* | | | | *Dry Gas Meter* | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Calibration Factor | | Flowrate | ΔH @ | |
| Dry Gas Meter | | Critical Orifice | | Value | Variation | Std & Corr | 0.75 SCFM | Variation |
| ($V_{m(std)}$) | ($Q_{m(std)}$) | ($Vcr_{(std)}$) | ($Q_{cr(std)}$) | (Y) | (ΔY) | ($Q_{m(std)(corr)}$) | (ΔH@) | (ΔΔH@) |
| cubic feet | cfm | cubic feet | cfm | | | cfm | in H2O | |
| 11.080 | 0.786 | 11.142 | 0.790 | 1.006 | 0.007 | 0.790 | 2.438 | 0.388 |
| 7.489 | 1.248 | 6.520 | 1.087 | 0.871 | -0.128 | 1.087 | 2.114 | 0.063 |
| 7.431 | 0.635 | 7.191 | 0.615 | 0.968 | -0.031 | 0.615 | 1.978 | -0.072 |
| 5.753 | 0.429 | 6.439 | 0.481 | 1.119 | 0.121 | 0.481 | 1.890 | -0.160 |
| 5.778 | 0.314 | 5.941 | 0.323 | 1.028 | 0.030 | 0.323 | 1.832 | -0.219 |
| | | | | 0.998 | Y Average | | 2.050 | ΔH@ Average |

Note For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature Joe Elliott Date 5 Sept 02

Quality Assurance Data Review:

Signature D. W. Gnatt Date 5 Sept 02

# Ambient Air Services, Inc. - Method 5 Post Test Dry Gas Meter Calibration

## USING CALIBRATED CRITICAL ORIFICES

## 3-POINT ENGLISH UNITS

| Meter Console Information | |
|---|---|
| Console Model Number | AASI |
| Console Serial Number | Box 10 |
| Pre Test Y Value | 0.989 |
| DGM Serial Number | ################ |

| Calibration Conditions | | | |
|---|---|---|---|
| Date | Time | 1-Nov-02 | 13:12 |
| Barometric Pressure | | 29.9 | in Hg |
| Theoretical Critical Vacuum[1] | | 14.1 | in Hg |
| Calibration Technician | | JE | |

| Factors/Conversions | | |
|---|---|---|
| Std Temp | 528 | °R |
| Std Press | 29.92 | in Hg |
| $K_1$ | 17.647 | oR/in Hg |

[1]For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

[2]The Critical Orifice Coefficient, K', must be entered in English units, $(ft^3 \cdot {}^oR^{1/2})/(in.Hg \cdot min)$.

**Calibration Data**

| Run Time | Metering Console | | | | | Critical Orifice | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed | DGM Orifice ΔH | Volume Initial | Volume Final | Outlet Temp Initial | Outlet Temp Final | Serial Number | Coefficient | Amb Temp Initial | Amb Temp Final | Actual Vacuum |
| (Θ) | ($P_m$) | ($V_{mi}$) | ($V_{mf}$) | ($t_{mi}$) | ($t_{mf}$) | | K' | ($t_{amb}$) | ($t_{amb}$) | |
| min | in $H_2O$ | cubic feet | cubic feet | °F | °F | | see above2 | °F | °F | in Hg |
| 7.5 | 2.3 | 401.578 | 407.667 | 72 | 75 | 63 | 0.6213 | 71 | 72 | 21 |
| 62.9 | 2.3 | 407.667 | 459.392 | 75 | 76 | 63 | 0.6213 | 73 | 74 | 21 |
| 14.5 | 2.3 | 459.392 | 471.442 | 79 | 79 | 63 | 0.6213 | 74 | 75 | 21 |

**Results**

| Standardized Data | | | | Dry Gas Meter | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Calibration Factor | | Flowrate | ΔH @ | |
| Dry Gas Meter | | Critical Orifice | | Value | Variation | Std & Corr | 0.75 SCFM | Variation |
| ($V_{m(std)}$) | ($Q_{m(std)}$) | ($Vcr_{(std)}$) | ($Q_{cr(std)}$) | (Y) | (ΔY) | ($Q_{m(std)(corr)}$) | (ΔH@) | (ΔΔH@) |
| cubic feet | cfm | cubic feet | cfm | | | cfm | in H2O | |
| 6.056 | 0.808 | 6.043 | 0.806 | 0.998 | 0.009 | 0.806 | 1.995 | 0.003 |
| 51.255 | 0.815 | 50.589 | 0.804 | 0.987 | -0.002 | 0.804 | 1.995 | 0.003 |
| 11.863 | 0.818 | 11.651 | 0.804 | 0.982 | -0.007 | 0.804 | 1.985 | -0.006 |
| | | | | 0.989 | Y Average | | 1.992 | ΔH@ Average |

Note. For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +-0.02.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature Joe Elliott Date 11-01-02

Quality Assurance Data Review:

Signature [illegible] Date 11-01-02

AAS Inc. AMBIENT AIR SERVICES INCORPORATED
ENVIRONMENTAL CONSULTANTS

## PITOT TUBE CALIBRATION MEASUREMENTS

DATE CALIBRATED 11/02/02 PITOT TUBE 6B

Pitot tube assembly level? ✓ (Yes) No

Pitot tube openings damaged? ____ Yes (explain below) ✓ (No)

$\alpha_1$ = 10 ° (<10°), $\alpha_2$ = 0.5 ° (<10°), $\beta_1$ = 00 ° (<5°),

$\beta_2$ = 0.0 ° (<5°)

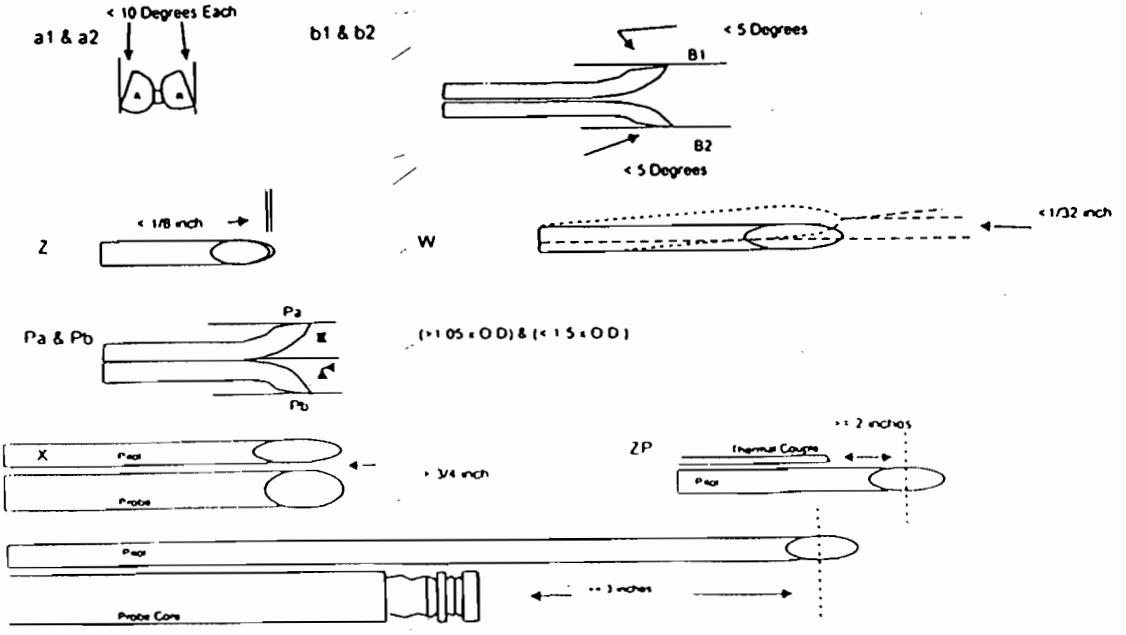
$\gamma$ = 1.5 °, $\theta$ = .5 °, A = 1202 in. = (Pa + Pb)

z = A sin $\gamma$ = 0031 in.; <0.32 / <1/8 in.

w = A sin $\theta$ = 0010 in.; <0.08 / <1/32 in.

$P_a$ .600 in. $P_b$ .602 in. $D_t$ = .375

Calibration required? ____ Yes ✓ (No)



# THERMOCOUPLE CALIBRATION FORM

Date 11/02/02 Time 08:30
Ambient Temperature 79 Source GP PALATKA
Barometric Pressure 30.05 Source
Technician's Signature Ryan Armfield

Standard Thermometer Type MERCURY IN GLASS
Manufacturer PRINCO
Serial Number 0932
Pyrometer Manufacturer ATKINS Model 396K
Serial Number AASI #4 Meter Box # 10

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TEMPERATURE SOURCE (A) | | | | | | | | | | | | | | |
| REFERENCE THERMOMETER | Actual Reading | AMBIENT AIR | | | BOILING $H_2O$ | | | ICE BATH | | | | | | |
| | Corrected Temperature | 79° | | | 212° | | | 32° | | | | | | |
| CALIBRATED THERMOCOUPLE | | | | | | | | | | | | | | |
| Serial Number | Location | Indicated Temp. | Difference (B) | Percent Diff. (C) | Indicated Temp. | Difference | Percent Diff. | Indicated Temp. | Difference | Percent Diff. | Indicated Temp. | Difference | Percent Diff. | |
| 6B | Stack | 79 | 0 | | 212 | 0 | | 32 | 0 | | | | | |
| Box 10 | Filter | 78 | -1 | | 211 | -1 | | 32 | 0 | | | | | |
| Box 4 | Impinger | 80 | +1 | | 212 | 0 | | 31 | -1 | | | | | |
| Box 10 | Meter In | 79 | 0 | | 212 | 0 | | 32 | 0 | | | | | |
| Box 10 | Meter Out | 79 | 0 | | 213 | +1 | | 33 | +1 | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

Comments:

Calibration Tolerances Stack = 1.5% of value, Filter Box = ±5.4°F, Impinger = ±2°F, Meter = ±5.4°F (40CFR Pt 60, App. A Method 5, and QA Handbook Section 3.4, Method 5, page 13, Rev. 0)

Type of calibration system used (B) Reference - Indicated = Difference

$$\left[\frac{(\text{ref. temp } °F + 460) - (\text{indicated temp. } °F + 460)}{(\text{reference temp } °F + 460)}\right] \times 100$$

# APPENDIX – E

## Sample Chain of Custody

**Technical Services, Inc.**
**2901 Danese St., Jacksonville, FL 32206**
**(904) 353-5761 / fax (904) 358-2908**

021100 37-1
thru
021100 43-1

# CHAIN of CUSTODY RECORD

CLIENT NAME & ADDRESS (REPORT TO BE SENT TO:)
Ambient Air Services, Inc.

REMARKS:
$Na_2S_2O_3$ added in Sampling @ TSI

PROJ. NO.

PROJECT NAME/ ADDRESS:
GP/Pottka
Bleach Plant

SAMPLERS: (SIGNATURE)

| Sample Location ID | SAMPLE DATE | TIME | COMP | GRAB | TOTAL NO. of Containers | BOTTLE MAKEUP: 0.1 N $Na_2S_2O_3$ w/ 2 N. Poly | Amber Glass w/ 0.1 N $Na_2S_2O_3$ | ½ Gal. Poly w/ $Na_2S_2O_3$ | | | | PARAMETERS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Run 1 Imp. Catch | 10/31/02 | | | | 1 | ✓ | | | | | | Cl- / BASE |
| 2 | " | | | | 1 | ✓ | | | | | | |
| 3 | " | | | | 1 | ✓ | | | | | | |
| | | | | | | | | | | | | |
| Run 1 Imp Catch | 10/29/02 | | | | 1 | | ✓ | | | | | |
| 2 | " | | | | 1 | | ✓ | | | | | |
| 3 | " | | | | 1 | | ✓ | | | | | |
| | | | | | | | | | | | | |
| Field Blank | | | | | 1 | | | 1 | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

| RELINQUISHED BY: | DATE/TIME | RECEIVED BY: | DATE/TIME |
|---|---|---|---|
| | | | |
| RELINQUISHED BY: | DATE/TIME | RECEIVED BY: H. C. Gray | DATE/TIME 1430 - 11/1/02 |
| RELINQUISHED BY: H C Gray | DATE/TIME 1615 - 11/1/02 | RECEIVED BY: | DATE/TIME |
| | | RECEIVED FOR LABORATORY BY: Debra A. Dalton | DATE/TIME 11/1/02 1615 |

02110037-1 thru 02110043-1

**Technical Services, Inc.**
**2901 Danese St., Jacksonville, FL 32206**
**(904) 353-5761 / fax (904) 358-2908**

# CHAIN of CUSTODY RECORD

CLIENT NAME & ADDRESS (REPORT TO BE SENT TO): Ambient Air Services, Inc.

REMARKS:

PROJ. NO.

PROJECT NAME/ ADDRESS: GP/Pratt Bleach Plant

SAMPLERS: (SIGNATURE)

| Sample Location ID | SAMPLE DATE | TIME | COMP | GRAB | TOTAL NO. of Containers | BOTTLE MAKEUP: 0.1 N NaOH 40 ml. poly | BOTTLE MAKEUP: Amber glass 1 gal N NaOH | PARAMETERS |
|---|---|---|---|---|---|---|---|---|
| Run 1 Imp Catch | 10/31/02 | | | | 1 | ✓ | | Cl- / BASE |
| 2 | " | | | | 1 | ✓ | | |
| 3 | " | | | | 1 | ✓ | | |
| Run 1 Imp Catch | 10/29/02 | | | | 1 | | ✓ | |
| 2 | " | | | | 1 | | ✓ | |
| 3 | " | | | | 1 | | ✓ | |
| Field Blank | | | | | 1 | | | |

| RELINQUISHED BY | DATE/TIME | RECEIVED BY | DATE/TIME |
|---|---|---|---|
| Ross Sellers | 0900 10-30-02 | D.W. Stanfield | 10/30/02 09:00 |
| D.W. Stanfield | 11/1/02 1430 | A. C. Gray | 1430 - 11/1/02 |
| A. C. Gray | 1615 - 11/1/02 | | |
| | | RECEIVED FOR LABORATORY BY: Debra A. Salter | DATE/TIME 11/1/02 1615 |

# APPENDIX - F

## Calibration Gas Certificates

PRAXAIR

**Best Available Copy**

**Praxair Distribution, Inc.**
145 Shimersville Road
Bethlehem, PA 18015
Tel. (610) 691-2474
Fax (610) 758-8384

# *CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS*

**CUSTOMER** PRAXAIR SOUTHEAST **P.O NUMBER** 333045-00

## *REFERENCE STANDARD*

| COMPONENT | NIST SRM NO. | CYLINDER NO. | CONCENTRATION |
|---|---|---|---|
| CARBON MONOXIDE 503.2PPM GMIS VS | 1680B | CLM-009396 | 490.4 PPM |

## *ANALYZER READINGS*

*R=REFERENCE STANDARD* *Z=ZERO GAS* *C=GAS CANDIDATE*

1. COMPONENT CARBON MONOXIDE 503.2PPM GMIS VS ANALYZER MAKE-MODEL-S/N Siemens Ultramat 5E S/N B8-900

ANALYTICAL PRINCIPLE NON-DISPERSIVE INFRARED LAST CALIBRATION DATE 12/31/00

FIRST ANALYSIS DATE 12/27/00 SECOND ANALYSIS DATE 01/03/01

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Z 0 | R 503 | C 301 | CONC. 301.3 | | Z 0 | R 504 | C 302 | CONC. 301.5 | | | |
| R 502 | Z 0 | C 302 | CONC. 302.3 | | R 504 | Z 0 | C 302 | CONC. 301.5 | | | |
| Z 0 | C 302 | R 503 | CONC. 302.3 | | Z 0 | C 303 | R 504 | CONC. 302.3 | | | |
| U/M ppm | | MEAN TEST ASSAY 302.0 | | | U/M ppm | | MEAN TEST ASSAY 301.9 | | | | |

VALUES NOT VALID BELOW 150 PSIG

UNCERTAINTIY OF CARBON MONOXIDE: ±1.9PPM

THIS CYLINDER NO. CC114912

HAS BEEN CERTIFIED ACCORDING TO SECTION 2.2 OF TRACEABILITY PROTOCOL NO. EPA-600/R97/121

PROCEDURE G1

CERTIFIED ACCURACY ± 1 % NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE 01/03/01

EXPIRATION DATE 01/03/04 TERM

**CERTIFIED CONCENTRATION**

| | |
|---|---|
| CARBON MONOXIDE | 301.9PPM |
| AIR | BALANCE |

*ANALYZED BY* JOHN PRIBISH

*CERTIFIED BY* KEVIN BRADY

PRAXAIR

Best Available Copy

**Praxair Distribution, Inc.**
145 Shimersville Road
Bethlehem, PA 18015
Tel. (610) 691-2474
Fax (610) 758-8384

# *CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS*

**CUSTOMER** PRAXAIR SOUTHEAST **P.O NUMBER** 333045-00

## *REFERENCE STANDARD*

| COMPONENT | NIST SRM NO. | CYLINDER NO. | CONCENTRATION |
|---|---|---|---|
| CARBON MONOXIDE 503.2PPM GMIS VS | 1680B | CLM-009396 | 490.4 PPM |

## *ANALYZER READINGS*

*R=REFERENCE STANDARD* *Z=ZERO GAS* *C=GAS CANDIDATE*

1. COMPONENT CARBON MONOXIDE 503.2PPM GMIS ANALYZER MAKE-MODEL-S/N Siemens Ultramat 5E S/N B8-900

ANALYTICAL PRINCIPLE NON-DISPERSIVE INFRARED LAST CALIBRATION DATE 12/31/00

FIRST ANALYSIS DATE 12/27/00 SECOND ANALYSIS DATE 01/03/01

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Z 0 | R 503 | C 595 | CONC. 595.6 | Z 0 | R 504 | C 595 | CONC. 594.1 | | |
| R 502 | Z 0 | C 595 | CONC. 595.6 | R 504 | Z 0 | C 595 | CONC. 594.1 | | |
| Z 0 | C 594 | R 503 | CONC. 595.6 | Z 0 | C 595 | R 504 | CONC. 594.1 | | |
| U/M ppm | | MEAN TEST ASSAY | 595.3 | U/M ppm | | MEAN TEST ASSAY | 594.1 | | |

VALUES NOT VALID BELOW 150 PSIG

UNCERTAINTIY OF CARBON MONOXIDE: ±4.2PPM

THIS CYLINDER NO. SA12251

HAS BEEN CERTIFIED ACCORDING TO SECTION 2.2 OF TRACEABILITY PROTOCOL NO. EPA 600/R97/121

PROCEDURE G1

CERTIFIED ACCURACY ± 1 % NIST TRACEABLE

CYLINDER PRESSURE 2000 PSIG

CERTIFICATION DATE 01/03/01

EXPIRATION DATE 01/03/04 TERM

| CERTIFIED CONCENTRATION | |
|---|---|
| CARBON MONOXIDE | 594.7PPM |
| AIR | BALANCE |

*ANALYZED BY* JOHN PRIBISH

*CERTIFIED BY* KEVIN BEAL

*Making Our Planet More Productive*

Best Available Copy

AIR LIQUIDE™

# CERTIFICATE of ANALYSIS

## Interference-Free Multi-Component EPA Protocol Gases

| Cyl. Number: | Cyl. Pressure:* | Document Number: |
|---|---|---|
| CC121974 | 1667psig | 9032348 |
| **Assay Date:** | **Expiration Date:** | **Item Number:** |
| 07/23/01 | 07/22/04 | |
| **Customer:** | **P.O. Number:** | **Notes:** |
| Technical Services | 070601 | |

*Mixture is valid only to 150 psig

| COMPONENT Name | REQUESTED Concentration | ASSAY Concentration |
|---|---|---|
| Carbon Monoxide | 1000 ppm | 991 ±15 ppm |
| Nitrogen | Balance | Balance |

**EPA Protocol, Section No. 2.0 Procedure: G1**

NOTE: Analytical uncertainty and NIST traceability are in compliance with EPA-600/R-97/123

**REFERENCE STANDARD EMPLOYED FOR ANALYSIS**

| Std Name | Std # | Conc | Units | Std Error | Comp | Balance | Cyl. No. | Exp. Date | Sample No. |
|---|---|---|---|---|---|---|---|---|---|
| GMIS91 | GMIS91 | 1500.0 | ppm | 21.0 | CO | N2 | CC113811 | 06/22/03 | N.A. |

| Component 1: Carbon Monoxide Gas Analyzer Employed: | | Component 2: None Gas Analyzer Employed: | | Component 3: Gas Analyzer Employed: | |
|---|---|---|---|---|---|
| Manufacturer: | KVB/Analect | Manufacturer: | | Manufacturer: | |
| Model Number: | EN3024 | Model Number: | | Model Number: | |
| Serial Number: | 3024 | Serial Number: | | Serial Number: | |
| Analytical Principle: | FTIR | Analytical Principle: | | Analytical Principle: | |
| MPC Calibrated: | 07/05/01 | MPC Calibrated: | | MPC Calibrated: | |

| 07/16/01 | Trial 1 | Trial 2 | Trial 3 | Units |
|---|---|---|---|---|
| Zero | -0.11 | -0.33 | -0.28 | |
| Reference 1 | 1614.16 | 1639.01 | 1648.95 | |
| Reference 2 | | | | |
| Candidate | 1061.20 | 1082.36 | 1088.32 | |
| Result | 974.23 | 993.65 | 999.12 | ppm |
| | | Mean Result: | 989.00 | ppm |

Component 1

Carbon Monoxide

| 07/23/01 | Trial 1 | Trial 2 | Trial 3 | Units |
|---|---|---|---|---|
| Zero | -0.02 | 0.05 | 0.16 | |
| Reference 1 | 1673.01 | 1678.36 | 1674.41 | |
| Reference 2 | | | | |
| Candidate | 1113.28 | 1105.85 | 1105.95 | |
| Result | 996.79 | 990.14 | 990.23 | ppm |
| | | Mean Result: | 992.39 | ppm |

Analyst: Jim Brad

Air Liquide America Corporation
11426 Fairmont Parkway, La Porte, Texas 77571-6000
Phone: (281) 474-8400 Fax: (281) 474-8419

Best Available Copy

AIR LIQUIDE™

# CERTIFICATE of ANALYSIS

## Interference-Free Multi-Component EPA Protocol Gases

| Cyl. Number: | Cyl. Pressure:* | Document Number: |
|---|---|---|
| CC70989 | 1667psig | 9032348 |
| **Assay Date:** | **Expiration Date:** | **Item Number:** |
| 07/23/01 | 07/22/04 | |
| **Customer:** | **P.O. Number:** | **Notes:** |
| Technical Services | 070601 | |

*Mixture is valid only to 150 psig

| COMPONENT Name | REQUESTED Concentration | ASSAY Concentration |
|---|---|---|
| Carbon Monoxide | 2000 ppm | 1994 ±30 ppm |
| Nitrogen | Balance | Balance |

EPA Protocol Section No. 2.2
Procedure: G1

NOTE: Analytical uncertainty and NIST traceability are in compliance with EPA-600/R-97/123

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

| Std. Name | Std. # | Conc. | Units | Std. Error | Comp. | Balance | Cyl. No. | Exp. Date | Sample No. |
|---|---|---|---|---|---|---|---|---|---|
| GMIS91 | GMIS91 | 1500.0 | ppm | 21.0 | CO | N2 | CC113811 | 06/22/03 | N.A. |

| Component 1: Carbon Monoxide Gas Analyzer Employed | | Component 2: None Gas Analyzer Employed | | Component 3: Gas Analyzer Employed | |
|---|---|---|---|---|---|
| Manufacturer: | KVB/Analect | Manufacturer: | | Manufacturer: | |
| Model Number: | EN3024 | Model Number: | | Model Number: | |
| Serial Number: | 3024 | Serial Number: | | Serial Number: | |
| Analytical Principle: | FTIR | Analytical Principle: | | Analytical Principle: | |
| MPC Calibrated: | 07/05/01 | MPC Calibrated: | | MPC Calibrated: | |

| 07/16/01 | Trial 1 | Trial 2 | Trial 3 | Units |
|---|---|---|---|---|
| Zero | -0.11 | -0.33 | -0.28 | |
| Reference 1 | 1614.16 | 1639.01 | 1648.95 | |
| Reference 2 | | | | |
| Candidate | 2132.25 | 2176.69 | 2193.10 | |
| Result | 1957.28 | 1998.07 | 2013.12 | ppm |
| | Mean Result: | | 1989.49 | ppm |

Component 1
Carbon Monoxide

| 07/23/01 | Trial 1 | Trial 2 | Trial 3 | Units |
|---|---|---|---|---|
| Zero | -0.02 | 0.05 | 0.16 | |
| Reference 1 | 1673.01 | 1678.36 | 1674.41 | |
| Reference 2 | | | | |
| Candidate | 2226.87 | 2236.96 | 2235.43 | |
| Result | 1993.92 | 2002.95 | 2001.58 | ppm |
| | Mean Result: | | 1999.49 | ppm |

Analyst:

Air Liquide America Corporation
11426 Fairmont Parkway, La Porte, Texas 77571-6000
Phone: (281) 474-8400 Fax: (281) 474-8419

# Airgas

Airgas Specialty Gases
12722 South Wentworth Avenue
Chicago, IL 60628
773.785.3000 Fax: 773.785.1926
www.airgas.com

## *Certificate of Analysis: E.P.A. Protocol Gas Mixture*

Certification performed in accordance with "EPA Traceability Protocol (Sept.1997)" using assay procedures listed.

| | | | |
|---|---|---|---|
| Cylinder No: | SG9140092BAL | Order No: | 008973-00 |
| Certification Date: | 09/9/2002 | Expiration Date: | 09/9/2005 |
| Cylinder Pressure: | 2000 | Part No: | E02NI95E15A0077 |

*Do not use cylinder below 150 psig.

| *Component* | *Certified Concentration* | *Unit of Measure* | *Accuracy* | *Procedure* | *Analytical Principle* |
|---|---|---|---|---|---|
| Carbon Dioxide | 5.049 | % | 1% | G-1 | NDIR |
| Nitrogen | Balance | | | | |

Nox (Reference Value Only) ppm

**Reference Standard Information**

| *Type* | *Component* | *Concentration* | *Unit* | *Cylinder Number* |
|---|---|---|---|---|
| Ntrm | Carbon Dioxide | 4.204 | % | SG9169571BAL |

**Analytical Data**

Component 1: Carbon Dioxide

1st Analysis Date: 09/9/2002

| | | | | | |
|---|---|---|---|---|---|
| Zero | 0.000 | Cand | 5.046 | Ref | 4.202 |
| Zero | 0.000 | Cand | 5.045 | Ref | 4.200 |
| Zero | 0.000 | Cand | 5.046 | Ref | 4.201 |

2nd Analysis Date: _____

| | | | | | |
|---|---|---|---|---|---|
| Zero | | Cand | | Ref | |
| Zero | | Cand | | Ref | |
| Zero | | Cand | | Ref | |

Analyzed by: _____ Approved by: _____

# APPENDIX – G

## Process Data

# PRODUCTION DATA FOR OCTOBER 29 AND 31, 2002 CO TESTING

| | | | | | |
|---|---|---|---|---|---|
| **DATE** | 10/29/02 | | 10/31/02 | | |
| **RUN** | 1 | 2 | 1 | 2 | 3 |
| **TIME** | 1225-1324 | 1433-1532 | 1330-1429 | 1547-1646 | 1710-1809 |

Notes: ADTBPH is air-dried tons of bleached pulp per hour
Kappa is the pre-washer kappa
%ClO2 is the %ClO2 applied in that stage

| | | Do Stage | | | | Eop Stage | | D1 Stage | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Run | ADTBPH | %SW | %HW | Kappa | %ClO2 | %SW | %HW | %SW | %HW | %ClO2 |
| 1 (29th) | 49.8 | 100 | 0 | 22.0 | 2.0 | 100 | 0 | 100 | 0 | 0.5 |
| 2 (29th) | 30.1 | 100 | 0 | 22.4 | 2.0 | 100 | 0 | 100 | 0 | 0.6 |
| 1 (31st) | 50.0 | 100 | 0 | 22.8 | 2.2 | 100 | 0 | 100 | 0 | 0.7 |
| 2 (31st) | 50.2 | 100 | 0 | 23.3 | 2.2 | 100 | 0 | 100 | 0 | 0.7 |
| 3 (31st) | 50.1 | 100 | 0 | 23.3 | 2.2 | 100 | 0 | 100 | 0 | 0.7 |

***THE KAPPA AND %ClO2 APPLIED ARE CONFIDENTIAL BUSINESS INFORMATION.***

# PRODUCTION AND SCRUBBER DATA FOR OCTOBER 29 AND 31, 2002 CHLORINATED HAP (METHOD 26A) TESTS

| | | | | | | |
|---|---|---|---|---|---|---|
| **DATE** | 10/29/02 | | | 10/31/02 | | |
| **RUN** | 1 | 2 | 3 | 1 | 2 | 3 |
| **TIME** | 1218-1323 | 1433-1538 | 1700-1802 | 1332-1443 | 1550-1656 | 1710-1816 |

Notes: ADTBPH is air-dried tons of bleached pulp per hour
Kappa is the pre-washer kappa
$\%ClO_2$ is the $\%ClO_2$ applied in that stage

| | | Do Stage | | | | Eop Stage | | D1 Stage | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Run | ADTBPH | %SW | %HW | Kappa | $\%ClO_2$ | %SW | %HW | %SW | %HW | $\%ClO_2$ |
| 1 (29th) | 49.8 | 100.0 | 0.0 | 21.9 | 2.0 | 100.0 | 0.0 | 100.0 | 0.0 | 0.5 |
| 2 (29th) | 30.1 | 100.0 | 0.0 | 22.4 | 2.0 | 100.0 | 0.0 | 100.0 | 0.0 | 0.7 |
| 3 (29th) | 30.0 | 100.0 | 0.0 | 22.9 | 1.6 | 100.0 | 0.0 | 100.0 | 0.0 | 0.7 |
| 1 (31st) | 49.8 | 100.0 | 0.0 | 21.9 | 2.2 | 100.0 | 0.0 | 100.0 | 0.0 | 0.5 |
| 2 (31st) | 49.8 | 100.0 | 0.0 | 21.9 | 2.2 | 100.0 | 0.0 | 100.0 | 0.0 | 0.5 |
| 3 (31st) | 49.8 | 100.0 | 0.0 | 21.9 | 2.2 | 100.0 | 0.0 | 100.0 | 0.0 | 0.5 |

***THE KAPPA AND $\%ClO_2$ APPLIED ARE CONFIDENTIAL BUSINESS INFORMATION.***

| Run | Flow, gpm | pH | Fan Load, % | Fan Amps | Fan Differential, in. $H_2O$ |
|---|---|---|---|---|---|
| 1 (29th) | 1262 | 9.2 | 84 | 15.0 | 20.8 |
| 2 (29th) | 1207 | 8.9 | 84 | 15.1 | 20.8 |
| 3 (29th) | 1153 | 9.0 | 85 | 15.2 | 21.1 |
| 1 (31st) | 1252 | 9.3 | 85 | 15.4 | 21.3 |
| 2 (31st) | 1258 | 9.3 | 85 | 15.4 | 21.3 |
| 3 (31st) | 1263 | 9.2 | 86 | 15.4 | 21.4 |

# Cl2 Testing Raw Scrubber Data

Run 1 10/29/02 1218-1323

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential, in. H2O |
|---|---|---|---|---|---|
| 1218-1233 | 1263 | 9.2 | 85 | 15.2 | 20.9 |
| 1233-1248 | 1263 | 9.1 | 84 | 15.1 | 20.9 |
| 1248-1303 | 1263 | 9.1 | 84 | 15.1 | 20.8 |
| 1303-1318 | 1262 | 9.0 | 83 | 15.0 | 20.8 |
| Average | 1262 | 9.1 | 84 | 15.1 | 20.9 |

# Cl2 Testing Raw Scrubber Data

Run 2 10/29/02 1433-1538

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential, in. H2O |
|---|---|---|---|---|---|
| 1433-1448 | 1239 | 8.9 | 83 | 15.0 | 20.8 |
| 1448-1503 | 1228 | 8.9 | 83 | 15.0 | 20.8 |
| 1503-1518 | 1217 | 8.9 | 83 | 15.0 | 20.8 |
| 1518-1533 | 1207 | 8.9 | 84 | 15.1 | 20.9 |
| Average | 1223 | 8.9 | 84 | 15.0 | 20.8 |

# Cl2 Testing Raw Scrubber Data

Run 3 10/29/02 1700-1802

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential, in. H2O |
|---|---|---|---|---|---|
| 1700-1715 | 1163 | 9.0 | 84 | 15.2 | 21.1 |
| 1715-1730 | 1159 | 9.0 | 84 | 15.2 | 21.1 |
| 1730-1745 | 1156 | 9.0 | 85 | 15.2 | 21.1 |
| 1745-1800 | 1153 | 9.0 | 85 | 15.2 | 21.1 |
| Average | 1158 | 9.0 | 84 | 15.2 | 21.1 |

# Cl2 Testing Raw Scrubber Data

Run 1 10/31/02 1332-1443

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential, in. H2O |
|---|---|---|---|---|---|
| 1332-1347 | 1252 | 9.3 | 86 | 15.4 | 21.4 |
| 1347-1402 | 1252 | 9.3 | 85 | 15.4 | 21.3 |
| 1402-1417 | 1252 | 9.3 | 85 | 15.4 | 21.3 |
| 1417-1432 | 1254 | 9.3 | 86 | 15.4 | 21.3 |
| 1432-1447 | 1254 | 9.3 | 86 | 15.4 | 21.3 |
| Average | 1253 | 9.3 | 85 | 15.4 | 21.3 |

# Cl2 Testing Raw Scrubber Data

Run 2 10/31/02 1550-1656

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential, in. H2O |
|---|---|---|---|---|---|
| 1550-1605 | 1258 | 9.3 | 85 | 15.4 | 21.3 |
| 1605-1620 | 1258 | 9.3 | 85 | 15.4 | 21.4 |
| 1620-1635 | 1259 | 9.3 | 85 | 15.4 | 21.4 |
| 1635-1650 | 1259 | 9.3 | 86 | 15.4 | 21.4 |
| Average | 1259 | 9.3 | 85 | 15.4 | 21.4 |

# Cl2 Testing Raw Scrubber Data

Run 3 10/31/02 1710-1816

| | Flow, gpm | pH | Fan Load, % | Fan Amps | Scrubber Differential, in. H2O |
|---|---|---|---|---|---|
| 1710-1725 | 1261 | 9.3 | 86 | 15.5 | 21.4 |
| 1725-1740 | 1261 | 9.3 | 86 | 15.4 | 21.4 |
| 1740-1755 | 1262 | 9.3 | 86 | 15.5 | 21.5 |
| 1755-1810 | 1263 | 9.2 | 86 | 15.4 | 21.5 |
| Average | 1262 | 9.3 | 86 | 15.4 | 21.4 |

## APPENDIX – H

## Project Participants

| | |
|---|---|
| Joe Cooksey of AASI | Report Review |
| Randy L Weston of AASI | Project Manager<br>Report Preparation<br>Field Testing |
| George Hawkins of AASI | Field Testing |
| Roger Dilinger of AASI | Field Testing |
| Joe Taylor of GP | Testing Support |

# Attachment D

**Subsection K. This section addresses the following emissions unit(s).**

| E.U. ID No. | Brief Description |
|---|---|
| 036 | Elemental Chlorine Free (ECF) No. 3 Bleach Plant |

Emissions Unit 036 consists of an ECF bleach plant. This plant uses chlorine dioxide in the bleaching process. Emissions are controlled by a wet scrubber. This emissions unit is regulated under 40 CFR 63 Subpart S - National Emission Standards for Hazardous Air Pollutants for Pulp Mills, adopted and incorporated by reference in Rule 62-204.800, F.A.C.; Rule 212.400(5), F.A.C., Prevention of Significant Deterioration (PSD): Permit(s) No. PSD-FL-264; Rule 62-212.400(6), F.A.C., and Best Available Control Technology (BACT) Determination, dated June 30, 1999.

**The following specific conditions apply to the emissions unit(s) listed above:**

## Operational Parameters

**K.0.** The Permittee shall meet the compliance milestones stated in Appendix CP-Compliance Plan.

**K.1.** Permitted Capacity. Until compliance is demonstrated with the air construction permit issued pursuant to the PSD review identified in the Compliance Schedule of the Compliance Plan, Appendix CP, Condition X.1, the maximum production rate of this emissions unit shall not exceed 840 tons per day of air-dried bleached pulp (ADBP) as a maximum monthly average. [Consent Order OGC File No. 02-1886]

**K.2.** Hours of Operation. The hours of operation are not restricted, i.e. 8,760 hours per year. [Rules 62-4.1610(2) and 62-210.200(PTE), F.A.C., Construction Permit No. 1070005-006-AC/PSD/FL-264]

## Operating Standards

**K.3.** Bleaching Stage Equipment. The equipment at each bleaching stage, of the No. 3 Bleach Plant, where chlorinated compounds are introduced shall be enclosed and vented into a closed-vent system and routed to the wet scrubber stack for control. The enclosures and closed-vent system shall meet the requirements specified in Condition K.5.
[63.445(b)]

**K.4.** Chloroform air emissions. To reduce chloroform air emissions to the atmosphere, the No. 3 Bleach Plant shall not use hypochlorite or chlorine for bleaching in the bleaching system or line. [63.445(d)(2), Construction Permit No. 1070005-006-AC/PSD-FL-264]

**K.5.** Enclosures and Closed-Vent Systems. The enclosure and closed-vent system specified in Condition K.3 for capturing and transporting vent streams that contain HAP shall meet the following requirements:

(a) Each enclosure shall maintain negative pressure at each enclosure or hood opening as demonstrated by the procedures specified in Condition K.18. Each enclosure or hood opening closed during the initial performance test specified in 40 CFR 63.457(a) shall be maintained in the same closed and sealed position as during the performance test at all times except when necessary to use the opening for sampling, inspection, maintenance, or repairs.

(b) Each component of the closed-vent system used to comply with Condition K.3. that is operated at positive pressure and located prior to a control device shall be designed for and operated with no detectable leaks as indicated by an instrument reading of less than 500 parts per million by volume above background, as measured by the procedures specified in Condition K.17..

(c)Each bypass line in the closed-vent system that could divert vent streams containing HAP to the atmosphere without meeting the emission limitations in 40 CFR 63.445 shall comply with either of the following requirements:

(1) On each bypass line, the owner or operator shall install, calibrate, maintain, and operate according to manufacturer's specifications a flow indicator that provides a record of the presence of gas stream flow in the bypass line at least once every 15 minutes. The flow indicator shall be installed in the bypass line in such a way as to indicate flow in the bypass line; or

(2) For bypass line valves that are not computer controlled, the owner or operator shall maintain the bypass line valve in the closed position with a car seal or a seal placed on the valve or closure mechanism in such a way that valve or closure mechanism cannot be opened without breaking the seal.

[63.450]

## Emission Limitations and Standards

{Permitting note: Table 1-1, Summary of Air Pollutant Standards and Terms, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

{Permitting Note: Unless otherwise specified, the averaging time for this condition is based on the specified averaging time of the applicable test method.}

**K.6.** Carbon Monoxide. Carbon monoxide emissions shall not exceed 46 lbs/hr and 201 tons per year[1]. Carbon monoxide emissions shall be minimized to the extent practicable by efficient bleaching operations.

[1] Compliance issues associated with CO emissions from this emissions unit are addressed within Consent Order OGC File No. 02-1886 until compliance is demonstrated with the air construction permit issued pursuant to the PSD review identified in the Compliance Schedule of the Compliance Plan, Appendix CP, Condition X.1.

[Rule 62-212.410, F.A.C., Construction Permit No. 1070005-006-AC/PSD-FL-264, Consent Order OGC File No. 02-1886]

**K.7.** Total Chlorinated HAPs. The total chlorinated HAP outlet concentration shall not exceed 10 parts per million by volume
[63.445(c)(2); Construction Permit No. 1070005-006-AC/PSD-FL-264]

**K.8.** Visible Emissions. Visible Emissions form this emissions unit shall not exceed 20% opacity. The visible emissions limit shall only be effective if the visible emission measurement can be made without being substantially affected by plume mixing or moisture condensation.
[Rule 62-296.320, F.A.C.; Rule 62-296.404(2)(b), F.A.C.; Construction Permit No. 1070005-006-AC/PSD-FL-264]

**Excess Emissions**

**K.9.** Excess emissions resulting from startup, shutdown or malfunction of any source shall be permitted providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized but in no case exceed two hours in any 24 hour period unless specifically authorized by the Department for longer duration.
[62-201.700(1), F.A.C.]

**K.10.** Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown, or malfunction shall be prohibited.
[Rule 62-210.700(4), F.A.C.]

**K.11.** Considering operational variations in types of industrial equipment operations affected by this rule, the Department may adjust maximum and minimum factors to provide reasonable and practical regulatory controls consistent with the public interest.
[Rule 62-210.700(5), F.A.C.]

**K.12.** In case of excess emissions resulting from malfunctions, each source shall notify the Department or the appropriate Local program in accordance with Rule 62-4.130, F.A.C. A full written report on the malfunctions shall be submitted in a quarterly report, if requested by the Department.
[Rule 62-210.700(6), F.A.C.]

## Test Methods and Procedures

{Permitting note: Table 2-1, Summary of Compliance Requirements, summarizes information for convenience purposes only. This table does not supersede any of the terms or conditions of this permit.}

**K.13.** Carbon Monoxide. The test method for carbon monoxide emissions shall be EPA Method 10 as incorporated in 40 CFR 60, Appendix A. The compliance testing shall be conducted annually with a frequency base date of 05/25[1].

[1] Compliance issues associated with CO emissions from this emissions unit are addressed within Consent Order OGC File No. 02-1886 until compliance is demonstrated with the air construction permit issued pursuant to the PSD review identified in the Compliance Schedule of the Compliance Plan, Appendix CP, Condition X.1.

[Construction Permit No. 1070005-006-AC/PSD-FL-264, Rule 62-204.800, F.A.C., Consent Order OGC File No. 02-1886]

*Please reference the Permit No., Facility ID No., and appropriate Emissions Unit(s) ID No(s). on all correspondence, test report submittals, applications, etc.*

**K.14.** Total Chlorinated HAPs. The test method for total chlorinated HAPs shall be EPA Method 26A as incorporated in 40 CFR 60, Appendix A. The compliance testing shall be conducted annually with a frequency base date of 05/26.
[Construction Permit No. 1070005-006-AC/PSD-FL-264; Rule 62-297.310(7)(a)4.c., F.A.C.]

**K.15.** Visible Emissions. The test method for visible emissions shall be EPA Method 9 as incorporated in 40 CFR 60, Appendix A. The compliance testing shall be conducted annually with a frequency base date of 05/25.
[Construction Permit No. 1070005-006-AC/PSD-FL-264, Rule 62-204.800, F.A.C.]

**K.16.** Vent sampling port locations and gas stream properties. For purposes of selecting vent sampling port locations and determining vent gas stream properties, required in 40 CFR 63.445, the owner or operator shall comply with the following procedures:

(1) Method 1 or 1A of part 60, appendix A, as appropriate, shall be used for selection of the sampling site as follows:

(i) To sample for vent gas concentrations and volumetric flow rates, the sampling site shall be located prior to dilution of the vent gas stream and prior to release to the atmosphere;

(ii) For determining compliance with percent reduction requirements, sampling sites shall be located prior to the inlet of the control device and at the outlet of the control device; measurements shall be performed simultaneously at the two sampling sites; and

(iii) For determining compliance with concentration limits or mass emission rate limits, the sampling site shall be located at the outlet of the control device.

(2) No traverse site selection method is needed for vents smaller than 0.10 meter (4.0 inches) in diameter.

(3) The vent gas volumetric flow rate shall be determined using Method 2, 2A, 2C, or 2D of part 60, appendix A, as appropriate.

(4) The moisture content of the vent gas shall be measured using Method 4 of part 60, appendix A.

(5) To determine vent gas concentrations, the owner or operator shall collect a minimum of three test runs that are representative of normal conditions and average the resulting pollutant concentrations using the following procedures.

(i) Method 308 in Appendix A of this part shall be used to determine the methanol concentration.

(ii) Except for the modifications specified in paragraphs (b)(5)(ii)(A) through (b)(5)(ii)(K) of this section, Method 26A of part 60, appendix A shall be used to determine chlorine concentration in the vent stream.

(A) *Probe/Sampling Line.* A separate probe is not required. The sampling line shall be an appropriate length of 0.64 cm (0.25 in) OD Teflon® tubing. The sample inlet end of the sampling line shall be inserted into the stack in such a way as to not entrain liquid condensation from the vent gases. The other end shall be connected to the impingers. The length of the tubing may vary from one sampling site to another, but shall be as short as possible in each situation. If sampling is conducted in sunlight, opaque tubing shall be used. Alternatively, if transparent tubing is used, it shall be covered with opaque tape.

(B) *Impinger Train.* Three 30 milliliter (ml) capacity midget impingers shall be connected in series to the sampling line. The impingers shall have regular tapered stems.

Silica gel shall be placed in the third impinger as a desiccant. All impinger train connectors shall be glass and/or Teflon®.

(C) *Critical Orifice.* The critical orifice shall have a flow rate of 200 to 250 ml/min and shall be followed by a vacuum pump capable of providing a vacuum of 640 millimeters of mercury (mm Hg). A 45 millimeter diameter in-line Teflon® 0.8 micrometer filter shall follow the impingers to project the critical orifice and vacuum pump.

(D) The following are necessary for the analysis apparatus:

(*1*) Wash bottle filled with deionized water;

(*2*) 25 or 50 ml graduated burette and stand;

(*3*) Magnetic stirring apparatus and stir bar;

(*4*) Calibrated pH Meter;

(*5*) 150-250 ml beaker or flask; and

(*6*) A 5 ml pipette.

(E) The procedures listed in paragraphs (b)(5)(ii)(E)(*1*) through (b)(5)(ii)(E)(*7*) of this section shall be used to prepare the reagents.

(*1*) To prepare the 1 molarity (M) potassium dihydrogen phosphate solution, dissolve 13.61 grams (g) of potassium dihydrogen phosphate in water and dilute to 100 ml.

(*2*) To prepare the 1 M sodium hydroxide solution (NaOH), dissolve 4.0 g of sodium hydroxide in water and dilute to 100 ml.

(*3*) To prepare the buffered 2 percent potassium iodide solution, dissolve 20 g of potassium iodide in 900 ml water. Add 50 ml of the 1 M potassium dihydrogen phosphate solution and 30 ml of the 1 M sodium hydroxide solution. While stirring solution, measure the pH of solution electrometrically and add the 1 M sodium hydroxide solution to bring pH to between 6.95 and 7.05.

(*4*) To prepare the 0.1 normality (N) sodium thiosulfate solution, dissolve 25 g of sodium thiosulfate, pentahydrate, in 800 ml of freshly boiled and cooled distilled water in a 1-liter volumetric flask. Dilute to volume. To prepare the 0.01 N sodium thiosulfate solution, add 10.0 ml standardized 0.1 N sodium thiosulfate solution to a 100 ml volumetric flask, and dilute to volume with water.

(*5*)To standardize the 0.1 N sodium thiosulfate solution, dissolve 3.249 g of anhydrous potassium bi-iodate, primary standard quality, or 3.567 g potassium iodate dried at 103 +/- 2 degrees Centigrade for 1 hour, in distilled water and dilute to 1000 ml to yield a 0.1000 N solution. Store in a glass-stoppered bottle. To 80 ml distilled water, add, with constant stirring, 1 ml concentrated sulfuric acid, 10.00 ml 0.1000 N anhydrous potassium bi-iodate, and 1 g potassium iodide. Titrate immediately with 0.1 n sodium thiosulfate titrant until the yellow color of the liberated iodine is almost discharged. Add 1 ml starch indicator solution and continue titrating until the blue color disappears. The normality of the sodium thiosulfate solution is inversely proportional to the ml of sodium thiosulfate solution consumed:

$$\text{Normality of Sodium Thiosulfate} = \frac{1}{\text{ml Sodium Thiosulfate Consumed}}$$

(6) To prepare the starch indicator solution, add a small amount of cold water to 5 g starch and grind in a mortar to obtain a thin paste. Pour paste into 1 L of boiling distilled water, stir, and let settle overnight. Use clear supernate for starch indicator solution.

(7) To prepare the 10 percent sulfuric acid solution, add 10 ml of concentrated sulfuric acid to 80 ml water in an 100 ml volumetric flask. Dilute to volume.

(F) The procedures specified in paragraphs (b)(5)(ii)(F)(*1*) through (b)(5)(ii)(F)(5) of this section shall be used to perform the sampling.

(*1*) Preparation of Collection Train. Measure 20 ml buffered potassium iodide solution into each of the first two impingers and connect probe, impingers, filter, critical orifice, and pump. The sampling line and the impingers shall be shielded from sunlight.

(*2*) Leak and Flow Check Procedure. Plug sampling line inlet tip and turn on pump. If a flow of bubbles is visible in either of the liquid impingers, tighten fittings and adjust connections and impingers. A leakage rate not in excess of 2 percent of the sampling rate is acceptable. Carefully remove the plug from the end of the probe. Check the flow rate at the probe inlet with a bubble tube flow meter. The flow should be comparable or slightly less than the flow rate of the critical orifice with the impingers off-line. Record the flow and turn off the pump.

(*3*) Sample Collection. Insert the sampling line into the stack and secure it with the tip slightly lower than the port height. Start the pump, recording the time. End the sampling after 60 minutes, or after yellow color is observed in the second in-line impinger. Record time and remove the tubing from the vent. Recheck flow rate at sampling line inlet and turn off pump. If the flow rate has changed significantly, redo sampling with fresh capture solution. A slight variation (less than 5 percent) in flow may be averaged. With the inlet end of the line elevated above the impingers, add about 5 ml water into the inlet tip to rinse the line into the first impinger.

(*4*) Sample Analysis. Fill the burette with 0.01 N sodium thiosulfate solution to the zero mark. Combine the contents of the impingers in the beaker or flask. Stir the solution and titrate with thiosulfate until the solution is colorless. Record the volume of the first endpoint (TN, ml). Add 5 ml of the 10 percent sulfuric acid solution, and continue the titration until the contents of the flask are again colorless. Record the total volume of titrant required to go through the first and to the second endpoint (TA, ml). If the volume of neutral titer is less than 0.5 ml, repeat the testing for a longer period of time. It is important that sufficient lighting be present to clearly see the endpoints, which are

determined when the solution turns from pale yellow to colorless. A lighted stirring plate and a white background are useful for this purpose.

(5) Interferences. Known interfering agents of this method are sulfur dioxide and hydrogen peroxide. Sulfur dioxide, which is used to reduce oxidant residuals in some bleaching systems, reduces formed iodine to iodide in the capture solution. It is therefore a negative interference for chlorine, and in some cases could result in erroneous negative chlorine concentrations. Any agent capable of reducing iodine to iodide could interfere in this manner. A chromium trioxide impregnated filter will capture sulfur dioxide and pass chlorine and chlorine dioxide. Hydrogen peroxide, which is commonly used as a bleaching agent in modern bleaching systems, reacts with iodide to form iodine and thus can cause a positive interference in the chlorine measurement. Due to the chemistry involved, the precision of the chlorine analysis will decrease as the ratio of chlorine dioxide to chlorine increases. Slightly negative calculated concentrations of chlorine may occur when sampling a vent gas with high concentrations of chlorine dioxide and very low concentrations of chlorine.

(6) The minimum sampling time for each of the three test runs shall be 1 hour in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, then the samples shall be taken at approximately equal intervals in time, such as 15 minute intervals during the test run.

(G) The following calculation shall be performed to determine the corrected sampling flow rate:

$$S_c = \frac{S_u(BP - PW)(293)}{(760)(273 + t)}$$

where:

$S_C$ = Corrected (dry standard) sampling flow rate, liters per minute;
$S_U$ = Uncorrected sampling flow rate, L/min;
BP = Barometric pressure at time of sampling;
PW = Saturated partial pressure of water vapor, mm Hg at temperature; and
t = Ambient temperature, °C.

(H) The following calculation shall be performed to determine the moles of chlorine in the sample:

$Cl_2$ Moles = 1/8000 (5 $T_N$ - $T_A$) x $N_{Thio}$

where:

$T_N$ = Volume neutral titer, ml;
$T_A$ = Volume acid titer (total), ml; and
$N_{Thio}$ = Normality of sodium thiosulfate titrant.

(I) The following calculation shall be performed to determine the concentration of chlorine in the sample:

$$ClO_2\ Moles = 1/4000\ (T_A - T_N) \times N_{Thio}$$

where:

$T_A$ = Volume acid titer (total), ml;
$T_N$ = Volume neutral titer, ml; and
$N_{Thio}$ = Normality of sodium thiosulfate titrant.

(K) The following calculation shall be performed to determine the concentration of chlorine dioxide in the sample:

$$ClO_2\ ppmv = \frac{6010(T_A - T_N) \times N_{Thio}}{S_c \times t_s}$$

where:

$S_C$ = Corrected (dry standard) sampling flow rate, liters per minute;
$t_S$ = Time sampled, minutes;
$T_A$ = Volume acid titer (total), ml;
$T_N$ = Volume neutral titer, ml; and
$N_{Thio}$ = Normality of sodium thiosulfate titrant.

(iii) Any other method that measures the total HAP or methanol concentration that has been demonstrated to the Administrator's satisfaction.

(6) The minimum sampling time for each of the three runs per method shall be 1 hour in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, then the samples shall be taken at approximately equal intervals in time, such as 15 minute intervals during the run.
[63.457(b)]

**K.17.** Detectable leak procedures. To measure detectable leaks for closed-vent systems as specified in Condition K.5., the owner or operator shall comply with the following:

(1) Method 21, of Part 60, Appendix A; and

(2) The instrument specified in Method 21 shall be calibrated before use according to the procedures specified in Method 21 on each day that leak checks are performed. The following calibration gases shall be used:

(i) Zero air (less than 10 parts per million by volume of hydrocarbon in air); and

(ii) A mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 parts per million by volume methane or n-hexane.
[63.457(d)]

**K.18.** Negative pressure procedures. To demonstrate negative pressure at process equipment enclosure openings as specified in Condition K.5., the owner or operator shall use one of the following procedures:

(1) An anemometer to demonstrate flow into the enclosure opening;

(2) Measure the static pressure across the opening;

(3) Smoke tubes to demonstrate flow into the enclosure opening; or

(4) Any other industrial ventilation test method demonstrated to the Administrator's satisfaction.
[63.457(e)]

**K.19.** Bleaching HAP concentration measurement. For purposes of complying with the bleaching system requirements in § 63.445, the owner or operator shall measure the total HAP concentration as the sum of all individual chlorinated HAPs or as chlorine.
[63.457(h)]

**Continuous Monitoring Requirements**

**K.20.** The permittee shall install, calibrate, certify, operate, and maintain according to the manufacturer's specifications, a continuous monitoring system (CMS, as defined in §63.2) as specified in Condition K.21. The CMS shall include a continuous recorder.
[63.453(a), Construction Permit No. 1070005-006-AC/PSD-FL-264]

**K.21.** A CMS shall be operated to measure the following parameters:
(1) The pH or the oxidation/reduction potential of the gas scrubber effluent;
(2) Fan amperage of the bleaching system vent gas fan*; and
(3) The gas scrubber liquid influent flow rate.

*EPA Approved Alternative Monitoring Parameter dated December 22, 2000.
[63.453(c), Construction Permit No. 1070005-006-AC/PSD-FL-264]

**K.22.** Enclosure and Closed-Vent System. The enclosure and closed-vent system shall comply with the following requirements:

(1) For each enclosure opening, a visual inspection of the closure mechanism specified in K.5.(a) shall be performed at least once every 30 days to ensure the opening is maintained in the closed position and sealed.

(2) The closed-vent system shall be visually inspected every 30 days and at other times as requested by the Administrator. The visual inspection shall include inspection of ductwork, piping, enclosures, and connections to covers for visible evidence of defects.

(3) For positive pressure closed-vent systems or portions of closed-vent systems, demonstrate no detectable leaks as specified in Condition K.5.(b) measured initially and annually by the procedures in Condition K.17..

(4) Demonstrate initially and annually that each enclosure opening is maintained at negative pressure as specified in Condition K.18..

(5) The valve or closure mechanism specified in Condition K.5.(c)(2) shall be inspected at least once every 30 days to ensure that the valve is maintained in the closed position and the emission point gas stream is not diverted through the bypass line.

(6) If an inspection required by paragraphs (1) through (5) of this Condition identifies visible defects in ductwork, piping, enclosures or connections to covers required by Condition K.5., or if an instrument reading of 500 parts per million by volume or greater above background is measured, or if enclosure openings are not maintained at negative pressure, then the following corrective actions shall be taken as soon as practicable.

(i) A first effort to repair or correct the closed-vent system shall be made as soon as practicable but no later than 5 calendar days after the problem is identified.

(ii) The repair or corrective action shall be completed no later than 15 calendar days after the problem is identified. Delay of repair or corrective action is allowed if the repair or corrective action is technically infeasible without a process unit shutdown or if the owner or

operator determines that the emissions resulting from immediate repair would be greater than the emissions likely to result from delay of repair. Repair of such equipment shall be completed by the end of the next process unit shutdown.
[63.453(k)]

**K.23.** Wet Scrubber Operating Parameters. The wet scrubber shall be operated in a manner consistent with the minimum pH of the scrubbing medium effluent at 9.1 s.u., the minimum fan motor loading of 85% (15.3 amps), and the minimum scrubber recirculation flow rate of 1,229 gpm. Operation of the wet scrubber below these minimum operating parameter values or failure to perform procedures required by 40 CFR 63 Subpart S shall constitute a violation of Condition K.7. and be reported as a period of excess emissions.

{Permitting Note: Unless otherwise specified, the averaging time for this condition is based on the specified averaging time of the applicable test method.}
[63.453(o), Applicant Request dated 12/20/02]

## Recordkeeping Requirements

**K.24.** The permittee shall maintain daily records of the following information in order to document continuous compliance with Condition Nos. K.1., K.6.., K.7., and K.21.:

- Quantity of pulp processed through the No. 3 Bleach Plant in air-dried bleach tons.
- Scrubber parameters monitored per Condition K.21.

**K.25.** The permittee shall comply with the recordkeeping requirements of 40 CFR 63.10, as shown in Table 1 of 40 CFR Part 63 Subpart S.
[63.454(a)]

**K.26.** Enclosure Opening, Closed-Vent System and Closed Collection System. For each applicable enclosure opening, closed-vent system, and closed collection system, the owner or operator shall prepare and maintain a site-specific inspection plan including a drawing or schematic of the components of applicable affected equipment and shall record the following information for each inspection:

(1) Date of inspection;
(2) The equipment type and identification;
(3) Results of negative pressure tests for enclosures;
(4) Results of leak detection tests;
(5) The nature of the defect or leak and the method of detection (i.e., visual inspection or instrument detection);
(6) The date the defect or leak was detected and the date of each attempt to repair the defect or leak;
(7) Repair methods applied in each attempt to repair the defect or leak;
(8) The reason for the delay if the defect or leak is not repaired within 15 days after discovery;
(9) The expected date of successful repair of the defect or leak if the repair is not completed within 15 days;
(10) The date of successful repair of the defect or leak;

(11) The position and duration of opening of bypass line valves and the condition of any valve seals; and

(12) The duration of the use of bypass valves on computer controlled valves.
[63.454(b)]

**K.27.** New affected Process Equipment. The permittee shall record the CMS parameters specified in §63.453 and meet the requirements specified in Condition K.25., for any new affected process equipment that becomes subject to the standards of 40 CFR Part 63 Subpart S due to a process change or modification.
[63.454(d)]

## Reporting Requirements

**K.28.** The permittee shall comply with the reporting requirements of 40 CFR Part 63, Subpart A as specified in Table 1 of Subpart S.
[63.455(a)]

**Common Conditions - F.A.C. Test Requirements**

**K.29.** This emissions unit is also subject to applicable F.A.C. Test Requirements in Subsection N.

**Common Conditions - Periodic Monitoring**

**K.30.** This emissions unit is also subject to applicable Periodic Monitoring Requirements in Subsection P.

## Appendix CP- Compliance Plan

X.1. Compliance Schedule. The following dates shall be met to satisfy measurable progress milestones for the facility to come into compliance with Conditions A.10., K.6., and K.7.

| E.U. ID. No. | Milestone | Milestone Date |
|---|---|---|
| 036<br>014 | Responsible Official to enter into a consent order agreement with Department concerning the No. 3 ECF Bleach Plant, and initiate agreements concerning any other non-compliant conditions. | November 12, 2002 |
| 036 | Facility to submit a complete application, including completed responses to Department requests for additional information, for an air construction permit/PSD Determination. | February 1, 2003 |
| Facility | Responsible Official to submit "Certification of Compliance", addressing the entire facility, indicating what is not in compliance, when non-compliance started, the degree or amount of non-compliance, the duration of non-compliant operations, steps taken to identify and correct non-compliant conditions, and actions (with time table), to correct any current non-compliant conditions and achieve compliance. | March 1, 2003 |
| 036 | Initiation of on-site construction and/or installation of emission control equipment or process change authorized by air construction permit | No later than 3 months from the date of issuance of the resulting air construction permit/PSD Determination |
| 036 | Completion of on-site construction or installation of emission control equipment or process change authorized by air construction permit | No later than 9 months from the date of issuance of the resulting air construction permit/PSD Determination |
| 036 | Compliance Testing conducted and test reports submitted pursuant to requirements of air construction permit | Pursuant to the timeframes established in the air construction permit/PSD Determination |
| 014 | Compliance Testing conducted and test reports submitted for the No. 4 Power Boiler | April 1, 2003 |
| 036 | Submittal of Title V Operation Permit Revision for the incorporation of the air construction permit/PSD Determination for the No. 3 ECF Bleach Plant | At least 90 days prior to expiration of air construction permit, but no later than 180 days after commencement of operation |

| | | |
|---|---|---|
| 036 | Final Compliance | No later than 11 months from the date of issuance of the resulting air construction permit/PSD Determination |
| Facility | Responsible Official to submit "Certification of Compliance", addressing the entire facility, indicating what is not in compliance, when non-compliance started, the degree or amount of non-compliance, the duration of non-compliant operations, steps taken to identify and correct non-compliant conditions, and actions (with time table), to correct any current non-compliant conditions and achieve compliance. | No later than 12 months from the date of issuance of the resulting air construction permit/PSD Determination |

**X.2.** Permitted Capacity. Until compliance is demonstrated with the air construction permit issued pursuant to the PSD review identified in the Compliance Schedule of Condition X.1, above, the maximum throughput rate of this emissions unit shall not exceed 840 tons per day of air-dried bleached pulp (ADBP) as a maximum monthly average.
[Consent Order OGC File No. 02-1886]

**X.3.** Recordkeeping. The Permittee shall maintain material throughput logs that indicate the type and amount of material used daily.
[Consent Order OGC File No. 02-1886]

# Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary


November 26, 2002

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Theodore D. Kennedy, Vice President
Palatka Operations
Georgia-Pacific Corporation
Post Office Box 919
Palatka, Florida 32178-0919

Re: DEP File No. 1070005-019-AC (PSD-FL-264A)
Palatka Mill, No. 3 Bleach Plant

Dear Mr. Kennedy:

The Department has received the revised application on November 14, 2002 for increasing the CO emission rate for the No. 3 Bleach Plant at the above referenced facility in Putnam County. Based on our initial review of the proposed project, we have determined that additional information is needed in order to continue processing this application package. Please submit the information requested below to the Department's Bureau of Air Regulation:

1. Please provide the total pulp production at the facility for the years 1999, 2000 and 2001. Also, give a breakdown of where this pulp was utilized in the facility (bleached and unbleached areas). Additionally, provide a detailed accounting of this pulp when utilized in the tissue-making mill. If, additional pulp was bought during those years, please include that in the accounting. The Department is expecting a complete material balance of the pulp produced in the facility and the pulp bought by the facility when compared to the material shipped from the facility.
2. Please give a detailed accounting of how much of softwood and hardwood was utilized in the total pulp production at the facility for the years 1999, 2000 and 2001. How are the two types of woods segregated when feeding to the digesters? How is the pulp kept segregated and is there any blending of the pulp taking place prior to making final product.
3. During the plant trip on November 12, the No. 3 Bleach Plant was operating at 30 tph. Please indicate if the production rate was 30 ADTBP per hour?
4. During the plant trip on November 12, the facility personnel talked about a chart at the No. 3 Bleach Plant presentation, which indicated, reduced usage of $ClO_2$ and increased usage of oxygen and hydrogen peroxide to get the same bleach ability. If testing was done to authenticate this fact, please provide the necessary documents. Also, provide a detailed written description as well as the chart showed to the Department.

5. Please indicate if 100% of softwood pulp or 100% of hardwood pulp is processed through the bleach plant at any given time. Are there occasions when a mix of the two type of wood pulp is processed at the same time? What indicators are available in the control room to help the operators know what type and how much of either hardwood or softwood pulp is being processed.
6. Please explain how the $ClO_2$ application rate to the pulp is monitored. If data is kept on the application rate, how often is it recorded?
7. Please provide a copy of the initial and annual compliance tests done for this plant. The report should include information on the production rate of the bleach plant during the compliance tests.
8. The Department is in receipt of daily pulp production data covering a period from January 2000 until October 2002 (34 months). The daily bleached pulp production data indicates a highest daily production rate of 1197.9 tons on June 30, 2002, and a highest monthly average of 884 tons per day in September 2002. Please explain the reasons for not achieving the permitted production rates of 1702 tons daily maximum and 1350 tons per day monthly average for the No. 3 Bleach Plant.
9. Please provide detail test reports of the series of tests conducted in October 2002 to measure actual CO emissions from the plant.
10. Please provide the $ClO_2$ application rate for the series of tests conducted in October 2002.
11. Please list the pertinent information (% $ClO_2$ applied, kappa number, temperature etc.) that a compliance inspector should gather during an inspection of a bleach plant to ensure that the source is complying with the permitted CO emission limits. How will these parameters or others provide assurance that the limit is not exceeded?
12. Please explain if there is a nexus between $ClO_2$ application rate and HAP emissions from a bleach plant. If a nexus exists, how is it being applied to keep HAP emissions to a minimum from the plant?
13. Please explain how the quantity of lignin in the pulp entering the bleach plant is being monitored and what role, if any, is that playing in the $ClO_2$ application rate.
14. The application pages under Section I, Page 20 proposes 3-hour average basis for monitoring pH of the gas scrubbing medium, fan amperage of the bleaching system vent gas fan and the scrubber recirculation flow. Please indicate if continuous monitoring of these parameters is required in 40 CFR 60, Subpart S. If so, EPA will have to approve this request.
15. Please provide the information submitted by you to the vendors in getting the quote for CO removal using thermal oxidation, catalytic incineration or incineration in an existing boiler. Provide copies of the quotes received for the three options listed. Also, indicate if the thermal oxidizer and the catalytic incinerator are designed to be located upstream or downstream of the existing scrubber. What advantage does one location have over the other?
16. Please provide cost analysis in modifying (if required) the existing thermal oxidizer used for NCG's control to accommodate the bleach plant exhaust for CO control.
17. The BACT analysis refers to the removal of some VOC and HAP's with the control options selected for CO removal. Explain the reasons for not including the removal of VOC and HAP's in the cost effectiveness ($/ton) figure obtained for CO removal.

18. EPA Air Pollution Control Cost Manual recommends using a flat 10 percent over the operations labor wage rate for maintenance labor costs. Table B-2 of the application indicates the maintenance labor cost to be twice the operating labor cost. Please explain the discrepancy.
19. Please explain the reasons for adding the cost of a new stack in Table B-2 using thermal oxidation or catalytic incineration when a stack already exists.
20. In the original PSD permitting done in 1999, the purchased equipment cost for Regenerative Catalytic Oxidation providing 95% removal of CO emissions was given as $427,250. The same equipment cost for this modification is given to be $1,163,400. Please justify the increase of over $0.7M in a three-year period. Also, explain the reasons for not including the cost of gas conditioning equipment in the original project.

We have not yet received comments from the Northeast District, U.S. Fish and Wildlife Service or from the EPA. Their comments will be forwarded to you as soon as we receive them.

The Department will resume processing this application after receipt of the requested information. Rule 62-4.050(3), F.A.C. requires that all applications for a Department permit must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. A new certification statement by the authorized representative or responsible official must accompany any material changes to the application. Rule 62-4.055(1), F.A.C. now requires applicants to respond to requests for information within 90 days.

Please note that in accordance with Rule 62-4.055(1), "The applicant shall have ninety days after the Department mails a timely request for additional information to submit that information to the Department..... Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."

If you have any questions regarding this matter, please call Syed Arif, P.E. at (850) 921-9528.

Sincerely,

A. A. Linero, P.E. Administrator
New Source Review Section

AAL/sa

cc: Jeaneanne Gettle, EPA region IV
John Bunyak, NPS
C. Kirts, DEP-NED
M. Carpenter, Georgia Pacific
D. Buff, Golder Associates

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Mr. Theodore D. Kennedy
Vice President
Georgia-Pacific Corporation -
Palatka Operations
Post Office Box 919
Palatka, FL 32178-0919

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PS Form 3800, January 2001 — See Reverse for Instructions

**Golder Associates Inc.**

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

November 13, 2002

RECEIVED
NOV 14 2002
BUREAU OF AIR REGULATION

0237561

Florida Department of Environmental Protection
New Source Review Section
2600 Blair Stone Road MS 5505
Tallahassee, FL 32399-2400

Attention: Mr. Syed Arif, P.E.

RE: GEORGIA-PACIFIC PALATKA MILL, CO EMISSION RATE INCREASE, REVISED APPLICATION

Dear Syed:

Enclosed please find four (4) copies of a revised version of Attachment GP-EU1-J9 from the above-referenced air permit application to revise the PSD permit for the No. 3 Bleach Plant at Georgia-Pacific's (G-P) Palatka mill. Please replace Attachment GP-EU1-J9 in the application that was submitted on November 12, 2002, with this revised Attachment GP-EU1-J9.

If you have any questions, please contact me at (352) 336-5600 or Myra Carpenter, G-P Palatka, at (386) 329-0918.

Sincerely,

GOLDER ASSOCIATES INC.

David A. Buff

David A. Buff, P.E., Q.E.P.
Principal Engineer
Florida P.E. #19011
Seal

DB/FWH/nav

Enclosures

cc: M. Aguilar, G-P Atlanta
M. Carpenter, G-P Palatka
F. Howard, Golder
J. Taylor, G-P Palatka
T. Wyles, G-P Atlanta

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**Golder Associates Inc.**

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

November 12, 2002

RECEIVED
NOV 13 2002
BUREAU OF AIR REGULATION

0237561

Florida Department of Environmental Protection
New Source Review Section
2600 Blair Stone Road MS 5505
Tallahassee, FL 32399-2400

Attention: Mr. Syed Arif, P.E.

RE: GEORGIA-PACIFIC PALATKA MILL, CO EMISSION RATE INCREASE, REVISED APPLICATION

Dear Syed:

Enclosed please find four (4) copies of a revised version of Table 2-1 from the above-referenced air permit application to revise the PSD permit for the No. 3 Bleach Plant at Georgia-Pacific's (G-P) Palatka mill. Please replace Table 2-1 in the application that was submitted on November 12, 2002 with this revised Table 2-1.

If you have any questions, please contact me at (352) 336-5600 or Myra Carpenter, G-P Palatka, at (386) 329-0918.

Sincerely,

GOLDER ASSOCIATES INC.

David A. Buff

David A. Buff, P.E., Q.E.P.
Principal Engineer

Florida P.E. #19011

SEAL

DB/FWH/jkw

Enclosures

cc: M. Aguilar, G-P Atlanta
M. Carpenter, G-P Palatka
F. Howard, Golder
J. Taylor, G-P Palatka
T. Wyles, G-P Atlanta

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# Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary


November 5, 2002

Mr. John Bunyak, Chief
Policy, Planning & Permit Review Branch
NPS – Air Quality Division
Post Office Box 25287
Denver, Colorado 80225

RE: Georgia-Pacific Corporation
No. 3 Bleach Plant, Palatka Mill
DEP File No. 1070005-019-AC, PSD-FL-264A

Dear Mr. Bunyak:

Enclosed for your review and comment is a PSD application submitted by Georgia-Pacific Corporation to revise the CO limit at the No. 3 Bleach Plant at the company's existing facility in Palatka, Putnam County, Florida.

Your comments may be forwarded to my attention at the letterhead address or faxed to the Bureau of Air Regulation at 850/922-6979. If you have any questions, please contact Syed Arif, review engineer, at 850/921-9528.

Sincerely,

Patty Adams

for Al Linero, P.E.
Administrator
New Source Review Section

AAL/pa
Enclosure
cc: Syed Arif

# Department of Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

November 5, 2002

Ms. Jeaneanne M. Gettle
Acting Chief
Air Permits Section
U.S. EPA, Region 4
61 Forsyth Street
Atlanta, Georgia 30303

RE: Georgia-Pacific Corporation
No. 3 Bleach Plant, Palatka Mill
DEP File No. 1070005-019-AC, PSD-FL-264A

Dear Ms. Gettle:

Enclosed for your review and comment is a PSD application submitted by Georgia-Pacific Corporation to revise the CO limit at the No. 3 Bleach Plant at the company's existing facility in Palatka, Putnam County, Florida.

Your comments may be forwarded to my attention at the letterhead address or faxed to the Bureau of Air Regulation at 850/922-6979. If you have any questions, please contact Syed Arif, review engineer, at 850/921-9528.

Sincerely,

Patty Adams

for Al Linero, P.E.
Administrator
New Source Review Section

AAL/pa
Enclosure
cc: Syed Arif

RECEIVED

NOV 01 2002

BUREAU OF AIR REGULATION

# AIR PERMIT APPLICATION TO REVISE PSD PERMIT FOR THE NO. 3 BLEACH PLANT

## GEORGIA-PACIFIC CORPORATION PALATKA MILL

**Prepared For:**

**Georgia-Pacific**
**North of CR-216; West of US 17**
**Palatka, Florida 32177**

**Prepared By:**

**Golder Associates Inc.**
**6241 NW 23rd Street, Suite 500**
**Gainesville, Florida 32653-1500**

**October 2002**
**0237561**

**DISTRIBUTION:**
**4 Copies - FDEP**
**2 Copies - Georgia-Pacific**
**2 Copies - Golder Associates Inc.**

# Department of Environmental Protection

## Division of Air Resources Management

## APPLICATION FOR AIR PERMIT - TITLE V SOURCE

See Instructions for Form No. 62-210.900(1)

### I. APPLICATION INFORMATION

**Identification of Facility**

| | |
|---|---|
| 1. Facility Owner/Company Name: **Georgia-Pacific Corporation** | |
| 2. Site Name: **Palatka Mill** | |
| 3. Facility Identification Number: **1070005** [ ] Unknown | |
| 4. Facility Location: Street Address or Other Locator: **North of CR 216; West of US 17** City: **Palatka** County: **Putnam** Zip Code: **32177** | |
| 5. Relocatable Facility? [ ] Yes [ **X** ] No | 6. Existing Permitted Facility? [ **X** ] Yes [ ] No |

**Application Contact**

| |
|---|
| 1. Name and Title of Application Contact: **Myra Carpenter, Superintendent of Environmental Affairs** |
| 2. Application Contact Mailing Address: Organization/Firm: **Georgia-Pacific Corporation** Street Address: **P.O. Box 919** City: **Palatka** State: **FL** Zip Code: **32178-0919** |
| 3. Application Contact Telephone Numbers: Telephone: **( 386 ) 325 - 2001** Fax: **( 386 ) 328 - 0014** |

**Application Processing Information (DEP Use)**

| | |
|---|---|
| 1. Date of Receipt of Application: | 11-1-02 |
| 2. Permit Number: | 1070005-019-AC |
| 3. PSD Number (if applicable): | PSD-FL-364A |
| 4. Siting Number (if applicable): | |

**Purpose of Application**

**Air Operation Permit Application**

This Application for Air Permit is submitted to obtain: (Check one)

[ ] Initial Title V air operation permit for an existing facility which is classified as a Title V source.

[ ] Initial Title V air operation permit for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number:_____

[ ] Title V air operation permit revision to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number:_____

Operation permit number to be revised:_____

[ ] Title V air operation permit revision or administrative correction to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. (Also check Air Construction Permit Application below.)

Operation permit number to be revised/corrected:_____

[ ] Title V air operation permit revision for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit number to be revised:_____

Reason for revision:_____

**Air Construction Permit Application**

This Application for Air Permit is submitted to obtain: (Check one)

[ X ] Air construction permit to construct or modify one or more emissions units.

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

**Owner/Authorized Representative or Responsible Official**

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   **Theodore D. Kennedy, Vice President, Georgia-Pacific, Palatka Operations**
2. Owner/Authorized Representative or Responsible Official Mailing Address:
   Organization/Firm: **Georgia-Pacific Corporation**
   Street Address: **P.O. Box 919**
   City: **Palatka** State: **FL** Zip Code: **32178-0919**
3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: **( 386 ) 325 - 2001** Fax: **(386 ) 328 - 0014**
4. Owner/Authorized Representative or Responsible Official Statement:

   *I, the undersigned, am the owner or authorized representative*(check here [ ], if so) or the responsible official (check here [X ], if so) of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*

   Theodore D Kennedy — Signature

   10/30/02 — Date

* Attach letter of authorization if not currently on file.

**Professional Engineer Certification**

1. Professional Engineer Name: **David A. Buff**
   Registration Number: **19011**
2. Professional Engineer Mailing Address:
   Organization/Firm: **Golder Associates Inc.**
   Street Address: **6241 NW 23rd Street, Suite 500**
   City: **Gainesville** State: **FL** Zip Code: **32653-1500**
3. Professional Engineer Telephone Numbers:
   Telephone: **( 352 ) 336 - 5600** Fax: **( 352 ) 336 - 6603**

4. Professional Engineer Statement:

*I, the undersigned, hereby certify, except as particularly noted herein*, that:*

*(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and*

*(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.*

*If the purpose of this application is to obtain a Title V source air operation permit (check here [ ], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.*

*If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [X], if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.*

*If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ], if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.*

David G. Buff — Signature

10/31/02 — Date

(seal)

*Attach any exception to certification statement.

## Scope of Application

| Emissions Unit ID | Description of Emissions Unit | Permit Type | Processing Fee |
|---|---|---|---|
| 036 | No. 3 Bleach Plant | ACM1 | |
| | | | |
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## Application Processing Fee

Check one: [ ] Attached - Amount: $: _____ [ X ] Not Applicable

## Construction/Modification Information

1. Description of Proposed Project or Alterations:

   **To revise CO emission limit. See Attachment A for details.**

2. Projected or Actual Date of Commencement of Construction: **Upon Receipt of Permit**

3. Projected Date of Completion of Construction: **N/A ***

## Application Comment

***No physical construction necessary for the proposed project. Application is for CO emission limit increase only.**

## II. FACILITY INFORMATION

## A. GENERAL FACILITY INFORMATION

**Facility Location and Type**

| | | | |
|---|---|---|---|
| 1. Facility UTM Coordinates:<br>Zone: **17** East (km): **434.0** North (km): **3283.4** | | | |
| 2. Facility Latitude/Longitude:<br>Latitude (DD/MM/SS): **29 / 41 / 0** Longitude (DD/MM/SS): **81 / 40 / 45** | | | |
| 3. Governmental Facility Code:<br>**0** | 4. Facility Status Code:<br>**A** | 5. Facility Major Group SIC Code:<br>**26** | 6. Facility SIC(s):<br>**2611, 2621** |
| 7. Facility Comment (limit to 500 characters): | | | |

**Facility Contact**

| |
|---|
| 1. Name and Title of Facility Contact:<br>**Myra Carpenter, Superintendent of Environmental Affairs** |
| 2. Facility Contact Mailing Address:<br>Organization/Firm: **Georgia-Pacific Corporation**<br>Street Address: **P.O. Box 919**<br>City: **Palatka** State: **FL** Zip Code: **32178-0919** |
| 3. Facility Contact Telephone Numbers:<br>Telephone: **( 386) 325-2001** Fax: **( 386) 328-0014** |

## Facility Regulatory Classifications

**Check all that apply:**

| | |
|---|---|
| 1. [ ] Small Business Stationary Source? | [ ] Unknown |
| 2. [ X ] Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)? | |
| 3. [ ] Synthetic Minor Source of Pollutants Other than HAPs? | |
| 4. [ X ] Major Source of Hazardous Air Pollutants (HAPs)? | |
| 5. [ ] Synthetic Minor Source of HAPs? | |
| 6. [ X ] One or More Emissions Units Subject to NSPS? | |
| 7. [ X ] One or More Emission Units Subject to NESHAP? | |
| 8. [ ] Title V Source by EPA Designation? | |
| 9. Facility Regulatory Classifications Comment (limit to 200 characters): | |

## List of Applicable Regulations

| |
|---|
| **62-210.700(1) - Excess Emission** |
| **62-210.700(4) - Excess Emission** |
| **62-210.700(5) - Excess Emission** |
| **62-210.700(6) - Excess Emission** |
| **62-296.320(4) - General VE Limit** |
| **See Title V Core List, Effective 3/1/02** |
| |
| |
| |
| |

# Title V Core List Effective: 03/01/02

[**Note:** The Title V Core List is meant to simplify the completion of the "List of Applicable Regulations" for DEP Form No. 62-210.900(1), Application for Air Permit - Long Form. The Title V Core List is a list of rules to which all Title V Sources are presumptively subject. The Title V Core List may be referenced in its entirety, or with specific exceptions. The Department may periodically update the Title V Core List.]

***Federal:*** ***(description)***

40 CFR 61, Subpart M: NESHAP for Asbestos.

40 CFR 82: Protection of Stratospheric Ozone.
40 CFR 82, Subpart B: Servicing of Motor Vehicle Air Conditioners (MVAC).
40 CFR 82, Subpart F: Recycling and Emissions Reduction.

***State: (description)***

**CHAPTER 62-4, F.A.C.: PERMITS**, effective 06-01-01

62-4.030, F.A.C.: General Prohibition.
62-4.040, F.A.C.: Exemptions.
62-4.050, F.A.C.: Procedure to Obtain Permits; Application
62-4.060, F.A.C.: Consultation.
62-4.070, F.A.C.: Standards for Issuing or Denying Permits; Issuance; Denial.
62-4.080, F.A.C.: Modification of Permit Conditions.
62-4.090, F.A.C.: Renewals.
62-4.100, F.A.C.: Suspension and Revocation.
62-4.110, F.A.C.: Financial Responsibility.
62-4.120, F.A.C.: Transfer of Permits.
62-4.130, F.A.C.: Plant Operation - Problems.
62-4.150, F.A.C.: Review
62-4.160, F.A.C.: Permit Conditions.
62-4.210, F.A.C.: Construction Permits.
62-4.220, F.A.C.: Operation Permit for New Sources.

**CHAPTER 62-210, F.A.C.: STATIONARY SOURCES - GENERAL REQUIREMENTS,** effective 06-21-01

62-210.300, F.A.C.: Permits Required.
62-210.300(1), F.A.C.: Air Construction Permits.
62-210.300(2), F.A.C.: Air Operation Permits.
62-210.300(3), F.A.C.: Exemptions.
62-210.300(5), F.A.C.: Notification of Startup.
62-210.300(6), F.A.C.: Emissions Unit Reclassification.
62-210.300(7), F.A.C.: Transfer of Air Permits.

62-210.350, F.A.C.: Public Notice and Comment.
62-210.350(1), F.A.C.: Public Notice of Proposed Agency Action.
62-210.350(2), F.A.C.: Additional Public Notice Requirements for Emissions Units Subject to Prevention of Significant Deterioration or Nonattainment-Area Preconstruction Review.
62-210.350(3), F.A.C.: Additional Public Notice Requirements for Sources Subject to Operation Permits for Title V Sources.

62-210.360, F.A.C.: Administrative Permit Corrections.
62-210.370(3), F.A.C.: Annual Operating Report for Air Pollutant Emitting Facility.
62-210.400, F.A.C.: Emission Estimates.
62-210.650, F.A.C.: Circumvention.
62-210.700, F.A.C.: Excess Emissions

62-210.900, F.A.C.: Forms and Instructions.
62-210.900(1), F.A.C.: Application for Air Permit - Title V Source, Form and Instructions.
62-210.900(5), F.A.C.: Annual Operating Report for Air Pollutant Emitting Facility, Form and Instructions.
62-210.900(7), F.A.C.: Application for Transfer of Air Permit - Title V and Non-Title V Source.

**CHAPTER 62-212, F.A.C.: STATIONARY SOURCES- PRECONSTRUCTION REVIEW,** effective 08-17-00

**CHAPTER 62-213, F.A.C.: OPERATION PERMITS FOR MAJOR SOURCES OF AIR POLLUTION,** effective 04-16-01

62-213.205, F.A.C.: Annual Emissions Fee.
62-213.400, F.A.C.: Permits and Permit Revisions Required.
62-213.410, F.A.C.: Changes Without Permit Revision.
62-213.412, F.A.C.: Immediate Implementation Pending Revision Process.
62-213.415, F.A.C.: Trading of Emissions Within a Source.
62-213.420, F.A.C.: Permit Applications.
62-213.430, F.A.C.: Permit Issuance, Renewal, and Revision.
62-213.440, F.A.C.: Permit Content.
62-213.450, F.A.C.: Permit Review by EPA and Affected States
62-213.460, F.A.C.: Permit Shield.

62-213.900, F.A.C.: Forms and Instructions.
62-213.900(1), F.A.C.: Major Air Pollution Source Annual Emissions Fee Form.
62-213.900(7), F.A.C.: Statement of Compliance Form

**CHAPTER 62-296, F.A.C.: STATIONARY SOURCES - EMISSION STANDARDS,** effective 03-02-99

62-296.320(2), F.A.C.: Objectionable Odor Prohibited.
62-296.320(4)(c), F.A.C.: Unconfined Emissions of Particulate Matter

**CHAPTER 62-297, F.A.C.: STATIONARY SOURCES - EMISSIONS MONITORING,** effective 03-02-99

62-297.310, F.A.C.: General Test Requirements.
62-297.330, F.A.C.: Applicable Test Procedures.
62-297.340, F.A.C.: Frequency of Compliance Tests.
62-297.345, F.A.C.: Stack Sampling Facilities Provided by the Owner of an Emissions Unit.
62-297.350, F.A.C.: Determination of Process Variables.
62-297.570, F.A.C.: Test Report.
62-297.620, F.A.C.: Exceptions and Approval of Alternate Procedures and Requirements.

**Miscellaneous:**

**CHAPTER 28-106, F.A.C.:** Decisions Determining Substantial Interests
**CHAPTER 62-110, F.A.C.:** Exception to the Uniform Rules of Procedure, effective 07-01-98
**CHAPTER 62-256, F.A.C.:** Open Burning and Frost Protection Fires, effective 11-30-94
**CHAPTER 62-257, F.A.C.:** Asbestos Notification and Fee, effective 02-09-99
**CHAPTER 62-281, F.A.C.:** Motor Vehicle Air Conditioning Refrigerant Recovery and Recycling, effective 09-10-96

## B. FACILITY POLLUTANTS

**List of Pollutants Emitted**

| 1. Pollutant Emitted | 2. Pollutant Classif. | 3. Requested Emissions Cap lbs/hr | tons/year | 4. Basis for Emissions Cap | 5. Pollutant Comment |
|---|---|---|---|---|---|
| PM | A | | | | Particulate Matter – Total |
| $PM_{10}$ | A | | | | Particulate Matter – $PM_{10}$ |
| $SO_2$ | A | | | | Sulfur Dioxide |
| $NO_X$ | A | | | | Nitrogen Oxides |
| CO | A | | | | Carbon Monoxide |
| VOC | A | | | | Volatile Organic Compounds |
| SAM | A | | | | Sulfuric Acid Mist |
| TRS | A | | | | Total Reduced Sulfur |
| HAPs | A | | | | Total Hazardous Air Pollutants |
| H001 | A | | | | Acetaldehyde |
| H021 | B | | | | Beryllium Compounds |
| H043 | A | | | | Chloroform |
| H095 | A | | | | Formaldehyde |
| H106 | A | | | | Hydrochloric Acid |
| H115 | A | | | | Methanol |
| | | | | | |
| | | | | | |

## C. FACILITY SUPPLEMENTAL INFORMATION

**Supplemental Requirements**

| |
|---|
| 1. Area Map Showing Facility Location:<br>[ X ] Attached, Document ID: GP-FI-C1 [ ] Not Applicable [ ] Waiver Requested |
| 2. Facility Plot Plan:<br>[ X ] Attached, Document ID: GP-FI-C2 [ ] Not Applicable [ ] Waiver Requested |
| 3. Process Flow Diagram(s):<br>[ X ] Attached, Document ID: GP-FI-C3 [ ] Not Applicable [ ] Waiver Requested |
| 4. Precautions to Prevent Emissions of Unconfined Particulate Matter:<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 5. Fugitive Emissions Identification:<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 6. Supplemental Information for Construction Permit Application:<br>[ X ] Attached, Document ID: Attachment A [ ] Not Applicable |
| 7. Supplemental Requirements Comment: |

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

8. List of Proposed Insignificant Activities:
   [ ] Attached, Document ID:_____ [ **X** ] Not Applicable

9. List of Equipment/Activities Regulated under Title VI:
   [ ] Attached, Document ID:_____
   [ ] Equipment/Activities On site but Not Required to be Individually Listed
   [ **X** ] Not Applicable

10. Alternative Methods of Operation:
    [ ] Attached, Document ID:_____ [ **X** ] Not Applicable

11. Alternative Modes of Operation (Emissions Trading):
    [ ] Attached, Document ID:_____ [ **X** ] Not Applicable

12. Identification of Additional Applicable Requirements:
    [ ] Attached, Document ID:_____[ **X** ] Not Applicable

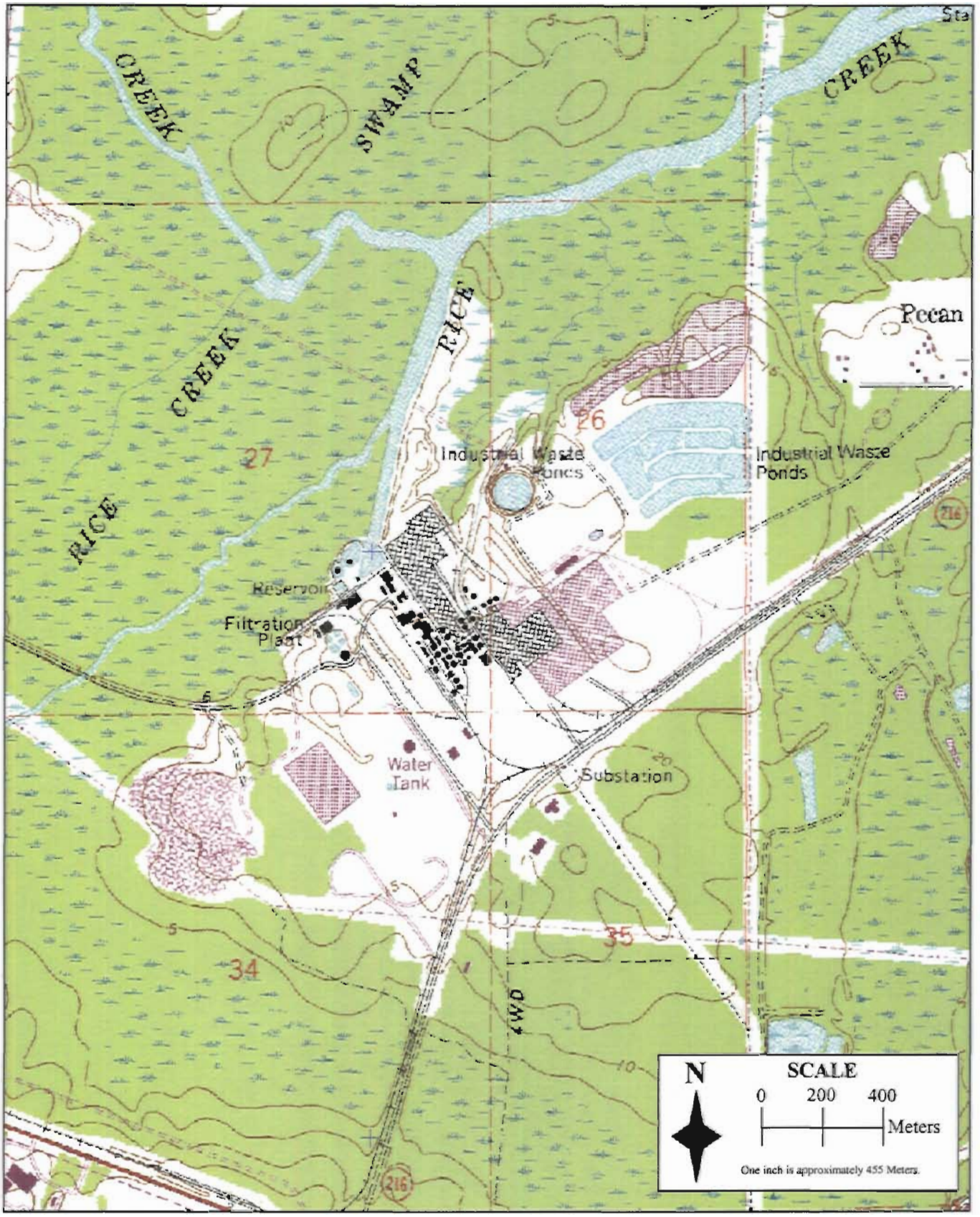
13. Risk Management Plan Verification:
    [ ] Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID:) _____ or previously submitted to DEP (Date and DEP Office:_____)
    [ ] Plan to be submitted to CEPPO (Date required:_____)
    [ **X** ] Not Applicable

14. Compliance Report and Plan:
    [ ] Attached, Document ID:_____ [ **X** ] Not Applicable

15. Compliance Certification (Hard-copy Required):
    [ ] Attached, Document ID:_____ [ **X** ] Not Applicable

# ATTACHMENT GP-FI-C1

## AREA MAP SHOWING FACILITY LOCATION




Attachment GP-Fl-C1
Area Map
Georgia-Pacific Corporation, Palatka Mill

Source: Golder, 2002.

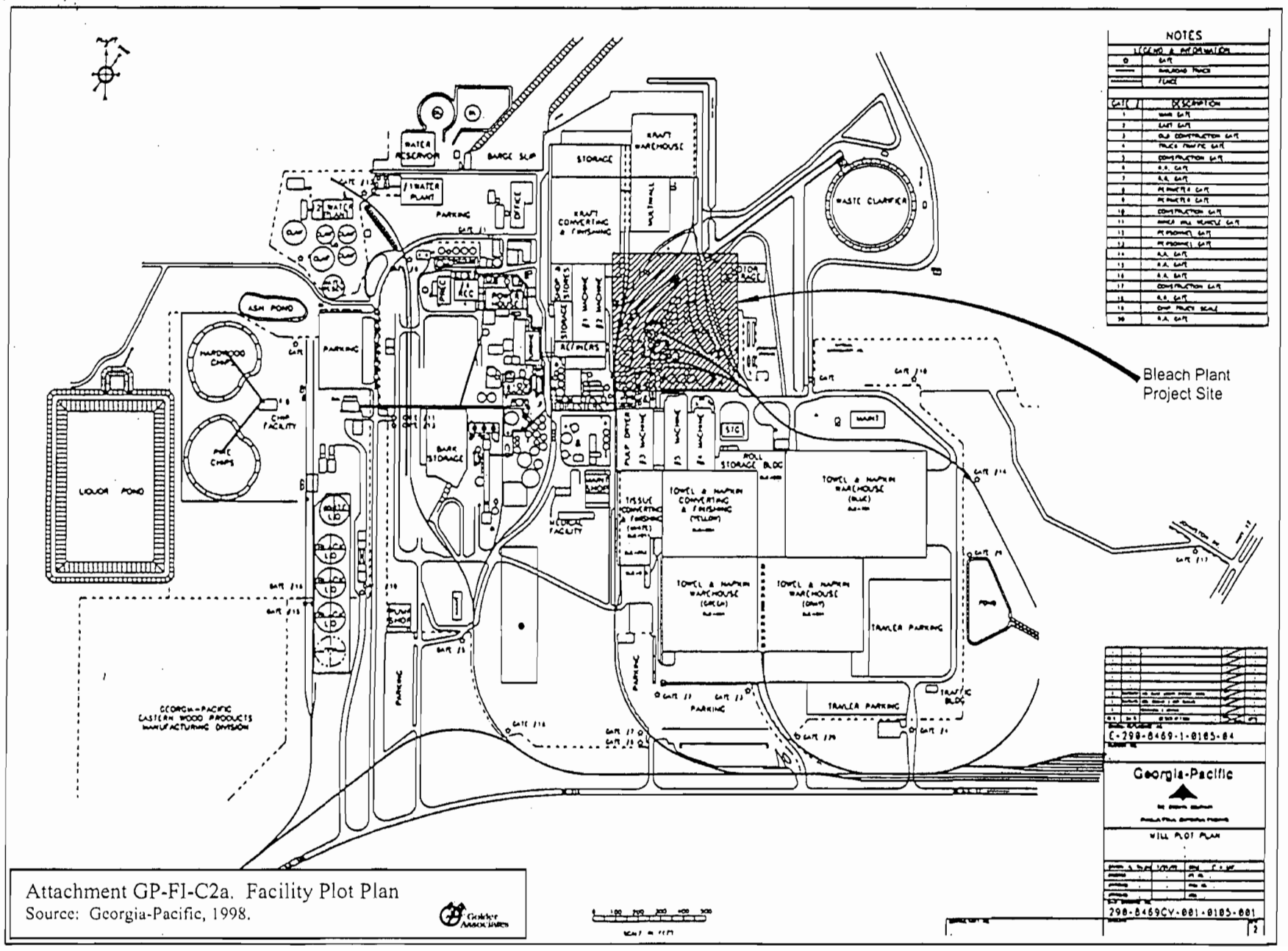
Golder Associates

**ATTACHMENT GP-FI-C2**

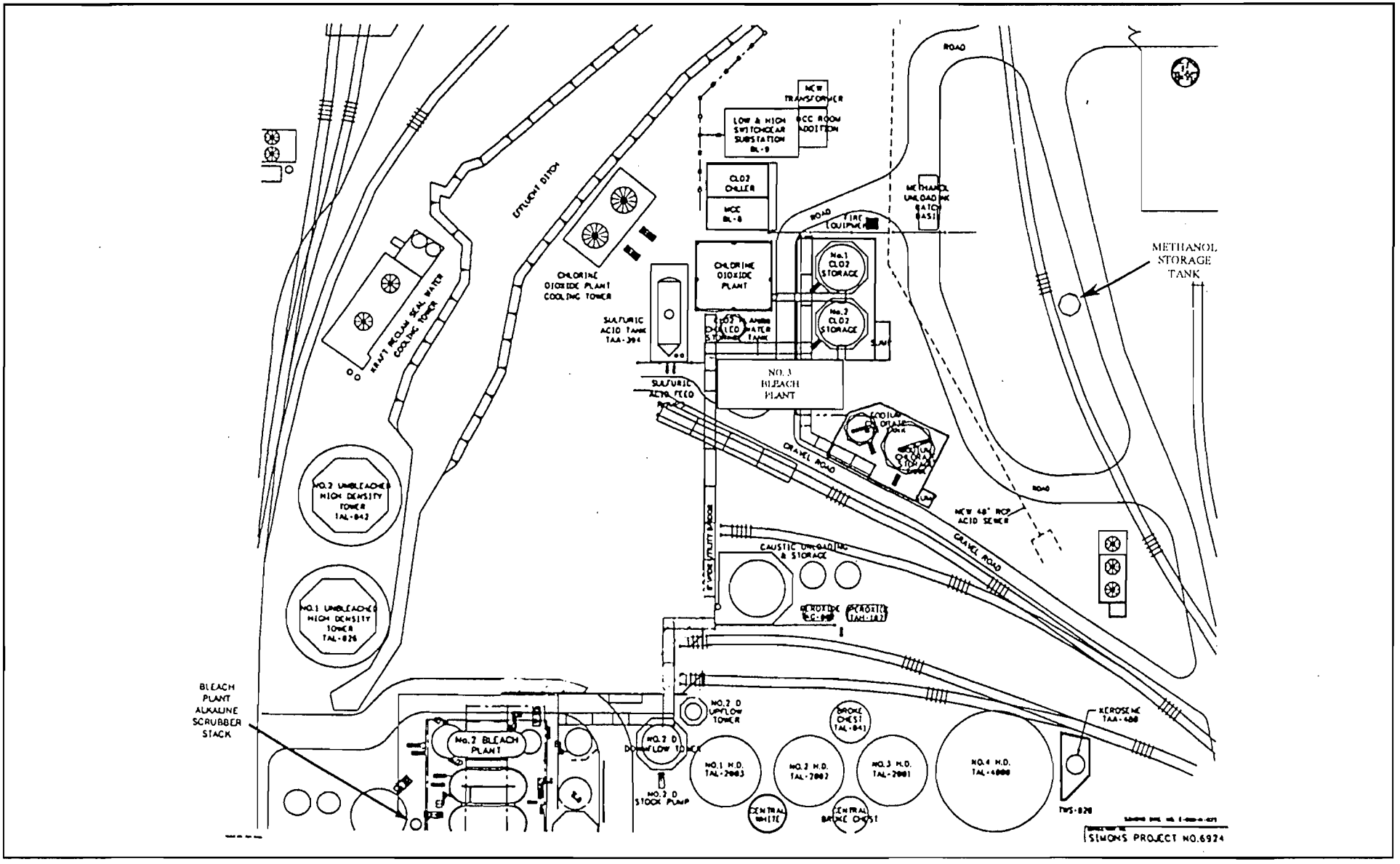
**FACILITY PLOT PLAN**

**Best Available Copy**






Attachment GP-FI-C2a. Facility Plot Plan
Source: Georgia-Pacific, 1998.



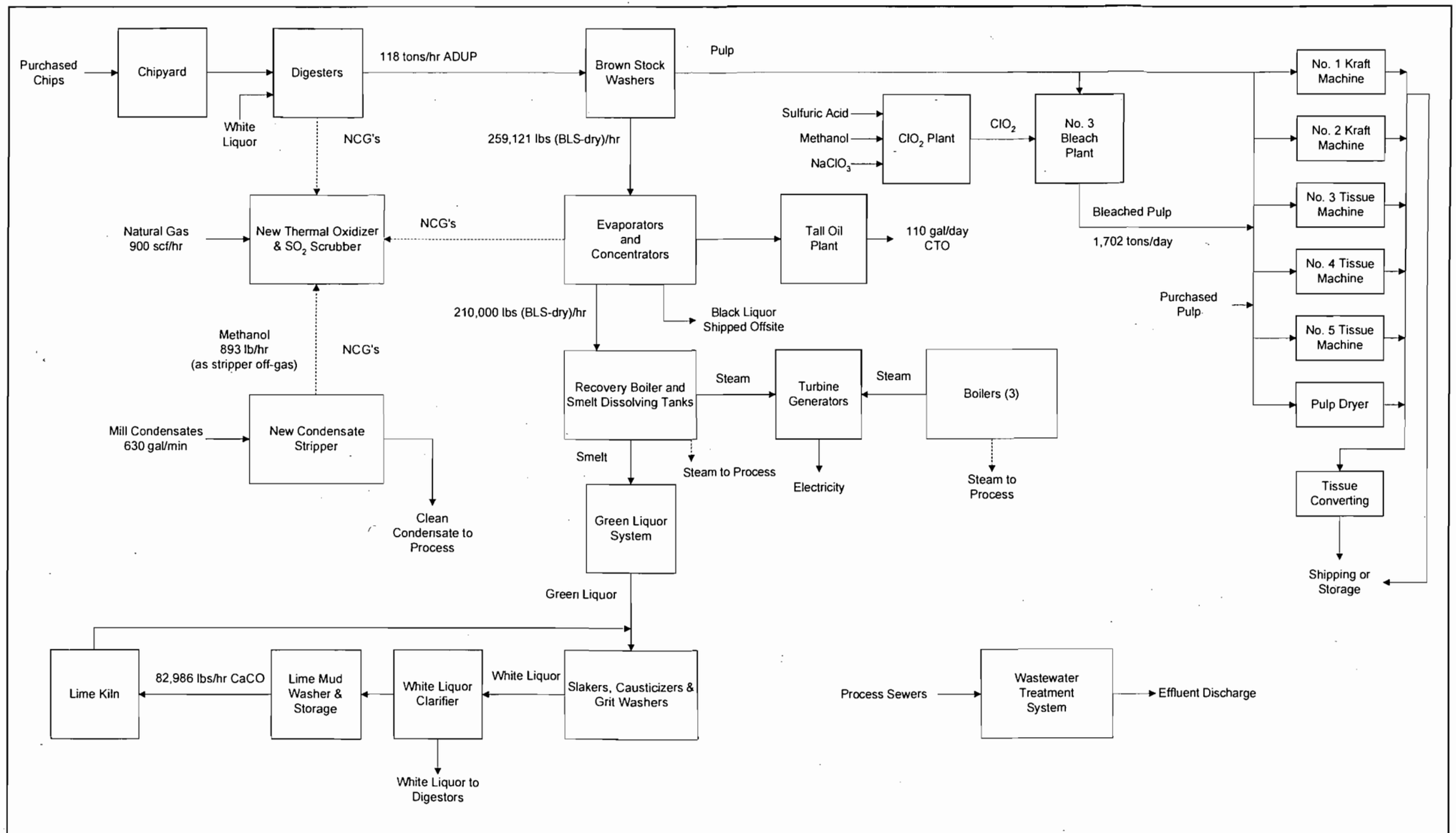

Attachment GP-FI-C2b
Plot Plan

Source: Golder, 2001.

Golder Associates

**ATTACHMENT GP-FI-C3**

**PROCESS FLOW DIAGRAM**




Attachment GP-FI-C3
Facility Process Flow Diagram
Georgia-Pacific Palatka Operations
Palatka, Florida

**Notes:**
ADUP = Air Dried Unbleached Pulp
CTO = Crude Tall Oil
Solid/Liquid
Gas

Filename: 0237561\4\4.4\4.4.1\GP-FI-C3.VSD
Date: 10/31/02

Golder Associates

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

### A. GENERAL EMISSIONS UNIT INFORMATION
### (All Emissions Units)

**Emissions Unit Description and Status**

1. Type of Emissions Unit Addressed in This Section: (Check one)

[ X ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[ X ] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):
**Elemental Chlorine Free (ECF) No. 3 Bleach Plant**

4. Emissions Unit Identification Number:
ID: **036**
[ ] No ID
[ ] ID Unknown

| 5. Emissions Unit Status Code: | 6. Initial Startup Date: | 7. Emissions Unit Major Group SIC Code: | 8. Acid Rain Unit? |
|---|---|---|---|
| **A** | **2/15/2001** | **26** | [ ] |

9. Emissions Unit Comment: (Limit to 500 Characters)

## Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   **Packed-Gas Adsorption Column**

2. Control Device or Method Code(s): **050**

## Emissions Unit Details

1. Package Unit:
   Manufacturer: Model Number:
2. Generator Nameplate Rating: MW
3. Incinerator Information:
   Dwell Temperature: °F
   Dwell Time: seconds
   Incinerator Afterburner Temperature: °F

## B. EMISSIONS UNIT CAPACITY INFORMATION
## (Regulated Emissions Units Only)

**Emissions Unit Operating Capacity and Schedule**

| | | | | |
|---|---|---|---|---|
| 1. Maximum Heat Input Rate: | | | | mmBtu/hr |
| 2. Maximum Incineration Rate: | | lbs/hr | | tons/day |
| 3. Maximum Process or Throughput Rate: | | | | |
| 4. Maximum Production Rate: | | **1,702 tons/day** | | |
| 5. Requested Maximum Operating Schedule: | | | | |
| | **24** | hours/day | **7** | days/week |
| | **52** | weeks/year | **8,760** | hours/year |

6. Operating Capacity/Schedule Comment (limit to 200 characters):

**Maximum production rate refers to maximum daily permit limit for air-dried tons of bleached pulp (ADTBP). Maximum monthly average permitted rate is 1,350 ADTBP/day.**

## C. EMISSIONS UNIT REGULATIONS
## (Regulated Emissions Units Only)

**List of Applicable Regulations**

See Attachment GP-EU1-C.

## D. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

**Emission Point Description and Type**

| | |
|---|---|
| 1. Identification of Point on Plot Plan or Flow Diagram?<br>**Bleach Plant Alkaline Scrubber Stack** | 2. Emission Point Type Code:<br>**2** |
| 3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): | |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: | |

| | | |
|---|---|---|
| 5. Discharge Type Code:<br>**V** | 6. Stack Height:<br>**118** feet | 7. Exit Diameter:<br>**3.5** feet |
| 8. Exit Temperature:<br>**~85** °F | 9. Actual Volumetric Flow Rate:<br>**~15,400** acfm | 10. Water Vapor:<br>% |
| 11. Maximum Dry Standard Flow Rate:<br>dscfm | 12. Nonstack Emission Point Height:<br>feet | |
| 13. Emission Point UTM Coordinates:<br>Zone: East (km): North (km): | | |
| 14. Emission Point Comment (limit to 200 characters):<br>**Values representative of scrubber exhaust stack. Exit temperature and actual volumetric flow rate values are constantly changing with ambient conditions.** | | |

## E. SEGMENT (PROCESS/FUEL) INFORMATION
## (All Emissions Units)

**Segment Description and Rate:** Segment 1 of 1

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type) (limit to 500 characters):<br>**Pulp and Paper and Wood - Sulfate (Kraft) Pulping; Industrial processes: Sulfate (Kraft) Pulping Bleaching Reactors** | | |
| 2. Source Classification Code (SCC):<br>**3-07-001-14** | 3. SCC Units:<br>**Tons of air-dried unbleached pulp produced** | |
| 4. Maximum Hourly Rate:<br>**77.1** | 5. Maximum Annual Rate:<br>**535,455** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: |
| 10. Segment Comment (limit to 200 characters):<br>**See Attachment GP-EU1-E10. Maximum hourly rate based on 1,702 tons per day ADBP. Maximum annual rate based on 1,350 tons per day ADBP.** | | |

**Segment Description and Rate:** Segment ____ of ____

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type ) (limit to 500 characters): | | |
| 2. Source Classification Code (SCC): | 3. SCC Units: | |
| 4. Maximum Hourly Rate: | 5. Maximum Annual Rate: | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: |
| 10. Segment Comment (limit to 200 characters): | | |

## F. EMISSIONS UNIT POLLUTANTS
**(All Emissions Units)**

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| VOC | 050 | | NS |
| HAPs | 050 | | WP |
| H115 | 050 | | NS |
| H043 | 050 | | WP |
| CO | | | EL |
| H038 | 050 | | WP |
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## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **CO** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **100** lbs/hr **349** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **1.42 lbs/ADTBP** Reference: **See Attachment A** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **See Table 2-2 for calculations.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **100 lbs/hr; 349 TPY** | 4. Equivalent Allowable Emissions: **100** lbs/hour **349** tons/year |
| 5. Method of Compliance (limit to 60 characters): **EPA Method 10** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **See Attachment A. Based on softwood bleaching only.** | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation 1 of 1

| | |
|---|---|
| 1. Visible Emissions Subtype: **VE20** | 2. Basis for Allowable Opacity: [ X ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: **20** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: **EPA Method 10** | |
| 5. Visible Emissions Comment (limit to 200 characters): **Based on Rules 62-296.320 and 62-296.404(2)(b), F.A.C., and Permit No. 1070005-006-AC; PSD-FL-264.** | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 1 of 3

| | |
|---|---|
| 1. Parameter Code: **pH** | 2. Pollutant(s): |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information: Manufacturer: Model Number: | Serial Number: |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): **40 CFR 63.453(c)(1) requires pH monitoring of the gas scrubbing medium. G-P proposes to record pH data on a 3-hour average basis.** | |

## H. VISIBLE EMISSIONS INFORMATION
**(Only Regulated Emissions Units Subject to a VE Limitation)**

**Visible Emissions Limitation:** Visible Emissions Limitation _____ of _____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
**(Only Regulated Emissions Units Subject to Continuous Monitoring)**

**Continuous Monitoring System:** Continuous Monitor 2 of 3

| | |
|---|---|
| 1. Parameter Code: **FLOW** | 2. Pollutant(s): |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: Serial Number: | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters):<br>**40 CFR 63.453(c)(2) requires measurement of vent gas inlet flow rate. EPA approved an alternative monitoring plan to monitor fan amperage of the bleaching system vent gas fan. G-P proposes to record fan amperage on a 3-hour average basis.** | |

## H. VISIBLE EMISSIONS INFORMATION
**(Only Regulated Emissions Units Subject to a VE Limitation)**

**Visible Emissions Limitation:** Visible Emissions Limitation _____ of _____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity:<br>[ ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
**(Only Regulated Emissions Units Subject to Continuous Monitoring)**

**Continuous Monitoring System:** Continuous Monitor 3 of 3

| | |
|---|---|
| 1. Parameter Code: **FLOW** | 2. Pollutant(s): |
| 3. CMS Requirement: | [ **X** ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: Serial Number: | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters):<br>**40 CFR 63.453(c)(3) requires measurement of the gas scrubber liquid flow rate. G-P will monitor the recirculation flow, which is the actual amount of liquid introduced to the scrubber. G-P proposes to record scrubber recirculation flow on a 3-hour average basis.** | |

## J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
## (Regulated Emissions Units Only)

**Supplemental Requirements**

1. Process Flow Diagram
   [ X ] Attached, Document ID: GP-EU1-J1 [ ] Not Applicable [ ] Waiver Requested

2. Fuel Analysis or Specification
   [ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested

3. Detailed Description of Control Equipment
   [ X ] Attached, Document ID: GP-EU1-J3 [ ] Not Applicable [ ] Waiver Requested

4. Description of Stack Sampling Facilities
   [ ] Attached, Document ID: _____ [ X] Not Applicable[ ] Waiver Requested

5. Compliance Test Report
   [ ] Attached, Document ID: _____
   [ X ] Previously submitted, Date: 11 JUN 2001
   [ ] Not Applicable

6. Procedures for Startup and Shutdown
   [ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested

7. Operation and Maintenance Plan
   [ X ] Attached, Document ID: GP-EU1-J7 [ ] Not Applicable [ ] Waiver Requested

8. Supplemental Information for Construction Permit Application
   [ X ] Attached, Document ID: Attachment A [ ] Not Applicable

9. Other Information Required by Rule or Statute
   [ X ] Attached, Document ID: GP-EU1-J9 [ ] Not Applicable

10. Supplemental Requirements Comment:

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

11. Alternative Methods of Operation
[ ] Attached, Document ID: _____ [ X ] Not Applicable

12. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID: _____ [ X ] Not Applicable

13. Identification of Additional Applicable Requirements
[ ] Attached, Document ID: _____ [ X ] Not Applicable

14. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID: _____ [ X ] Not Applicable

15. Acid Rain Part Application (Hard-copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID: _____

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID: _____

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID: _____

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID: _____

[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
Attached, Document ID: _____

[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
Attached, Document ID: _____

[ X ] Not Applicable

# ATTACHMENT GP-EU1-C

# LIST OF APPLICABLE REGULATIONS

## ATTACHMENT GP-EU1-C

## LIST OF APPLICABLE REGULATIONS

(Page 1 of 2)

| | |
|---|---|
| 40 CFR 63.445(a)(2) | Standards for the bleaching system |
| 40 CFR 63.445(b) | Standards for the bleaching system |
| 40 CFR 63.445(c)(1) | Standards for the bleaching system |
| 40 CFR 63.445(d) | Standards for the bleaching system |
| 40 CFR 63.450(a)-(d) | Standards for enclosures and closed-vent systems |
| 40 CFR 63.453(a) | Monitoring Requirements |
| 40 CFR 63.453(c)-(d) | Monitoring Requirements |
| 40 CFR 63.453(k) | Monitoring Requirements |
| 40 CFR 63.453(n)-(o) | Monitoring Requirements |
| 40 CFR 63.454(a)-(b) | Recordkeeping Requirements |
| 40 CFR 63.454(d) | Recordkeeping Requirements |
| 40 CFR 63.455(a) | Recordkeeping Requirements |
| 40 CFR 63.454(d) | Recordkeeping Requirements |
| 40 CFR 63.457(a)-(b) | Test Methods and Procedures |
| 40 CFR 63.457(d)-(e) | Test Methods and Procedures |
| 40 CFR 63.457(h)-(i) | Test Methods and Procedures |
| 62-212.400 | PSD |
| 62-210.700 | Excess Emissions |
| 40 CFR 63.1(a)(1)-(4) | Applicability |
| 40 CFR 63.1(a)(11)-(14) | Applicability |
| 40 CFR 63.1(b)(2)-(3) | Applicability |
| 40 CFR 63.1(c)(1)-(2) | Applicability |
| 40 CFR 63.1(c)(5) | Applicability |
| 40 CFR 63.1(e) | Applicability |
| 40 CFR 63.2 | Definitions |
| 40 CFR 63.3 | Units and Abbreviations |
| 40 CFR 63.4(a)(1) | Prohibited Activities and Circumvention |
| 40 CFR 63.4(a)(3) | Prohibited Activities and Circumvention |
| 40 CFR 63.4(a)(5) | Prohibited Activities and Circumvention |
| 40 CFR 63.4(b)-(c) | Prohibited Activities and Circumvention |
| 40 CFR 63.5(a) | Construction and Reconstruction |
| 40 CFR 63.5(b)(1) | Construction and Reconstruction |
| 40 CFR 63.5(b)(3)-(6) | Construction and Reconstruction |
| 40 CFR 63.5(d)(1) | Construction and Reconstruction |
| 40 CFR 63.5(d)(3)-(4) | Construction and Reconstruction |
| 40 CFR 63.5(e) | Construction and Reconstruction |
| 40 CFR 63.5(f) | Construction and Reconstruction |
| 40 CFR 63.6(a) | Compliance with Standards and Maintenance Requirements |
| 40 CFR 63.6(e)-(g) | Compliance with Standards and Maintenance Requirements |
| 40 CFR 63.6(i)-(j) | Compliance with Standards and Maintenance Requirements |
| 40 CFR 63.8(a)(1)-(2) | Monitoring Requirements |
| 40 CFR 63.8(a)(4) | Monitoring Requirements |
| 40 CFR 63.8(b)(1) | Monitoring Requirements |
| 40 CFR 63.8(b)(3) | Monitoring Requirements |
| 40 CFR 63.8(c)(1)-(3) | Monitoring Requirements |
| 40 CFR 63.8(c)(6)-(8) | Monitoring Requirements |

## ATTACHMENT GP-EU1-C

## LIST OF APPLICABLE REGULATIONS

(Page 2 of 2)

| | |
|---|---|
| 40 CFR 63.8(d) | Monitoring Requirements |
| 40 CFR 63.8(e) | Monitoring Requirements |
| 40 CFR 63.8(f)(1)-(5) | Monitoring Requirements |
| 40 CFR 63.8(g) | Monitoring Requirements |
| 40 CFR 63.9(a)-(b) | Notification Requirements |
| 40 CFR 63.9(c) | Notification Requirements |
| 40 CFR 63.9(g)(1) | Notification Requirements |
| 40 CFR 63.9(h)-(j) | Notification Requirements |
| 40 CFR 63.10(a)-(c) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(d)(1)-(2) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(d)(4)-(5) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(e)(1) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(e)(2)(i) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(e)(3) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(f) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.12 | State Authority and Delegation |
| 40 CFR 63.13 | Addresses of State Air Pollution Control Agencies and EPA Regional Offices |
| 40 CFR 63.14 | Incorporations by References |
| 40 CFR 63.15 | Availability of Information and Confidentiality |

**ATTACHMENT GP-EU1-E10**

**SEGMENT COMMENT**

## ATTACHMENT GP-EU1-E10
## SEGMENT COMMENT

Maximum Annual Rate based on average monthly No. 3 Bleach plant production of 1,350 Air Dried Tons of Bleached Pulp (ADTBP) per day. Maximum hourly rate based on maximum daily production of 1,702 ADTBP per day. Values converted to Air-Dried Tons Unbleached Pulp (ADTUP) using a conversion factor of Unbleached/Bleached = 1:0.92.

1,350 ADTBP ÷0.92 = 1,467 ADTUP (monthly average)

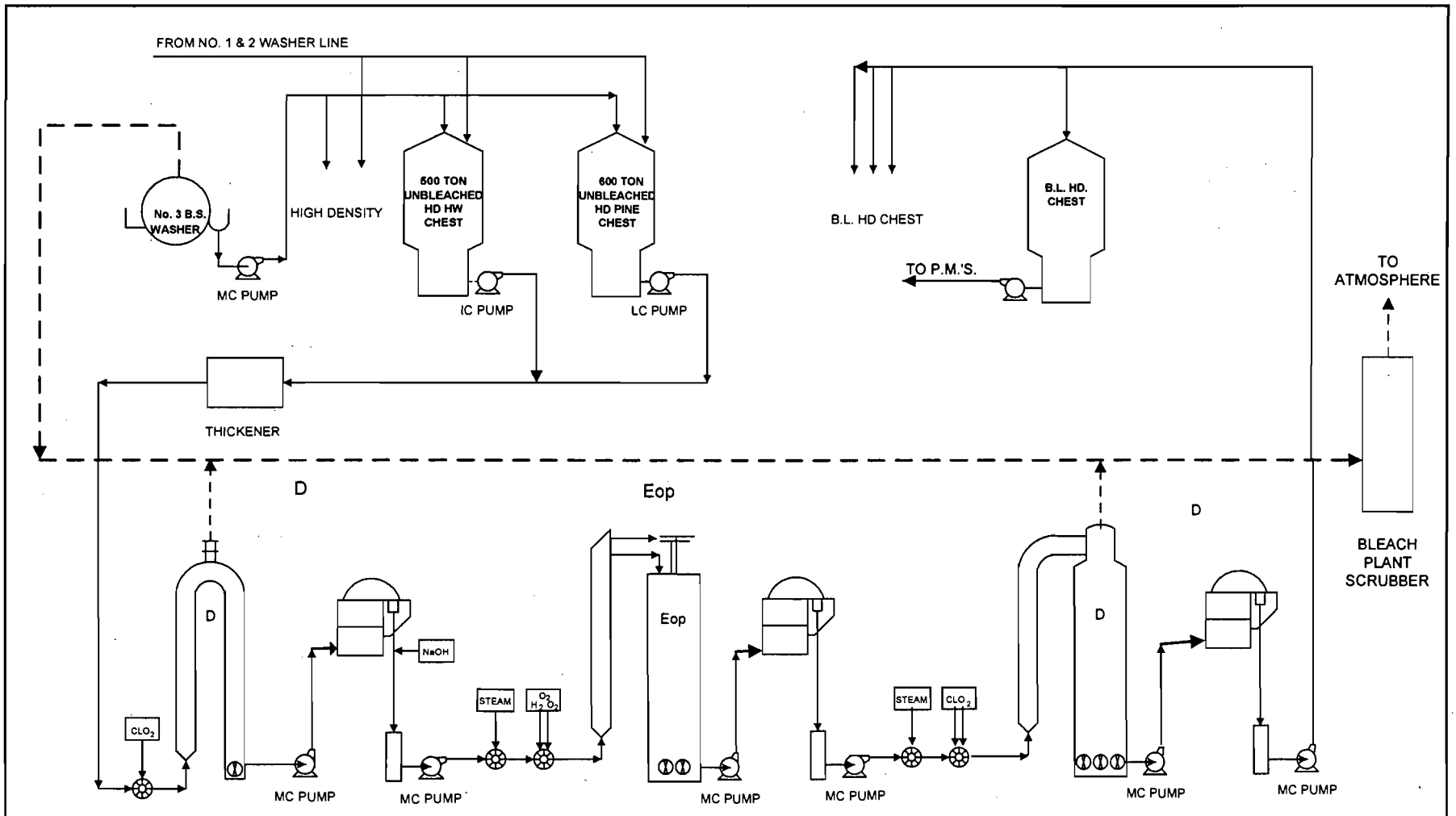
1,702 ADTBP÷0.92 = 1,850 ADTUP (maximum daily)

Maximum Hourly Rate: 1,850 ADTUP÷24 hrs/day = 77.1 ADTUP per hour, 24-hr average

Maximum Annual Rate: 1,467 ADTUP x 365 days/year = 535,455 ADTUP per year

**ATTACHMENT GP-EU1-J1**

**PROCESS FLOW DIAGRAM**




NO. 3 BLEACH PLANT - D(Eop)D

ATTACHMENT GP-EU1-J1
ECF BLEACH PLANT FLOW DIAGRAM

Source: Georgia-Pacific, 1998.

Process Flow Legend:
Solid / Liquid ——→
Gas ----------→

**Project:** 0237561\4\4.4\4.4.1
**Filename:** GP-EU1-J1.VSD
**Date:** 10/30/02

Golder Associates

# ATTACHMENT GP-EU1-J3

# DETAILED DESCRIPTION OF CONTROL EQUIPMENT

# ATTACHMENT GP-EU1-J3

## Georgia-Pacific Corporation Palatka Facility

## No. 3 Bleach Plant

## Alkaline Scrubber Equipment Design Parameters

| | |
|---|---|
| Scrubber Type | Packed Bed Wet Scrubber |
| Scrubbant | Alkaline Liquid |
| Packing Material | No. 2 Super Interlocks |
| Packing Arrangement | Two 25-ft beds |
| Outlet Gas Temp (°F) | 85 |
| Outlet Gas Flow Rate (ACFM) | 15,400 |
| Average Scrubbant pH | >7.0 |
| Scrubbant Flow Rate (gpm) | >1,200 |

# ATTACHMENT GP-EU1-J7

# OPERATION AND MAINTENANCE PLAN

# No. 3 Bleach Plant
# O & M Plan

## Plant Overview

The Georgia-Pacific Palatka Operations mill uses a Prewash-$D_o$-$E_{op}$-$D_1$ bleaching sequence.

In simple terms, the bleaching sequence is:

**Prewash Stage** - provides final washing and consistency control of the pulp before starting the bleaching process.

**$D_o$ Stage** - the first bleaching stage, where chlorine dioxide ($D_o$; $ClO_2$) followed by washing. This stage solubilizes most of the remaining lignin.

**$E_{op}$ Stage** -the second bleaching stage, where the sequential addition of caustic (E; NaOH), then hydrogen peroxide (p; $H_2O_2$) and oxygen (0; $O_2$) takes place, followed by washing. This stage dissolves the soluble lignin and removes it at the stage's wash press.

**$D_1$ Stage** - the final bleaching stage, where the true bleaching of the pulp occurs using chlorine dioxide ($D_1$; $ClO_2$), followed by washing. In this stage, the pulp is bleached to the desired brightness and the impact of impurities (wood dirt, shives) is greatly reduced.

The main objective of bleaching is to increase the brightness (whiteness) of the pulp while still maintaining good physical strength properties. The pulp is then used by the paper mill to manufacture a wide variety of consumer goods.

When bleaching pulp, there are a number of key parameters that influence the results of the chemical reactions and the effectiveness of each treatment. To obtain optimal bleaching results, specific conditions need to be met in each stage. The chemicals used in the different bleaching stages vary in their selectivity when reacting with cellulose and lignin as well as their ability to brighten the pulp.

The four key parameters for all bleaching stages are:

1) chemical dosage
2) reaction time
3) reaction temperature
4) stock pH.

All bleaching chemicals react according to the same principle with a fast initial reaction phase and then a slower subsequent phase. Chlorine dioxide ($ClO_2$) is unique, however, having an almost instantaneous reaction with pulp.

In order to take advantage of this known reaction mechanism, a typical bleaching stage usually involves chemical addition, a chemical/pulp mixer, reaction in a tower to provide retention time, followed by washing to remove the excess chemicals and reaction products.

The Palatka facility utilizes this type of equipment for the bleaching of both hardwoods and softwoods in the same and only bleach plant. The physical equipment operation is fundamentally the same for both species with different targeted values for the four key parameters mentioned above.

The following are examples of the type of instrumentation used to assure a safe, effective, and efficient bleaching process:

- Flow Indication for stock, water, effluent, chemicals, and steam.
- Consistency meters prior to each beaching sequence for chemical addition.
- Temperatures for all flows in all stages of the process.
- pH probes for stock and effluent throughout the process.
- Chemical residual analyzers for stock streams throughout process. >- Stock Kappa analyzer at each stage for chemical addition.
- Brightness instrumentation at each stage for brightness development and chemical addition.
- Fiber length analyzers for accurate species tracking and correct chemical addition.
- $ClO_2$ strength analyzer for maximizing $ClO_2$ addition on stock.
- Local and DCS gas emission alarms strategically placed throughout all levels of the operation.
- Conductivity probes in sewer effluent.

Operator training consisted of the following:

- 24 hours of Computer Based Training
- 16 hours of Class Room Training
- 16 hours of in the Field Training
- 40 hours of one on one Running the Plant Training.

The operating staff of this equipment utilizes sophisticated Digital Controls Systems via remote PC to monitor and make every control adjustment to the key parameters.

Operators maintain a log sheet that contains critical operating data. A shift by shift equipment checklist is completed each day for equipment lubrication, vibration, noise, and temperature. A multitude of alarm limits and safety interlocks also help to assure that the four key parameters are kept in check.

In an effort to verify that the control instrumentation is correct, operating staff complete manual test verification log sheets periodically during the day. Deviations from field instrumentation are adjusted as needed and calibrations are made as soon as possible.

To minimize the need for frequent adjustments, field instrumentation is inspected, cleaned, replaced and/or calibrated on either a daily, weekly, or monthly basis.

All environmental, safety, or major pieces of equipment have written maintenance procedures and parts lists readily available to the maintenance staff. Preventative Maintenance routes are completed routinely via either vender recommendations or historical performance. All maintenance work on any piece of equipment is tracked electronically for repetitive issue resolution.

# ATTACHMENT GP-EU1-J9

# OTHER INFORMATION REQUIRED BY RULE OR STATUTE

**ATTACHMENT GP-EU1-J9**

**(Revised 11/13/02)**

This application is being submitted to revise the PSD Permit (Permit No. 1070005-010-AC) to increase the CO emission rate for the No. 3 Bleach Plant at Georgia-Pacific (G-P) Palatka.

Specific Condition 3 of Permit No. 1070005-010-AC requires that an Operation and Maintenance (O&M) Plan for the No. 3 Bleach Plant be submitted which sets forth the practices which are employed to result in efficient bleaching operations. The required O & M Plan is contained in Attachment GP-EU1-J7.

As per Specific Condition 12 of Permit No. 1070005-010-AC, G-P is to operate continuous monitors for pH of the gas scrubber liquid, the gas scrubber liquid recirculation flow rate, and gas scrubber vent inlet flow rate. The monitoring of the fan loading is an alternative to the continuous monitoring of the gas scrubber vent inlet flow rate. The EPA letter of approval for use of alternative monitoring is attached. Monitoring fan loading insures that gas is flowing to the scrubber. G-P will be submitting a letter to the Administrator, in the near future, requesting approval to monitor differential pressure in place of fan loading in the event the fan load monitor is inoperative. Monitoring pH insures that the scrubber liquid is the appropriate strength to control emissions from the vent gas. Monitoring the scrubber recirculation flow ensures that scrubber liquid is actually flowing into the scrubber.

G-P plans to establish parametric values during the most recent compliance test. The methodology and calculations utilized in setting the parametric values will be submitted in conjunction with any compliance test results. Once these values are established, operation will be allowed at 90% or greater of the minimum value or 110% or less of the maximum value.

G-P requests that any condition placed in the Title V permit to require minimum or maximum scrubber operating parameters state the following: "Such parameters remain valid until a compliance test demonstrates that compliance can be achieved at lower or higher values. Upon such demonstration, the lower or higher values become the new limitations for the gas scrubber."

JET

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

DEC 2 ? 2000

received
12-27-00

4APT-ARB

Myra J. Carpenter
Superintendent, Environmental Affairs
Georgia-Pacific Corporation
P. O. Box 919
Palatka, Florida 32178-0919

Dear Ms. Carpenter:

Thank you for your letter dated December 1, 2000, regarding a request from the Georgia-Pacific Corporation, Palatka, Florida, for approval of a bleach plant alternative monitoring parameter pursuant to the Pulp & Paper MACT standard. Section 63.453(c)(2) of the MACT requires subject mills to continuously monitor the gas scrubber vent gas inlet flow rate. However, the facility states that because the inlet to the gas scrubber is a very corrosive, moist environment, it is not conducive to continuous flow measurement and therefore Georgia-Pacific is seeking approval of a system to continuously monitor operation of the fan used to convey hazardous air pollutants to the bleach plant scrubber.

Based on the discussion of the alternative monitoring parameter issue in the Environmental Protection Agency's (EPA's) Q&A Document for the Pulp & Paper MACT (Volume 1, Page 8 - 10), Region 4 concurs that adequate rationale for using an alternative parameter (as required in 63.453(n)), has been demonstrated. Therefore, Region 4 concurs with the Georgia-Pacific request to substitute vent gas fan data (i.e., install, calibrate, operate and properly maintain a continuous monitoring system to monitor the fan amperage of the bleaching system vent gas fan) as an alternative monitoring parameter to 63.453(c)(2) and accordingly approves this specific request.

If further assistance is needed, please contact Lee Page of the EPA Region 4 staff at (404) 562-9131.

Sincerely,

Paul Stagner

R. Douglas Neeley
Chief
Air and Radiation Technology Branch
Air, Pesticides and Toxics
Management Division

cc: Howard Rhodes, FL DEP

# ATTACHMENT A

# SUPPLEMENTAL INFORMATION FOR CONSTRUCTION PERMIT APPLICATION

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A DERIVATION OF PROPOSED CO EMISSION FACTORS

# 1.0 INTRODUCTION

Georgia-Pacific Corporation (G-P) operates a Kraft pulp mill located in Palatka, Florida. As part of the paper making process, pulp bleaching is conducted at the facility. In 1999, G-P applied for a construction permit to construct an elemental chlorine-free (ECF) three-stage bleach plant. On June 30, 1999, the Florida Department of Environmental Protection (FDEP) issued G-P a Prevention of Significant Deterioration (PSD) permit to construct the No. 3 Bleach Plant. Construction for the No. 3 Bleach Plant was completed by February 15, 2001 and the bleach plant is now operational. Based on initial test data from the new bleach plant, G-P believes that the carbon monoxide (CO) emission limit that the bleach plant is subject to does not adequately reflect process variability of the bleach plant.

G-P is now submitting this application to revise the CO emission limit in the No. 3 Bleach Plant PSD permit, Permit No. 1070005-006-AC; PSD-FL-264. The current permit limit is 46 pounds per hour (lbs/hr) and 201 tons per year (TPY). G-P is proposing to increase the CO emission limit to 100 lbs/hr and 349 TPY. This increase in emissions reflects the potential for 100 percent softwood processing, as well as increased application of chlorine dioxide to the pulp compared to what was originally proposed in the PSD permit application. G-P believes that the revised emission estimate is more representative of potential CO emissions from the No. 3 Bleach Plant. It should be noted that G-P estimated an average hourly CO emission rate of 63.4 lb/hr in the original PSD application, based on processing 65 percent softwood and 35 percent hardwood. The revised potential CO emissions contained in this application, reflects the scenario of 100 percent softwood production.

This report contains background information relating to the CO emissions, an update on Best Available Control Technology (BACT), and a modeling analysis showing that the proposed higher emission rate for CO will not have any adverse air quality impacts. As discussed further in Section 3.0, G-P still feels that the BACT analysis presented in the original application is appropriate, even in light of the revised emission limits. As such, that section is included for informational purposes only.

# 2.0 PROJECT DESCRIPTION

## 2.1 BACKGROUND

G-P operates a Kraft pulp and paper mill located in Palatka, Florida. Processes and systems at the mill include a batch digester system, multiple effect evaporator (MEE) system, condensate stripper system, recovery boiler and smelt dissolving tanks, lime kiln, tall oil plant, utilities, bleach plant, chlorine dioxide plant, and other equipment to produce finished paper products from virgin wood.

Prior to the construction of the No. 3 Bleach Plant, G-P operated two bleach plants, the No. 1 and No. 2 Bleach Plants. These bleach plants used a combination of chlorine dioxide ($ClO_2$) and elemental chlorine to bleach pulp. The No. 3 Bleach Plant was constructed to replace the No. 1 and the No. 2 Bleach Plant and to help G-P meet the Maximum Achievable Control Technology (MACT) Standards promulgated for the pulp and paper industry (40 CFR Part 63, Subpart S) by converting the bleaching system to a totally ECF process.

The No. 3 Bleach Plant has the ability to bleach either softwood or hardwood pulp. The bleach plant operates in three stages, with a prewash prior to the front sequence. The three stages consist of a $D_0$ stage (chlorine dioxide stage), an $E_{OP}$ stage (caustic extraction with oxygen and peroxide), and a $D_1$ stage (chlorine dioxide stage), resulting in a $D_0(E_{OP})D_1$ sequence. Pulp is supplied to the bleach plant from the No. 2 High Density (HD) chest for hardwood and from the No. 3 HD chest for softwood. The bleach plant is designed for a maximum daily production rate of 1,702 air-dried tons of bleached pulp (ADTBP) per day and a monthly average production rate of 1,350 ADTBP per day.

## 2.2 PROJECTED CO EMISSIONS

### 2.2.1 ORIGINAL CONSTRUCTION PERMIT APPLICATION

When G-P applied for the PSD construction permit for the bleach plant, G-P did not have specific data for its three stage bleaching plant on which to base CO emissions. CO emissions from the No. 3 Bleach Plant were estimated based on emissions presented in technical literature. Specifically, NCASI Technical Bulletin No. 760 was used to estimate emissions from the No. 3 Bleach Plant.

A summary of the CO emissions data contained in NCASI Technical Bulletin No. 760 is presented in Table 2-1. As discussed further in the NCASI Technical Bulletin, these data indicated that CO emissions from softwood bleaching are dependent on the rate of $ClO_2$ application to the pulp, but CO

emissions from hardwood bleaching are not dependent on $ClO_2$ application rate. To estimate CO emissions from softwood bleaching in the No. 3 Bleach Plant, an interpolation of the presented data was performed using estimated peak and average $ClO_2$ application rates (see Appendix A to this permit application). CO emissions from hardwood bleaching were estimated by averaging the emission factors for the hardwood bleaching.

The projected CO emissions from softwood bleaching were estimated as 1.03 lb/ADTBP for short-term emissions and 0.91 lb/ADTBP for long-term emissions. The projected CO emissions from hardwood bleaching were estimated as 0.64 lb/ADTBP. Maximum hourly emissions from the No. 3 Bleach Plant were based on the maximum pulp production rate of 1,702 ADTBP per day and a processing ratio of 65 percent softwood and 35 percent hardwood. Annual emissions were based on the average pulp production rate of 1,350 ADTBP per day and a processing ratio of 65 percent softwood and 35 percent hardwood. This resulted in an hourly emission rate of 63.4 lbs/hr and an annual emission rate of 201 TPY. These derivations can be found in Appendix A of the original PSD application.

### 2.2.2 REVISED PROJECTIONS BASED ON OPERATIONAL DATA

Since the bleach plant is now operating, G-P has actual operating data experience with the No. 3 Bleach Plant. In the original PSD application, G-P estimated that the peak $ClO_2$ application rate would be 3.57 percent and the average application rate would be 2.89 percent. G-P now believes that a maximum application rate of 5.7 percent is more representative of the softwood bleaching operations. Incorporating this updated $ClO_2$ application rate into the emission calculations results in a maximum emission factor for CO of 1.42 lb/ADTBP. These calculations are presented in Appendix A.

G-P desires to permit the No. 3 Bleach Plant for the 100-percent softwood bleaching scenario, which according to NCASI Technical Bulletin No. 760, would correspond to the highest emissions. Again, this NCASI data is utilized in developing an emission factor for use at the Palatka Mill (see Appendix A for emission factor derivation).

Proposed maximum hourly emissions from the No. 3 Bleach Plant are based on the permitted maximum daily pulp production rate of 1,702 ADTBP per day and the emission factor of 1.42 lbs CO/ADTBP. The proposed annual emissions are based on the permitted maximum monthly

average pulp production rate of 1,350 ADTBP per day and the emission factor of 1.42 lbs CO/ADTBP. These calculations can be found in Appendix A of this application.

## 2.3 SUMMARY

Based on the information presented above, G-P is requesting a higher emission limit for CO for the No. 3 Bleach Plant. G-P is requesting a CO emission limit of 100 lb/hr and 349 TPY. The derivation of these emission rates is summarized in Appendix A of this application. The short-term and annual CO emissions for the No. 3 Bleach Plant are summarized in Table 2-2.

Table 2-1. Comparison of CO Emissions from Hardwood and Softwood Bleach Plants

| Mill Code | Carbon Monoxide Emissions | | |
|---|---|---|---|
| | lb/ODTUP | lb/ADTUP | lb/ADTBP |
| Softwood | | | |
| B | 0.85 | 0.77 | 0.83 |
| C | 0.62 | 0.56 | 0.61 |
| C | 0.93 | 0.84 | 0.91 |
| G | 1.02 | 0.92 | 1.00 |
| Average = | 0.86 | 0.77 | 0.84 |
| Hardwood | | | |
| B | 0.65 | 0.59 | 0.62 |
| C | 0.88 | 0.79 | 0.84 |
| SA | 0.54 | 0.49 | 0.52 |
| SE | 0.64 | 0.58 | 0.61 |
| SH | 0.63 | 0.57 | 0.60 |
| Average = | 0.67 | 0.60 | 0.64 |

Note: ADTUP = air-dried tons unbleached pulp.
ODTUP = oven-dried tons unbleached pulp.

Source: NCASI Technical Bulletin No. 760, July 1998.

Table 2-2 Revised Maximum CO Emissions for the No. 3 Bleach Plant (Revised 11/12/02)

| Averaging Period | Wood Species | Emission Factor (lbs/ADTBP) (a) | Throughput Rate | Emission Rate |
|---|---|---|---|---|
| | | | | |
| Short-Term (Hourly) | Softwood | 1.68 | 60 ADTBP/hour | 100.8 lbs/hour (d) |
| | | | | |
| Long-Term (Annual) | Softwood | 1.68 | 320,287.5 ADTBP/year (b) | 269.0 tons/year |
| | Hardwood | 0.64 | 172,462.5 ADTBP/year (c) | 55.2 tons/year |
| | | | | |
| | | Total (Long-Term) | 492,750 ADTBP/year | 324.2 tons/year |

(a) Refer to Appendix A of Attachment A for derivation of softwood and hardwood emission factors.

(b) Based on an average daily throughput of 1,350 ADTBP and assuming 65% softwood on an annual basis (1,350 ADTBP/day x 365 days/year x 0.65 = 320,287.5 ADTBP/year).

(c) Based on an average daily throughput of 1,350 ADTBP and assuming 35% hardwood on an annual basis (1,350 ADTBP/day x 365 days/year x 0.35 = 172,462.5 ADTBP/year).

(d) Actual calculated value is 100.8 lbs/hour; G-P is proposing a maximum hourly permitted rate for CO of 100 lbs/hour.

## 3.0 AIR QUALITY MONITORING REQUIREMENTS

In accordance with requirements of 40 CFR 52.21(m) and FDEP Rule 62-212.400(5)(f), F.A.C., any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility potentially would emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate.

Ambient air monitoring for a period of up to 1 year is generally appropriate to satisfy the PSD monitoring requirements. A minimum of 4 months of data is required. Existing data from the vicinity of the proposed source may be used if the data meet minimum of 4 months of data is required. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided in the U.S. Environmental Protection Agency's (EPA's) Ambient Monitoring Guidelines for Prevention of Significant Deterioration (EPA, 1987a).

FDEP may exempt a proposed major stationary facility or major modification from the monitoring requirements with respect to a particular pollutant if the emissions increase of the pollutant from the facility or modification would cause, in any area, air quality impacts less than the *de minimis* monitoring levels (FDEP Rule 62-212.400, F.A.C.). Presented in Table 3-1 is a comparison of the maximum future CO impact of the No. 3 Bleach Plant to the CO *de minimis* monitoring concentration. Since the maximum 8-hour CO concentration of 293 micrograms per cubic meter ($\mu g/m^3$) is less than the 8-hour *de minimis* monitoring concentration of 575 $\mu g/m^3$, the proposed project is exempt from monitoring requirements for CO.

Table 3-1. Comparison of Maximum Future Impact of the No. 3 Bleach Plant to the *De Minimis* Monitoring Concentration

| Pollutant | Impact Due to Future Proposed Project [a] ($\mu g/m^3$) | *De Minimis* Monitoring Concentration ($\mu g/m^3$) | Preconstruction Ambient Monitoring Analysis Required? |
|---|---|---|---|
| Carbon Monoxide | 293, 8-hour | 575, 8-hour | No |

[a] Impact presented is for maximum CO emissions from the No. 3 Bleach Plant.

Source: Golder Associates Inc., 2002.

# 4.0 BEST AVAILABLE CONTROL TECHNOLOGY REQUIREMENTS

In the case of the Bleach Plant addition at G-P, only CO required a BACT analysis for the proposed No. 3 Bleach Plant. The following section presents an update to the BACT analysis for CO.

## 4.1 BACT FOR CO FROM THE NO. 3 BLEACH PLANT

CO is a byproduct that is formed when bleaching pulp in a pulp mill. It has been known for some time that CO is formed in the stages of a chlorine, caustic extraction, and chlorine dioxide (CEDED) bleaching sequence. This sequence is similar to the sequence used in G-P's existing bleaching process. However, until recently, it was not known how much CO formation could be expected from bleaching using up to 100 percent $ClO_2$ substitution (NCASI TB 760, 1998).

Based on studies performed by NCASI, it has been postulated that CO formation from $ClO_2$ substitution occurs as a result of the synergistic reaction between $ClO_2$ and certain precursors formed from bleaching with chlorine. The results of the studies do not show a correlation between CO formation and percent $ClO_2$ substitution. However, there is evidence to show that, when using 100 percent $ClO_2$ substitution, CO emissions appear to increase linearly with the total percent $ClO_2$ applied on the pulp. Therefore, it would appear that when bleaching using an ECF bleaching process (i.e., 100 percent $ClO_2$ substitution), CO formation may be reduced be reducing the amount of $ClO_2$ applied to the pulp. This would suggest that CO emissions from the ECF bleaching process could be "controlled" by maintaining the percentage of $ClO_2$ applied to the pulp at minimum levels that would ensure proper bleaching of the pulp. Thus, ensuring efficient use of $ClO_2$ and efficient operation of the bleaching process would minimize CO emissions.

As part of the BACT analysis, EPA's BACT Clearinghouse database was searched for instances of similar BACT determinations for CO emissions from bleach plants. Other than G-P's original BACT determination for the No. 3 Bleach Plant, only three other such determinations were found. A summary of these determinations is provided in Table 4-1. The determinations were made for two different Weyerhaeuser facilities, located in North Carolina and Mississippi. The BACT determinations were 2.2 pounds per oven-dried ton (lb/ODT) and 0.98 lb/ODT, respectively, for these two facilities. There were no control technologies associated with these BACT determinations. The Mississippi Weyerhaeuser facility's BACT determination was based on efficient operations of

the bleach plant. G-P's proposed limit is equivalent to 1.28 lbs/oven-dried tons per bleached pulp (ODTBP) (1.42 lbs/ADTBP), which falls within the range of previous determinations.

In addition, key researchers of bleach plant CO emission studies for NCASI were queried as to the most effective means of control of CO emissions from ECF bleach plants. The consensus was that the most effective method to control CO emissions is to maintain efficient operations of the bleach plant.

Based on this information, G-P still feels that "efficient bleaching operations" as a work practice to minimize CO emissions represents BACT from the No. 3 Bleach Plant. No other feasible or practical means of CO emissions control or reduction has been applied to pulp mill CO emissions.

Table 4-1. Summary of BACT Determinations for Carbon Monoxide Emissions from Bleach Plants

| Company Name | State | RBLC ID | Permit Issue Date | Throughput Per Unit | Emission Limits As provided in BACT/LAER Clearinghouse | Emission Limits Converted to lb/hr [a] | Control Technology/Comment |
|---|---|---|---|---|---|---|---|
| Georgia-Pacific Corp. | FL | FL-0183 | 6/30/99 | 1,532 ODT/D [b] | 0.71 lb/ODT | 46 | -- |
| Weyerhaeuser Company--Plymouth Pulp and Paper Mill | NC | NC-0070 | 11/25/98 | 800 ODT/D | 2.2 lb/ODT | 73.3 | -- |
| Weyerhaeuser Company--Plymouth Pulp and Paper Mill | NC | NC-0070 | 11/25/98 | 1,250 ODT/D | 2.2 lb/ODT | 114.6 | -- |
| Weyerhaeuser Company | MS | MS-0029 | 9/10/96 | 1,685 ODT/D [b] | 0.98 lb/ODT | 69.0 | Efficient Operation |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2001
ADT/D = Air dried tons per day
ODT/D = Oven dried tons per day

[a] Calculating assuming 24 hour operation per day.

[b] Converted from ADT/D to ODT/D using the conversion factor ADT/D = ODT/D x 1/0.90

# 5.0 AIR QUALITY MODELING ANALYSIS

## 5.1 INTRODUCTION

To demonstrate that the increased CO emissions will not have an adverse affect on air quality, a modeling analysis for CO was performed. Except as noted below, this analysis was performed in the same manner as the modeling performed in the original construction permit application that was submitted in 1999 for the No. 3 Bleach Plant, except as discussed below. The latest version of the Industrial Source Complex Short-Term [(ISCST3), Version 02035] dispersion model (EPA, 2002) was used to evaluate the CO impacts due to the proposed project in areas within 50 kilometers (km) of the proposed facility. A listing of ISCST3 model features is presented in Table 5-1.

A different receptor grid was used in this modeling analysis. To determine the CO significant impact area for the proposed project, concentrations were predicted using polar grids. The receptor grids, comprised of 36 radials spaced at 10-degree intervals, began at the plant property and extended out to a distance of 5.5 km. An additional 334 Cartesian grid receptors, spaced at 100-meter (m) intervals, were used to predict impacts along the fence line areas. A summary of the fence line receptors is presented in Table 5-2.

At the off-property areas between the fence line and the outermost ring distance of 5.5 km, 205 discrete polar receptors were used, spaced at 10-degree intervals at ring distances of 0.5, 0.6, 0.7, 1.0, 2.0, 3.0, 4.0, 4.5, 5.0, and 5.5 km from the origin. All receptor locations are relative to the former TRS Incinerator stack location, an origin that was used for the modeling in the original PSD application. The radial and property line receptors are presented in Figure 5-1.

Eleven receptors were used to predict the CO concentrations at the Okefenokee and Wolf Island National Wilderness Area (NWA) PSD Class I areas. Ten of the 11 receptors were located along the southern and eastern boundaries of Okefenokee NWA. One additional receptor was located at the Wolf Island NWA. A list of these receptors is presented in Table 5-3. Because allowable PSD increments do not exist for CO, the Class I modeling analysis was performed only for the air quality related value (AQRV) assessment.

## 5.2 EMISSION INVENTORY

The maximum short-term CO emissions for the No. 3 Bleach Plant are 100 lbs/hr as presented in Table 2-2. The maximum CO impacts due to these future maximum CO emissions from the No. 3 Bleach Plant were compared to the CO significant impact levels. The stack parameters for the bleach plant scrubber used in the modeling analysis are presented in Table 5-4. Since the original PSD application was submitted prior to construction of the No. 3 Bleach Plant, some of the stack parameters varied slightly from the original design parameters.

## 5.3 BUILDING DOWNWASH EFFECTS

The potential for building downwash to occur was evaluated for all source/structure combinations at the G-P Palatka facility. A total of 12 building structures were evaluated. All building structures were processed in the EPA Building Input Profile (BPIP, Version 95086) program to determine direction-specific building heights and projected widths for each 10-degree azimuth direction for the bleach plant scrubber. The evaluated structures are presented in Table 5-5. A plot plan showing building and stack locations is presented in Attachments GP-FI-C2a and GP-FI-C2b.

## 5.4 MODEL RESULTS - SIGNIFICANT IMPACT ANALYSIS

Results of the significant impact screening analyses for CO are summarized in Table 5-6. The maximum 8-hour and 1-hour CO impacts of 293 and 1,096 $\mu g/m^3$, respectively, are below the significant impact levels of 500 and 2,000 $\mu g/m^3$, respectively. Because the maximum predicted impacts from the screening analysis were less than 60 percent of the EPA significant impact levels, additional refinements were not performed. Furthermore, since the predicted CO impacts do not exceed the significant impact levels, an additional analysis comparing the CO impacts to the ambient air quality standards (AAQS) is not required.

Table 5-1. Major Features of the ISCST3 Model

| ISCST3 Model Features |
|---|
| • Polar or Cartesian coordinate systems for receptor locations. |
| • Rural or one of three urban options which affect wind speed profile exponent, dispersion rates, and mixing height calculations. |
| • Plume rise due to momentum and buoyancy as a function of downwind distance for stack emissions (Briggs, 1969, 1971, 1972, and 1975; Bowers *et al.*, 1979). |
| • Procedures suggested by Huber and Snyder (1976); Huber (1977); and Schulman and Scire (1980) for evaluating building wake effects. |
| • Procedures suggested by Briggs (1974) for evaluating stack-tip downwash. |
| • Separation of multiple emission sources. |
| • Consideration of the effects of gravitational settling and dry deposition on ambient particulate concentrations. |
| • Capability of simulating point, line, volume, area, and open pit sources. |
| • Capability to calculate dry and wet deposition, including both gaseous and particulate precipitation scavenging for wet deposition. |
| • Variation of wind speed with height (wind speed-profile exponent law). |
| • Concentration estimates for 1 hour to annual average times. |
| • Terrain-adjustment procedures for elevated terrain including a terrain truncation algorithm for ISCST3; a built-in algorithm for predicting concentrations in complex terrain. |
| • Consideration of time-dependent exponential decay of pollutants. |
| • The method of Pasquill (1976) to account for buoyancy-induced dispersion. |
| • A regulatory default option to set various model options and parameters to EPA recommended values (see text for regulatory options used). |
| • Procedure for calm-wind processing including setting wind speeds less than 1 m/s to 1 m/s. |

Note: ISCST3 = Industrial Source Complex Short-Term.

References:

Bowers, J.F., J.R. Bjorklund and C.S. Cheney. 1979. Industrial Source Complex (ISC) Dispersion Model User's Guide. Volume I, EPA-450/4-79-030; Volume II. EPA-450/4-79-031. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

Briggs, G.A. 1969. Plume Rise, USAEC Critical Review Series, TID-25075. National Technical Information Service, Springfield, Virginia 22161.

Briggs, G.A. 1972. Discussion on Chimney Plumes in Neutral and Stable Surroundings. *Atmos. Environ.*, Q, 507-510.

Briggs, G.A. 1974. Diffusion Estimation for Small Emissions. *In*: ERL, ARL USAEC Report ATDL-106. U.S. Atomic Energy Commission, Oak Ridge, Tennessee.

Briggs, G.A. 1975. Plume Rise Predications. In Lectures on Air Pollution and Environmental Impact Analysis. American Meteorological Society, Boston, Massachusetts.

Briggs, G.A. 1979. Some Recent Analyses of Plume Rise Observations. *In*: Proceedings of the Second International Clean Air Congress. Academic Press, New York.

Huber, A.H. 1977. Incorporating Building/Terrain Wake Effects on Stack Effluents. Preprint Volume for the Joint Conference on Applications of Air Pollution Meteorology, American Meteorological Society, Boston, Massachusetts.

Huber, A.H. and W.H. Snyder. 1976. Building Wake Effects on Short Stack Effluents. Preprint Volume for the Third Symposium on Atmospheric Diffusion and Air Quality, American Meteorological Society, Boston, Massachusetts.

Pasquill, F. 1976. Atmospheric Dispersion Parameters in Gaussian Plume Modeling - Part II. Possible Requirements for Change in the Turner Workbook Values. EPA-600/4-76-030b, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

Schulman, L.L. and J.S. Scire. 1980. Buoyant Line and Point Source (BLP) Dispersion Model User's Guide. Document P-7304B, Environmental Research and Technology, Inc., Concord, MA.

Table 5-2. Property Boundary Receptors Used in the G-P Modeling Analysis

| Coordinates (m) | | Coordinates (m) | | Coordinates (m) | | Coordinates (m) | | Coordinates (m) | | Coordinates (m) | | Coordinates (m) | | Coordinates (m) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | Y | X | Y | X | Y | X | Y | X | Y | X | Y | X | Y | X | Y |
| -311.0 | -1781.0 | -3231.4 | -279.6 | -4162.2 | 2413.6 | -3944.5 | 3977.0 | -1217.8 | 4808.0 | 1914.3 | 4492.0 | 1574.6 | 2851.9 | 1248.5 | 842.0 |
| -402.0 | -1739.6 | -3331.4 | -276.3 | -4168.3 | 2513.4 | -4044.5 | 3977.0 | -1117.8 | 4808.6 | 1911.6 | 4392.0 | 1527.7 | 2763.6 | 1348.5 | 842.0 |
| -493.1 | -1698.2 | -3431.3 | -273.0 | -4174.5 | 2613.3 | -4144.5 | 3977.0 | -1017.8 | 4809.3 | 1908.9 | 4292.0 | 1480.8 | 2675.3 | 1448.5 | 842.0 |
| -584.1 | -1656.9 | -3531.3 | -269.7 | -4180.6 | 2713.1 | -4185.0 | 4036.5 | -917.8 | 4809.9 | 1906.3 | 4192.1 | 1433.9 | 2587.0 | 1548.5 | 842.0 |
| -675.1 | -1615.5 | -3631.2 | -266.4 | -4186.8 | 2812.9 | -4185.0 | 4136.5 | -817.8 | 4810.5 | 1903.6 | 4092.1 | 1341.7 | 2574.0 | 1648.5 | 842.0 |
| -766.2 | -1574.1 | -3731.1 | -263.1 | -4193.0 | 2912.7 | -4185.0 | 4236.5 | -717.8 | 4811.2 | 1826.1 | 4069.0 | 1241.7 | 2574.0 | 1740.2 | 832.5 |
| -857.2 | -1532.7 | -3831.1 | -259.8 | -4199.1 | 3012.5 | -4161.5 | 4313.4 | -617.8 | 4811.8 | 1739.0 | 4081.9 | 1141.7 | 2574.0 | 1737.6 | 740.0 |
| -948.3 | -1491.3 | -3931.0 | -256.5 | -4205.3 | 3112.3 | -4061.5 | 4315.0 | -517.8 | 4812.5 | 1739.0 | 4181.9 | 1116.1 | 2482.6 | 1657.5 | 680.0 |
| -1039.3 | -1450.0 | -3894.6 | -190.3 | -4211.4 | 3212.1 | -3961.5 | 4316.6 | -417.8 | 4813.1 | 1739.0 | 4281.9 | 1095.9 | 2384.7 | 1577.5 | 620.1 |
| -1130.3 | -1408.6 | -3832.3 | -112.1 | -4217.6 | 3311.9 | -3861.6 | 4318.3 | -317.8 | 4813.7 | 1739.0 | 4381.9 | 1075.6 | 2286.8 | 1497.4 | 560.2 |
| -1221.4 | -1367.2 | -3769.9 | -33.9 | -4176.6 | 3360.5 | -3761.6 | 4319.9 | -217.8 | 4814.4 | 1739.0 | 4481.9 | 1055.4 | 2188.8 | 1417.4 | 500.2 |
| -1312.4 | -1325.8 | -3707.6 | 44.3 | -4077.7 | 3346.0 | -3661.6 | 4321.5 | -117.8 | 4815.0 | 1739.0 | 4581.9 | 1035.1 | 2090.9 | 1337.3 | 440.3 |
| -1403.4 | -1284.4 | -3651.2 | 125.9 | -3978.8 | 3331.6 | -3561.6 | 4323.2 | -17.9 | 4815.7 | 1739.0 | 4681.9 | 1033.7 | 2027.3 | 1257.3 | 380.4 |
| -1494.5 | -1243.1 | -3613.9 | 218.7 | -3879.8 | 3317.1 | -3461.6 | 4324.8 | 82.1 | 4816.3 | 1642.1 | 4685.0 | 1105.3 | 2097.0 | 1177.2 | 320.4 |
| -1585.5 | -1201.7 | -3576.7 | 311.5 | -3780.9 | 3302.6 | -3361.6 | 4326.4 | 182.1 | 4816.9 | 1542.1 | 4685.0 | 1177.0 | 2166.7 | 1097.2 | 260.5 |
| -1676.5 | -1160.3 | -3562.9 | 403.3 | -3681.9 | 3288.1 | -3261.6 | 4328.1 | 282.1 | 4817.6 | 1442.1 | 4685.0 | 1248.7 | 2236.4 | 1017.1 | 200.6 |
| -1767.6 | -1118.9 | -3608.6 | 492.2 | -3583.0 | 3273.7 | -3161.6 | 4329.7 | 382.1 | 4818.2 | 1410.0 | 4624.5 | 1320.4 | 2306.2 | 937.1 | 140.6 |
| -1858.6 | -1077.5 | -3654.2 | 581.2 | -3484.0 | 3259.2 | -3087.4 | 4349.2 | 482.1 | 4818.9 | 1421.4 | 4525.2 | 1392.1 | 2375.9 | 857.0 | 80.7 |
| -1949.7 | -1036.2 | -3732.9 | 616.0 | -3385.1 | 3244.7 | -3120.8 | 4443.5 | 582.1 | 4819.5 | 1432.8 | 4425.8 | 1466.0 | 2440.6 | 777.0 | 20.7 |
| -2040.7 | -994.8 | -3832.9 | 616.0 | -3286.1 | 3230.2 | -3154.1 | 4537.8 | 682.1 | 4820.1 | 1444.3 | 4326.5 | 1565.7 | 2448.5 | 696.9 | -39.2 |
| -2131.7 | -953.4 | -3924.1 | 634.0 | -3187.2 | 3215.8 | -3187.4 | 4632.1 | 782.1 | 4820.8 | 1455.7 | 4227.1 | 1615.7 | 2396.7 | 616.9 | -99.1 |
| -2222.8 | -912.0 | -3985.8 | 712.8 | -3088.2 | 3201.3 | -3220.7 | 4726.4 | 882.1 | 4821.4 | 1467.2 | 4127.8 | 1625.9 | 2297.2 | 536.8 | -159.1 |
| -2313.8 | -870.6 | -4039.0 | 789.7 | -2989.3 | 3186.8 | -3217.8 | 4795.2 | 982.1 | 4822.1 | 1478.6 | 4028.4 | 1636.0 | 2197.8 | 456.8 | -219.0 |
| -2404.8 | -829.3 | -3951.2 | 837.5 | -2890.3 | 3172.3 | -3117.8 | 4795.8 | 1082.1 | 4822.7 | 1490.0 | 3929.1 | 1646.2 | 2098.3 | 376.7 | -278.9 |
| -2495.9 | -787.9 | -3863.4 | 885.4 | -2806.0 | 3174.8 | -3017.8 | 4796.5 | 1182.1 | 4823.3 | 1551.6 | 3886.0 | 1656.4 | 1998.8 | 296.7 | -338.9 |
| -2586.9 | -746.5 | -3831.0 | 966.1 | -2806.0 | 3274.8 | -2917.8 | 4797.1 | 1282.1 | 4824.0 | 1651.6 | 3886.0 | 1666.6 | 1899.3 | 216.6 | -398.8 |
| -2678.0 | -705.1 | -3831.0 | 1066.1 | -2806.0 | 3374.8 | -2817.8 | 4797.7 | 1382.1 | 4824.6 | 1751.6 | 3886.0 | 1676.8 | 1799.8 | 169.7 | -483.4 |
| -2769.0 | -663.7 | -3899.1 | 1098.0 | -2806.0 | 3474.8 | -2717.8 | 4798.4 | 1482.1 | 4825.3 | 1851.6 | 3886.0 | 1687.0 | 1700.4 | 134.9 | -577.2 |
| -2860.0 | -622.4 | -3999.1 | 1098.0 | -2806.0 | 3574.8 | -2617.8 | 4799.0 | 1582.1 | 4825.9 | 1951.6 | 3886.0 | 1625.4 | 1642.7 | 100.2 | -671.0 |
| -2940.6 | -573.9 | -4082.1 | 1116.1 | -2806.0 | 3674.8 | -2517.8 | 4799.7 | 1682.1 | 4826.5 | 2051.6 | 3886.0 | 1537.4 | 1600.6 | 65.5 | -764.7 |
| -2945.1 | -474.0 | -4088.3 | 1215.9 | -2806.0 | 3774.8 | -2417.8 | 4800.3 | 1782.1 | 4827.2 | 2076.0 | 3837.1 | 1549.7 | 1501.3 | 30.7 | -858.5 |
| -2949.7 | -374.1 | -4094.4 | 1315.7 | -2860.4 | 3831.0 | -2317.8 | 4800.9 | 1882.1 | 4827.8 | 2034.9 | 3745.9 | 1562.0 | 1402.1 | -4.0 | -952.3 |
| -2954.3 | -274.2 | -4100.6 | 1415.5 | -2958.1 | 3852.7 | -2217.8 | 4801.6 | 1982.1 | 4828.5 | 1993.9 | 3654.8 | 1617.3 | 1369.0 | -38.8 | -1046.1 |
| -2958.8 | -174.3 | -4106.8 | 1515.3 | -3055.7 | 3874.3 | -2117.8 | 4802.2 | 2082.1 | 4829.1 | 1952.8 | 3563.6 | 1696.5 | 1367.8 | -73.5 | -1139.8 |
| -2963.4 | -74.4 | -4112.9 | 1615.2 | -3153.4 | 3895.9 | -2017.8 | 4802.9 | 2182.1 | 4829.7 | 1911.7 | 3472.4 | 1723.6 | 1271.6 | -108.2 | -1233.6 |
| -2968.0 | 25.5 | -4119.1 | 1715.0 | -3251.0 | 3917.5 | -1917.8 | 4803.5 | 2282.1 | 4830.4 | 1940.0 | 3383.5 | 1641.3 | 1229.4 | -143.0 | -1327.4 |
| -3004.4 | 92.0 | -4125.2 | 1814.8 | -3348.6 | 3939.1 | -1817.8 | 4804.1 | 2376.0 | 4830.1 | 1924.8 | 3291.7 | 1548.4 | 1192.5 | -177.7 | -1421.1 |
| -3104.4 | 92.0 | -4131.4 | 1914.6 | -3446.3 | 3960.7 | -1717.8 | 4804.8 | 2280.4 | 4801.0 | 1875.8 | 3209.6 | 1457.8 | 1152.2 | -212.4 | -1514.9 |
| -3190.0 | 77.6 | -4137.5 | 2014.4 | -3544.5 | 3977.0 | -1617.8 | 4805.4 | 2184.7 | 4771.8 | 1787.8 | 3162.1 | 1389.9 | 1078.8 | -247.2 | -1608.7 |
| -3190.0 | -22.4 | -4143.7 | 2114.2 | -3644.5 | 3977.0 | -1517.8 | 4806.1 | 2107.3 | 4712.3 | 1699.8 | 3114.6 | 1322.0 | 1005.4 | -281.9 | -1702.5 |
| -3190.0 | -122.4 | -4149.9 | 2214.0 | -3744.5 | 3977.0 | -1417.8 | 4806.7 | 2036.6 | 4641.6 | 1654.9 | 3033.7 | 1254.1 | 931.9 | | |
| -3190.0 | -222.4 | -4156.0 | 2313.8 | -3844.5 | 3977.0 | -1317.8 | 4807.3 | 1965.9 | 4570.9 | 1621.5 | 2940.2 | 1186.2 | 858.5 | | |

Note: All coordinates are relative to old TRS incinerator stack location.

Table 5-3. Class I Area Receptors Used in the Modeling Analysis

| PSD Class I Area | UTM Coordinates | |
|---|---|---|
| | East (km) | North (km) |
| Wolf Island NWA | 470.5 | 3459.0 |
| Okefenokee NWA | 391.0 | 3417.0 |
| Okefenokee NWA | 390.0 | 3410.0 |
| Okefenokee NWA | 392.0 | 3400.0 |
| Okefenokee NWA | 390.0 | 3395.0 |
| Okefenokee NWA | 391.0 | 3390.0 |
| Okefenokee NWA | 390.0 | 3384.0 |
| Okefenokee NWA | 383.0 | 3382.0 |
| Okefenokee NWA | 378.0 | 3382.0 |
| Okefenokee NWA | 374.0 | 3383.0 |
| Okefenokee NWA | 370.0 | 3383.0 |

NWA = National Wilderness Area

Table 5-4. No. 3 Bleach Plant Source Location and Operating Parameters Used in Modeling Analysis

| Source | ISCST Source ID | CO Emissions | | Stack Height | | Stack Diameter | | Gas Flow Rate | Gas Exit Temperature | | Velocity | | Location [a] X Coordinate | | Location [a] Y Coordinate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | lb/hr | g/sec | ft | m | ft | m | acfm | °F | K | ft/sec | m/sec | ft | m | ft | m |
| No. 3 Bleach Plant | BLEACH | 126.6 | 16.0 | 118 | 36.0 | 3.5 | 1.07 | 15,400 | 85 | 302.6 | 26.7 | 8.13 | 358.6 | 109.3 | 464.2 | 141.5 |

[a] Relative to the old TRS incinerator stack and to true north.

Table 5-5. Structure Dimensions Used in the Georgia-Pacific Modeling Analysis

| Structure | Height | | Length | | Width | |
|---|---|---|---|---|---|---|
| | ft | m | ft | m | ft | m |
| RB4 Precipitator | 85 | 25.9 | 130 | 39.6 | 59 | 18.0 |
| RB4 Boiler Building | 193.7 | 59.0 | 104 | 31.7 | 90 | 27.4 |
| Power Plant Building | 107.6 | 32.8 | 92 | 28.0 | 92 | 28.0 |
| Pulp Dryer No. 3 | 84.5 | 25.8 | 263 | 80.2 | 147 | 44.8 |
| Pulp Dryer No. 5 | 70.5 | 21.5 | 306 | 93.3 | 95 | 29.0 |
| Pulp Dryer No. 4 | 73 | 22.3 | 242 | 73.8 | 127 | 38.7 |
| Warehouse Complex 1 | 62.67 | 19.1 | 1,382 | 421.2 | 411 | 125.3 |
| Warehouse Complex 2 | 46.8 | 14.3 | 852 | 259.7 | 370 | 112.8 |
| Nos. 1 and 2 Machines, Storage | 71.16 | 21.7 | 232 | 70.7 | 412 | 125.6 |
| Kraft Converting and Storing | 60.75 | 18.5 | 264 | 80.5 | 516 | 157.3 |
| Kraft Warehouse and Multi-Wall | 56.7 | 17.3 | 274 | 83.5 | 507 | 154.5 |
| Digester | 62.2 | 19.0 | 264 | 80.5 | 32 | 9.8 |

Table 5-6. Maximum Predicted CO Concentrations for the No. 3 Bleach Plant Predicted in the Plant Vicinity, Georgia Pacific, Palatka

| Averaging Time | Concentration [a] ($\mu g/m^3$) | Receptor Location [b] X (m) | Receptor Location [b] Y (m) | Time Period (YYMMDDHH) [c] |
|---|---|---|---|---|
| Annual | 11.7 | 492 | -180 | 84123124 |
| | 11.1 | 542 | -109 | 85123124 |
| | 11.1 | 431 | -242 | 86123124 |
| | 15.2 | 536.8 | -159.1 | 87123124 |
| | 14.3 | 456.8 | -219 | 88123124 |
| High 24-Hour | 180 | 296.7 | -338.9 | 84011424 |
| | 119 | 616.9 | -99.1 | 85070824 |
| | 162 | 169.7 | -483.4 | 86121524 |
| | 140 | 492 | -180 | 87102724 |
| | 157 | 492 | -180 | 88022124 |
| High 8-Hour | 278 | 216.6 | -398.8 | 84011308 |
| | 251 | 536.8 | -159.1 | 85071716 |
| | 266 | 134.9 | -577.2 | 86121524 |
| | 279 | 359 | -292 | 87110508 |
| | 293 | 431 | -242 | 88042808 |
| High 3-Hour | 416 | 296.7 | -338.9 | 84011703 |
| | 398 | 456.8 | -219 | 85062612 |
| | 463 | 431 | -242 | 86051309 |
| | 574 | 431 | -242 | 87072509 |
| | 444 | 231 | -548 | 88011003 |
| High 1-Hour | 700 | 359 | -292 | 84112008 |
| | 785 | 376.7 | -278.9 | 85072002 |
| | 861 | 376.7 | -278.9 | 86082921 |
| | 1,096 | 296.7 | -338.9 | 87012008 |
| | 715 | 456.8 | -219 | 88091822 |

[a] Predicted on 5-year meteorological record, Jacksonville and Waycross, 1984 to 1988.

[b] All receptor coordinates are relative to the old TRS incinerator stack location.

[c] YYMMDDHH = Year, Month, Day, Hour Ending

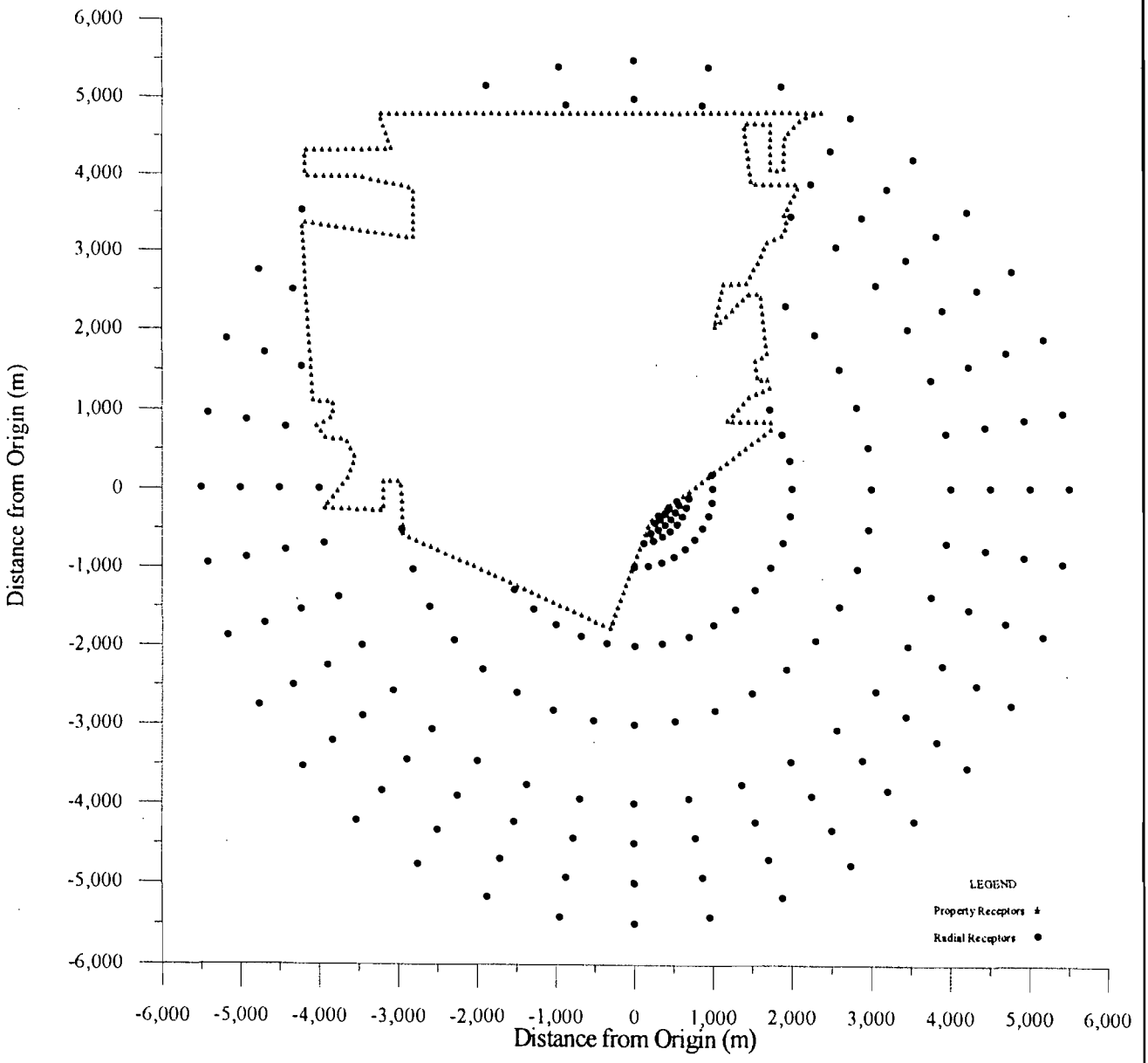



Figure 5-1. Property and Radial Receptors Used in Modeling Analysis
Georgia-Pacific, Palatka Mill

Source: Golder, 2002.

# 6.0 ADDITIONAL IMPACT ANALYSIS

## 6.1 INTRODUCTION

The additional impact analysis and the Class I area analysis address CO. The analysis addresses the potential impacts on vegetation, soils, and wildlife in the surrounding area and at the nearest two PSD Class I areas due to the increase in allowable CO emissions at G-P's Palatka Mill. Due to the distance from G-P, the Okefenokee NWA area would potentially receive much higher impacts than would the Wolf Island NWA. Therefore, only the Okefenokee NWA is addressed in this analysis.

A full CO impact analysis was performed for the initial PSD application. It was demonstrated that the predicted impacts due to the No. 3 Bleach Plant would not have any adverse affects on visibility, soil, vegetation, and wildlife at the G-P plant site and the Okefenokee NWA area. All of the predicted impacts were well below any reported levels of adverse affects. This analysis will compare the predicted impacts of the PSD application with the predicted impacts of the increased CO emissions to demonstrate that the increase in CO emissions will not have any adverse affects on the G-P plant site and the Okefenokee NWA Class I area.

## 6.2 PREDICTED IMPACTS IN VICINITY OF G-P PLANT

In the foregoing analysis, the maximum air quality impacts predicted to occur in the vicinity of the Georgia-Pacific plant and in the Class I area due to the No. 3 Bleach Plant are used. The ISCST3 model (Version 02035) was used to compute maximum concentrations. Maximum impacts in the vicinity of the G-P plant and in the Class I areas were predicted as discussed in Section 5.0. Meteorological data used in the ISCST3 consisted of the same 5-year record as used in the air quality analysis that was performed in support of the original PSD Permit Application. Emissions and stack data for the No. 3 Bleach Plant are presented in Section 5.0.

The results of the CO air quality modeling for the No. 3 Bleach Plant, predicted in the vicinity of the plant are presented in Table 6-1. Maximum predicted CO concentrations are presented for the annual, 24-hour, 8-hour, 3-hour, and 1-hour averaging times. This table presents a comparison of the updated modeling results included in the original PSD Permit Application submittal. As expected, the predicted impacts due to the increase in CO emissions are higher than those predicted in the original PSD application. Although the predicted impacts are higher, the predicted impacts are still less than the lowest reported concentration that has had detrimental affects on vegetation

($1.15 \times 10^5$ µg/m$^3$) (EPA, 1978a). In addition, there are no reports of CO effects on soils, so no additional impacts to soils from CO are predicted. Therefore, the increase in CO should not have any adverse affects in the vicinity of G-P plant site.

Furthermore, there will be no significant increase in permanent employment at G-P as a result of the installation of the new bleach plant. Therefore, there will be no anticipated permanent impacts on air quality caused by associated population growth.

## 6.3 PREDICTED IMPACTS TO THE OKEFENOKEE NWA CLASS I AREA

The results of the revised Class I area air quality modeling for the higher CO emissions are presented in Table 6-2. Predicted air quality concentrations of CO are presented for the Okefenokee NWA for the annual, 24-hour, 8-hour, 3-hour, and 1-hour averaging times. These concentrations reflect the total revised CO emissions due to the No. 3 Bleach Plant.

A comparison of the impacts from the original PSD application and the impacts due to the revised CO emissions is presented in Table 6-3. As expected, the impacts resulting from the revised CO emissions are higher than the impacts presented in the original PSD application. Although, the predicted impacts for the increase in CO emissions are higher, the impacts are still extremely low and are not expected to cause any adverse affects on the Class I area.

Table 6-1. Comparison of Maximum Predicted CO Concentrations from the No. 3 Bleach Plant Only in the Vicinity of the G-P Plant Site

| Averaging Time | CO Concentration ($\mu g/m^3$) | |
|---|---|---|
| | 1999 PSD Application | 2002 Proposed PSD Revision |
| Highest 1-hour | 367 | 1,096 |
| Highest 3-hour | 220 | 574 |
| Highest 8-hour | 182 | 293 |
| Highest 24-hour | 107 | 180 |
| Annual | 8 | 15 |

Table 6-2. Maximum Predicted CO Concentrations due to the No. 3 Bleach Plant at the Okefenokee NWA Class I Area

| Averaging Time | Concentration ($\mu g/m^3$) [a] | Receptor Location [b] | | Time Period (YYMMDDHH) [c] |
|---|---|---|---|---|
| | | UTM-E (m) | UTM-N (m) | |
| Annual | 0.015 | 374000 | 3383000 | 84123124 |
| | 0.013 | 391000 | 3390000 | 85123124 |
| | 0.015 | 383000 | 3382000 | 86123124 |
| | 0.013 | 378000 | 3382000 | 87123124 |
| | 0.012 | 370000 | 3383000 | 88123124 |
| High 24-Hour | 0.35 | 383000 | 3382000 | 84102224 |
| | 0.38 | 370000 | 3383000 | 85072624 |
| | 0.39 | 390000 | 3384000 | 86041424 |
| | 0.43 | 378000 | 3382000 | 87070224 |
| | 0.51 | 370000 | 3383000 | 88050324 |
| High 8-Hour | 0.97 | 374000 | 3383000 | 84080208 |
| | 1.23 | 374000 | 3383000 | 85012808 |
| | 1.16 | 390000 | 3384000 | 86041424 |
| | 1.33 | 378000 | 3382000 | 87070208 |
| | 1.14 | 370000 | 3383000 | 88050324 |
| High 3-Hour | 1.88 | 392000 | 3400000 | 84080403 |
| | 2.45 | 374000 | 3383000 | 85012809 |
| | 2.05 | 383000 | 3382000 | 86082221 |
| | 2.40 | 378000 | 3382000 | 87070206 |
| | 2.09 | 390000 | 3395000 | 88102803 |
| High 1-Hour | 5.65 | 392000 | 3400000 | 84080401 |
| | 7.35 | 374000 | 3383000 | 85012808 |
| | 6.15 | 383000 | 3382000 | 86082220 |
| | 4.79 | 383000 | 3382000 | 87070206 |
| | 5.82 | 370000 | 3383000 | 88050321 |

[a] Predicted on 5-year meteorological record, Jacksonville and Waycross, 1984 to 1988.

[b] All receptor coordinates are reported in Universal Transverse Mercator (UTM) Coordinates.

[c] YYMMDDHH = Year, Month, Day, Hour Ending

Table 6-3. Comparison of Maximum Predicted CO Concentrations from the No. 3 Bleach Plant Only at the Okefenokee NWA Area

| Averaging Time | CO Concentration ($\mu g/m^3$) | |
|---|---|---|
| | 1999 PSD Application | 2002 Proposed PSD Revision |
| Highest 1-hour | 3.9 | 7.4 |
| Highest 3-hour | 1.8 | 2.5 |
| Highest 8-hour | 0.9 | 1.3 |
| Highest 24-hour | 0.3 | 0.5 |
| Annual | 0.007 | 0.015 |

# APPENDIX A

# DERIVATION OF PROPOSED CO EMISSION FACTORS

**Appendix A. Derivation of Proposed Emission Factors**

**A. Derivation of CO Emission Factor for Softwood Bleaching**

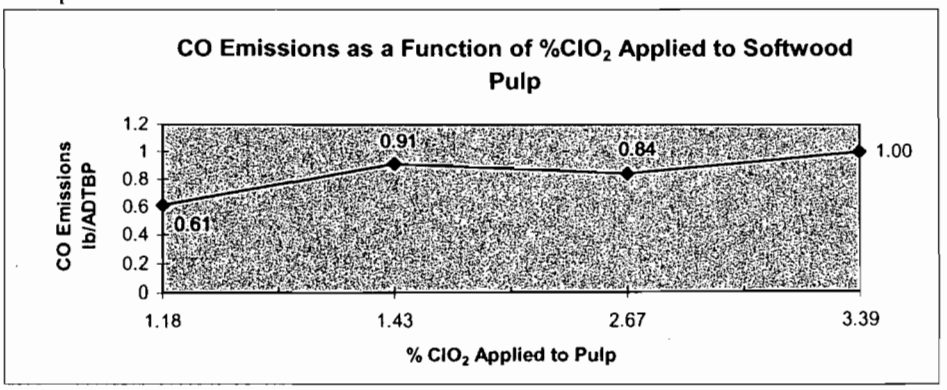
CO Emissions From Softwood Processing

| % $ClO_2$ Applied | CO lbs/ODTUP | CO lbs/ADTUP | CO lbs/ADTBP |
|---|---|---|---|
| 1.18 | 0.62 | 0.56 | 0.61 |
| 1.43 | 0.93 | 0.84 | 0.91 |
| 2.67 | 0.85 | 0.77 | 0.84 |
| 3.39 | 1.02 | 0.92 | 1.00 |

Nomenclature:
ODTUP = Oven Dried Tons of Unbleached Pulp
ADTUP = Air Dried Tons of Unbleached Pulp
ADTBP = Air Dried Tons of Bleached Pulp

Conversion Factors for a Given Amount of CO:
lb/ODTUP X 0.90 = lb/ADTUP
For softwood lb/ADTUP = 0.92 X lb/ADTBP

Example Here




Source: NCASI Technical Bulletin 760. Mill Codes B, C, G for Softwood.

**Short-Term (Peak) and Annual (Average) CO Emission Factor (Softwood)**

Proposed ECF bleach plant peak $ClO_2$ to be applied to the pulp is 5.75%.

Linear Interpolation of CO Emissions at 5.75% $ClO_2$ Applied to Pulp from NCASI TB760 Mills B, C, and G:

Slope of line = CO / %$ClO_2$ = (1.0-0.61) / (3.39-1.18) = 0.176
Given y=mx+b
y= (0.176 X(5.75-1.18)) + 0.61
y= 1.42 lb CO / ADTBP

**B. Derivation of CO Emission Factor for Hardwood Bleaching**

CO Emissions From Hardwood Processing

| Mill Code | CO lbs/ODTUP | CO lbs/ADTUP | CO lbs/ADTBP |
|---|---|---|---|
| B | 0.65 | 0.59 | 0.63 |
| C | 0.88 | 0.79 | 0.84 |
| SA12 | 0.54 | 0.49 | 0.52 |
| SE2 | 0.64 | 0.58 | 0.62 |
| SH2 | 0.63 | 0.57 | 0.61 |
| Average | 0.67 | 0.60 | 0.64 |

Conversion Factors:

lb/ODTUP X 0.90 = lb/ADTUP

For Hardwood lb/ADTUP = 0.94 X lb/ADTBP

Source: NCASI Technical Bulletin 760.

Mills B, C, SA12, SE2, SH2 process hardwood with 100% $ClO_2$ substitution.

**C. Potential Hourly CO Emissions from Proposed ECF Bleach Plant:**

Based on an estimated maximum pulp production rate of 1,702 ADTBP per day and assuming a processing rate for softwood of 100% and 0% for hardwood:

SW = 100% X 1,702 ADTBP/day = 1,702 ADTBP/day
HW = 0% X 1,702 ADTBP/day = 0 ADTBP/day

TOTAL CO emissions = [(0 ADTBP/day X 0.64 lb/ADTBP) + (1,702 ADTBP/day X 1.42 lb/ADTBP)]/24 hr/day
= 100 lb/hr CO emissions

**D. Total Potential Annual CO Emissions from Proposed ECF Bleach Plant:**

Based on an estimated monthly average pulp production rate of 1,350 ADTBP per day and assuming a processing rate for softwood of 100% and 0% for hardwood:

SW = 100% 1,350 ADTBP/day = 1,350 ADTBP/day
HW = 0% 1,350 ADTBP/day = 0 ADTBP/day

TOTAL CO emissions = [(0 ADTBP/day X 0.64 lb/ADTBP) + (1,350 ADTBP/day X 1.42 lb/ADTBP)] X 365 days/yr X ton/2000 lbs
= 349 TPY CO emissions

Georgia-Pacific

Palatka Pulp and Paper Operations
*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919
(386) 325-2001

November 12, 2002

Mr. Syed Arif
State of Florida
Department of Environmental Protection
2600 Blair Stone Road
Twin Towers Office Building
Tallahassee, Florida 32399

RE: Georgia-Pacific Corporation – Palatka Mill
Air Permit Application to Revise
PSD Permit for the
No. 3 Bleach Plant
1070005-019-AC PSD-FL-364A

Dear Mr. Arif:

Please find enclosed the Revised Air Permit Application to Revise PSD Permit for the No. 3 Bleach Plant.

If you have any questions, please contact me at (386) 329-0918.

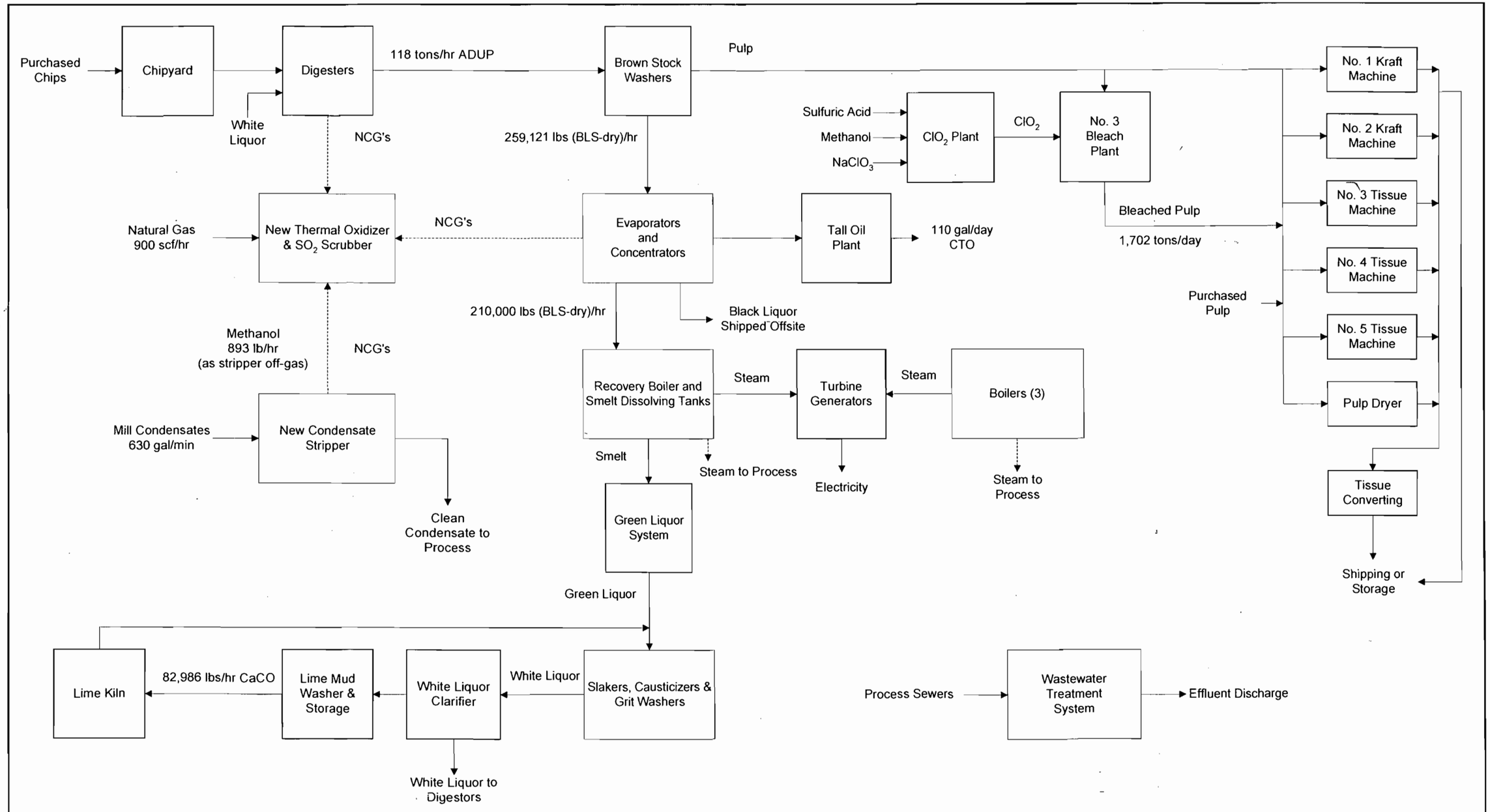
Sincerely,

Myra J. Carpenter
Environmental Superintendent

tk

Enclosure

cc: T. D. Kennedy
W. M. Jernigan
C. Holladay
C. Kirts, NED
G. Bumgarner, NPS
G. Bettler, EPA




Attachment GP-FI-C3
Facility Process Flow Diagram
Georgia-Pacific Palatka Operations
Palatka, Florida

**Notes:**
ADUP = Air Dried Unbleached Pulp
CTO = Crude Tall Oil
Solid/Liquid
Gas

Filename: 0237561\4\4.4\4.4.1\GP-FI-C3.VSD
Date: 10/31/02

Golder Associates

*REVISED*

# AIR PERMIT APPLICATION TO REVISE PSD PERMIT FOR THE NO. 3 BLEACH PLANT

## GEORGIA-PACIFIC CORPORATION PALATKA MILL

**Prepared For:**

**Georgia-Pacific**
**North of CR-216; West of US 17**
**Palatka, Florida 32177**

**Prepared By:**

**Golder Associates Inc.**
**6241 NW 23rd Street, Suite 500**
**Gainesville, Florida 32653-1500**

**November 2002**
**0237561**

**DISTRIBUTION:**
**6 Copies - FDEP**
**3 Copies - Georgia-Pacific**
**2 Copies - Golder Associates Inc.**

# Department of Environmental Protection

## Division of Air Resources Management

## APPLICATION FOR AIR PERMIT - TITLE V SOURCE

See Instructions for Form No. 62-210.900(1)

### I. APPLICATION INFORMATION

**Identification of Facility**

| | |
|---|---|
| 1. Facility Owner/Company Name: **Georgia-Pacific Corporation** | |
| 2. Site Name: **Palatka Mill** | |
| 3. Facility Identification Number: **1070005** [ ] Unknown | |
| 4. Facility Location: Street Address or Other Locator: **North of CR 216; West of US 17** City: **Palatka** County: **Putnam** Zip Code: **32177** | |
| 5. Relocatable Facility? [ ] Yes [ **X** ] No | 6. Existing Permitted Facility? [ **X** ] Yes [ ] No |

**Application Contact**

| |
|---|
| 1. Name and Title of Application Contact: **Myra Carpenter, Superintendent of Environmental Affairs** |
| 2. Application Contact Mailing Address: Organization/Firm: **Georgia-Pacific Corporation** Street Address: **P.O. Box 919** City: **Palatka** State: **FL** Zip Code: **32178-0919** |
| 3. Application Contact Telephone Numbers: Telephone: **( 386 ) 325 - 2001** Fax: **( 386 ) 328 - 0014** |

**Application Processing Information (DEP Use)**

| | |
|---|---|
| 1. Date of Receipt of Application: | |
| 2. Permit Number: | |
| 3. PSD Number (if applicable): | |
| 4. Siting Number (if applicable): | |

**Purpose of Application**

**Air Operation Permit Application**

This Application for Air Permit is submitted to obtain: (Check one)

[ ] Initial Title V air operation permit for an existing facility which is classified as a Title V source.

[ ] Initial Title V air operation permit for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number:_____

[ ] Title V air operation permit revision to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number:_____

Operation permit number to be revised:_____

[ ] Title V air operation permit revision or administrative correction to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. (Also check Air Construction Permit Application below.)

Operation permit number to be revised/corrected:_____

[ ] Title V air operation permit revision for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit number to be revised:_____

Reason for revision:_____

**Air Construction Permit Application**

This Application for Air Permit is submitted to obtain: (Check one)

[ X ] Air construction permit to construct or modify one or more emissions units.

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

## Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   **Theodore D. Kennedy, Vice President, Georgia-Pacific, Palatka Operations**
2. Owner/Authorized Representative or Responsible Official Mailing Address:
   Organization/Firm: **Georgia-Pacific Corporation**
   Street Address: **P.O. Box 919**
   City: **Palatka** State: **FL** Zip Code: **32178-0919**
3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: **( 386 ) 325 - 2001** Fax: **(386 ) 328 - 0014**
4. Owner/Authorized Representative or Responsible Official Statement:

*I, the undersigned, am the owner or authorized representative*(check here [ ], if so) or the responsible official (check here [ X ], if so) of the Title V source addressed in this application, whichever is applicable. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof. I understand that a permit, if granted by the Department, cannot be transferred without authorization from the Department, and I will promptly notify the Department upon sale or legal transfer of any permitted emissions unit.*

Theodore D. Kennedy — Signature

11/12/02 — Date

* Attach letter of authorization if not currently on file.

## Professional Engineer Certification

1. Professional Engineer Name: **David A. Buff**
   Registration Number: **19011**
2. Professional Engineer Mailing Address:
   Organization/Firm: **Golder Associates Inc.***
   Street Address: **6241 NW 23rd Street, Suite 500**
   City: **Gainesville** State: **FL** Zip Code: **32653-1500**
3. Professional Engineer Telephone Numbers:
   Telephone: **( 352 ) 336 - 5600** Fax: **( 352 ) 336 - 6603**

***Board of Professional Engineers Certificate of Authorization #00001670**

4. Professional Engineer Statement:

*I, the undersigned, hereby certify, except as particularly noted herein*, that:*

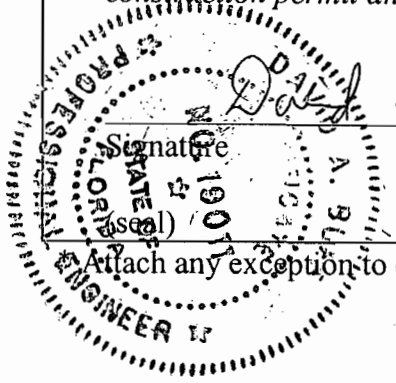
*(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this Application for Air Permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and*

*(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.*

*If the purpose of this application is to obtain a Title V source air operation permit (check here [ ], if so), I further certify that each emissions unit described in this Application for Air Permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance schedule is submitted with this application.*

*If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [X], if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.*

*If the purpose of this application is to obtain an initial air operation permit or operation permit revision for one or more newly constructed or modified emissions units (check here [ ], if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.*



Signature (seal)

11/11/02
Date

* Attach any exception to certification statement.

**Scope of Application**

| Emissions Unit ID | Description of Emissions Unit | Permit Type | Processing Fee |
|---|---|---|---|
| 036 | No. 3 Bleach Plant | ACM1 | $7,500 |
| | | | |
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**Application Processing Fee**

Check one: [ X ] Attached - Amount: $: **$7,500** [ ] Not Applicable

## Construction/Modification Information

1. Description of Proposed Project or Alterations:

   **To revise CO emission limit for the No. 3 Bleach Plant. See Attachment A for details.**

2. Projected or Actual Date of Commencement of Construction: **Upon Receipt of Permit**

3. Projected Date of Completion of Construction: **N/A ***

## Application Comment

***No physical construction necessary for the proposed project. Application is for CO emission limit increase only for the purpose of accommodating process variability.**

## II. FACILITY INFORMATION

### A. GENERAL FACILITY INFORMATION

**Facility Location and Type**

| | | | |
|---|---|---|---|
| 1. Facility UTM Coordinates: Zone: **17** East (km): **434.0** North (km): **3283.4** | | | |
| 2. Facility Latitude/Longitude: Latitude (DD/MM/SS): **29 / 41 / 0** Longitude (DD/MM/SS): **81 / 40 / 45** | | | |
| 3. Governmental Facility Code: **0** | 4. Facility Status Code: **A** | 5. Facility Major Group SIC Code: **26** | 6. Facility SIC(s): **2611, 2621** |
| 7. Facility Comment (limit to 500 characters): | | | |

**Facility Contact**

| |
|---|
| 1. Name and Title of Facility Contact: **Myra Carpenter, Superintendent of Environmental Affairs** |
| 2. Facility Contact Mailing Address: Organization/Firm: **Georgia-Pacific Corporation** Street Address: **P.O. Box 919** City: **Palatka** State: **FL** Zip Code: **32178-0919** |
| 3. Facility Contact Telephone Numbers: Telephone: **( 386) 325-2001** Fax: **( 386) 328-0014** |

## Facility Regulatory Classifications

**Check all that apply:**

| |
|---|
| 1. [ ] Small Business Stationary Source? [ ] Unknown |
| 2. [ X ] Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)? |
| 3. [ ] Synthetic Minor Source of Pollutants Other than HAPs? |
| 4. [ X ] Major Source of Hazardous Air Pollutants (HAPs)? |
| 5. [ ] Synthetic Minor Source of HAPs? |
| 6. [ X ] One or More Emissions Units Subject to NSPS? |
| 7. [ X ] One or More Emission Units Subject to NESHAP? |
| 8. [ ] Title V Source by EPA Designation? |
| 9. Facility Regulatory Classifications Comment (limit to 200 characters): |

## List of Applicable Regulations

| |
|---|
| **62-210.700(1) - Excess Emission** |
| **62-210.700(4) - Excess Emission** |
| **62-210.700(5) - Excess Emission** |
| **62-210.700(6) - Excess Emission** |
| **62-296.320(4) - General VE Limit** |
| **See Title V Core List, Effective 3/1/02** |
| |
| |
| |
| |

# Title V Core List Effective: 03/01/02

[**Note:** The Title V Core List is meant to simplify the completion of the "List of Applicable Regulations" for DEP Form No. 62-210.900(1), Application for Air Permit - Long Form. The Title V Core List is a list of rules to which all Title V Sources are presumptively subject. The Title V Core List may be referenced in its entirety, or with specific exceptions. The Department may periodically update the Title V Core List.]

***Federal:*** ***(description)***

40 CFR 61, Subpart M: NESHAP for Asbestos.

40 CFR 82: Protection of Stratospheric Ozone.
40 CFR 82, Subpart B: Servicing of Motor Vehicle Air Conditioners (MVAC).
40 CFR 82, Subpart F: Recycling and Emissions Reduction.

***State: (description)***

**CHAPTER 62-4, F.A.C.: PERMITS**, effective 06-01-01

62-4.030, F.A.C.: General Prohibition.
62-4.040, F.A.C.: Exemptions.
62-4.050, F.A.C.: Procedure to Obtain Permits; Application
62-4.060, F.A.C.: Consultation.
62-4.070, F.A.C.: Standards for Issuing or Denying Permits; Issuance; Denial.
62-4.080, F.A.C.: Modification of Permit Conditions.
62-4.090, F.A.C.: Renewals.
62-4.100, F.A.C.: Suspension and Revocation.
62-4.110, F.A.C.: Financial Responsibility.
62-4.120, F.A.C.: Transfer of Permits.
62-4.130, F.A.C.: Plant Operation - Problems.
62-4.150, F.A.C.: Review
62-4.160, F.A.C.: Permit Conditions.
62-4.210, F.A.C.: Construction Permits.
62-4.220, F.A.C.: Operation Permit for New Sources.

**CHAPTER 62-210, F.A.C.: STATIONARY SOURCES - GENERAL REQUIREMENTS,** effective 06-21-01

62-210.300, F.A.C.: Permits Required.
62-210.300(1), F.A.C.: Air Construction Permits.
62-210.300(2), F.A.C.: Air Operation Permits.
62-210.300(3), F.A.C.: Exemptions.
62-210.300(5), F.A.C.: Notification of Startup.
62-210.300(6), F.A.C.: Emissions Unit Reclassification.
62-210.300(7), F.A.C.: Transfer of Air Permits.

62-210.350, F.A.C.: Public Notice and Comment.
62-210.350(1), F.A.C.: Public Notice of Proposed Agency Action.
62-210.350(2), F.A.C.: Additional Public Notice Requirements for Emissions Units Subject to Prevention of Significant Deterioration or Nonattainment-Area Preconstruction Review.
62-210.350(3), F.A.C.: Additional Public Notice Requirements for Sources Subject to Operation Permits for Title V Sources.

62-210.360, F.A.C.: Administrative Permit Corrections.
62-210.370(3), F.A.C.: Annual Operating Report for Air Pollutant Emitting Facility.
62-210.400, F.A.C.: Emission Estimates.
62-210.650, F.A.C.: Circumvention.
62-210.700, F.A.C.: Excess Emissions

62-210.900, F.A.C.: Forms and Instructions.
62-210.900(1), F.A.C.: Application for Air Permit - Title V Source, Form and Instructions.
62-210.900(5), F.A.C.: Annual Operating Report for Air Pollutant Emitting Facility, Form and Instructions.
62-210.900(7), F.A.C.: Application for Transfer of Air Permit - Title V and Non-Title V Source.

**CHAPTER 62-212, F.A.C.: STATIONARY SOURCES- PRECONSTRUCTION REVIEW,** effective 08-17-00

**CHAPTER 62-213, F.A.C.: OPERATION PERMITS FOR MAJOR SOURCES OF AIR POLLUTION,** effective 04-16-01

62-213.205, F.A.C.: Annual Emissions Fee.
62-213.400, F.A.C.: Permits and Permit Revisions Required.
62-213.410, F.A.C.: Changes Without Permit Revision.
62-213.412, F.A.C.: Immediate Implementation Pending Revision Process.
62-213.415, F.A.C.: Trading of Emissions Within a Source.
62-213.420, F.A.C.: Permit Applications.
62-213.430, F.A.C.: Permit Issuance, Renewal, and Revision.
62-213.440, F.A.C.: Permit Content.
62-213.450, F.A.C.: Permit Review by EPA and Affected States
62-213.460, F.A.C.: Permit Shield.

62-213.900, F.A.C.: Forms and Instructions.
62-213.900(1), F.A.C.: Major Air Pollution Source Annual Emissions Fee Form.
62-213.900(7), F.A.C.: Statement of Compliance Form

**CHAPTER 62-296, F.A.C.: STATIONARY SOURCES - EMISSION STANDARDS,** effective 03-02-99

62-296.320(2), F.A.C.: Objectionable Odor Prohibited.
62-296.320(4)(c), F.A.C.: Unconfined Emissions of Particulate Matter

**CHAPTER 62-297, F.A.C.: STATIONARY SOURCES - EMISSIONS MONITORING,** effective 03-02-99

62-297.310, F.A.C.: General Test Requirements.
62-297.330, F.A.C.: Applicable Test Procedures.
62-297.340, F.A.C.: Frequency of Compliance Tests.
62-297.345, F.A.C.: Stack Sampling Facilities Provided by the Owner of an Emissions Unit.
62-297.350, F.A.C.: Determination of Process Variables.
62-297.570, F.A.C.: Test Report.
62-297.620, F.A.C.: Exceptions and Approval of Alternate Procedures and Requirements.

**Miscellaneous:**

**CHAPTER 28-106, F.A.C.:** Decisions Determining Substantial Interests
**CHAPTER 62-110, F.A.C.:** Exception to the Uniform Rules of Procedure, effective 07-01-98
**CHAPTER 62-256, F.A.C.:** Open Burning and Frost Protection Fires, effective 11-30-94
**CHAPTER 62-257, F.A.C.:** Asbestos Notification and Fee, effective 02-09-99
**CHAPTER 62-281, F.A.C.:** Motor Vehicle Air Conditioning Refrigerant Recovery and Recycling, effective 09-10-96

## B. FACILITY POLLUTANTS

**List of Pollutants Emitted**

| 1. Pollutant Emitted | 2. Pollutant Classif. | 3. Requested Emissions Cap lbs/hr | tons/year | 4. Basis for Emissions Cap | 5. Pollutant Comment |
|---|---|---|---|---|---|
| PM | A | | | | Particulate Matter – Total |
| $PM_{10}$ | A | | | | Particulate Matter – $PM_{10}$ |
| $SO_2$ | A | | | | Sulfur Dioxide |
| $NO_X$ | A | | | | Nitrogen Oxides |
| CO | A | | | | Carbon Monoxide |
| VOC | A | | | | Volatile Organic Compounds |
| SAM | A | | | | Sulfuric Acid Mist |
| TRS | A | | | | Total Reduced Sulfur |
| HAPs | A | | | | Total Hazardous Air Pollutants |
| H001 | A | | | | Acetaldehyde |
| H021 | B | | | | Beryllium Compounds |
| H043 | A | | | | Chloroform |
| H095 | A | | | | Formaldehyde |
| H106 | A | | | | Hydrochloric Acid |
| H115 | A | | | | Methanol |
| | | | | | |
| | | | | | |

## C. FACILITY SUPPLEMENTAL INFORMATION

**Supplemental Requirements**

1. Area Map Showing Facility Location:
   [ X ] Attached, Document ID: GP-FI-C1 [ ] Not Applicable [ ] Waiver Requested

2. Facility Plot Plan:
   [ X ] Attached, Document ID: GP-FI-C2 [ ] Not Applicable [ ] Waiver Requested

3. Process Flow Diagram(s):
   [ X ] Attached, Document ID: GP-FI-C3 [ ] Not Applicable [ ] Waiver Requested

4. Precautions to Prevent Emissions of Unconfined Particulate Matter:
   [ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested

5. Fugitive Emissions Identification:
   [ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested

6. Supplemental Information for Construction Permit Application:
   [ X ] Attached, Document ID: Attachment A [ ] Not Applicable

7. Supplemental Requirements Comment:

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

8. List of Proposed Insignificant Activities:
   [ ] Attached, Document ID:_____ [ X ] Not Applicable

9. List of Equipment/Activities Regulated under Title VI:
   [ ] Attached, Document ID:_____
   [ ] Equipment/Activities On site but Not Required to be Individually Listed
   [ X ] Not Applicable

10. Alternative Methods of Operation:
    [ ] Attached, Document ID:_____ [ X ] Not Applicable

11. Alternative Modes of Operation (Emissions Trading):
    [ ] Attached, Document ID:_____ [ X ] Not Applicable

12. Identification of Additional Applicable Requirements:
    [ ] Attached, Document ID:_____[ X ] Not Applicable

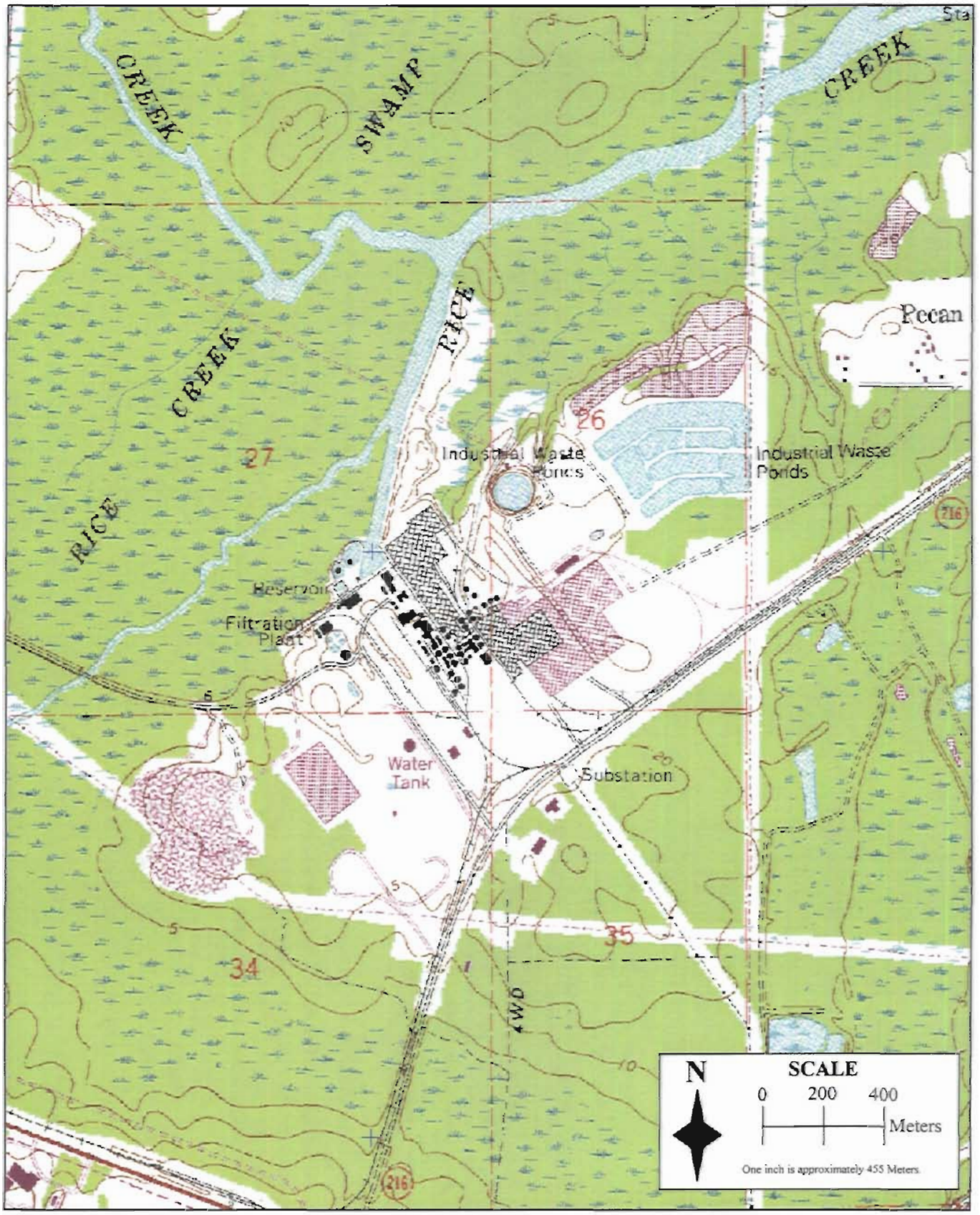
13. Risk Management Plan Verification:
    [ ] Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID:) _____ or previously submitted to DEP (Date and DEP Office:_____)
    [ ] Plan to be submitted to CEPPO (Date required:_____)
    [ X ] Not Applicable

14. Compliance Report and Plan:
    [ ] Attached, Document ID:_____ [ X ] Not Applicable

15. Compliance Certification (Hard-copy Required):
    [ ] Attached, Document ID:_____ [ X ] Not Applicable

# ATTACHMENT GP-FI-C1

# AREA MAP SHOWING FACILITY LOCATION




Attachment GP-FI-C1
Area Map
Georgia-Pacific Corporation, Palatka Mill

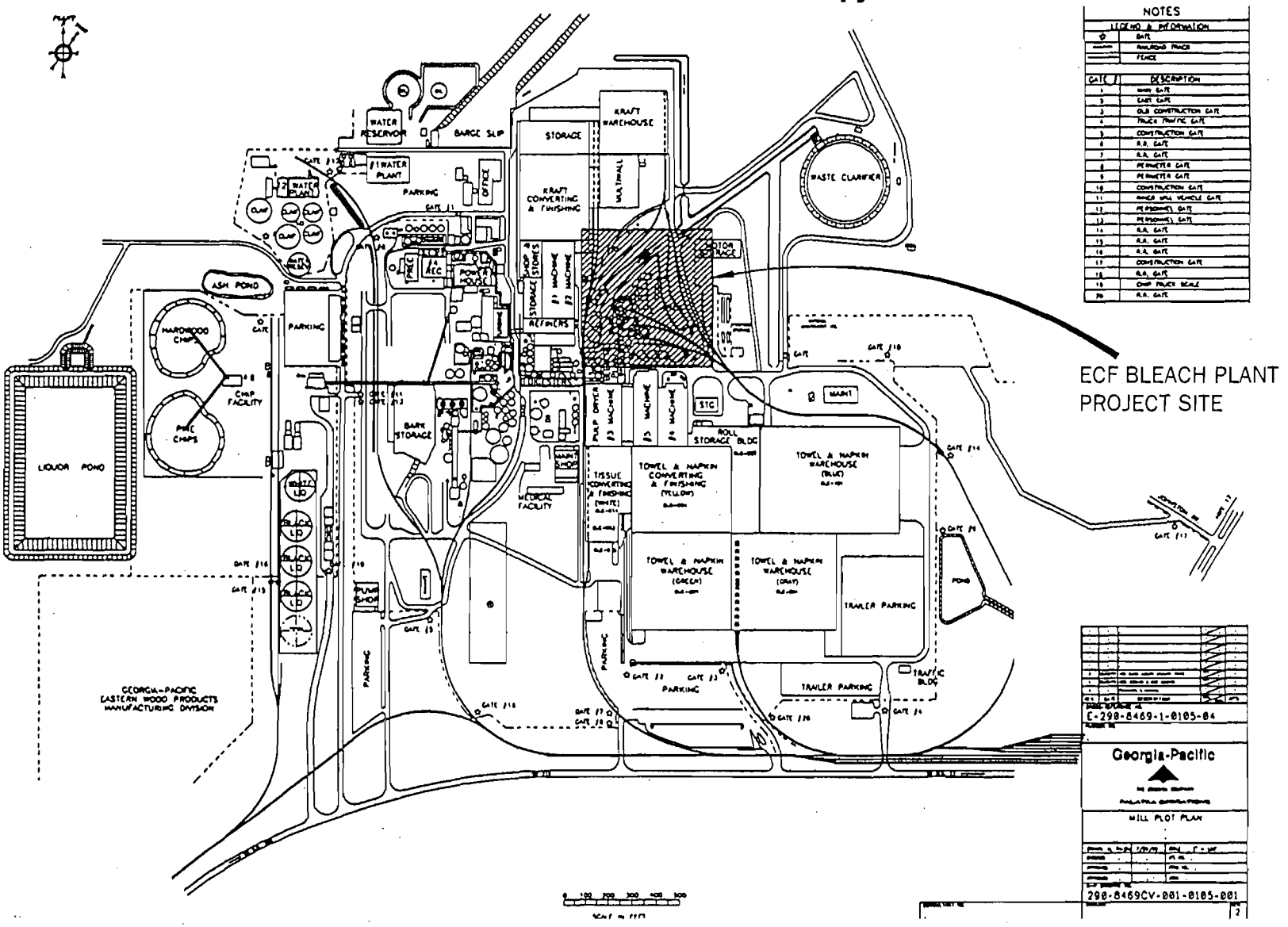
Source: Golder, 2002.

Golder Associates

**ATTACHMENT GP-FI-C2**

**FACILITY PLOT PLAN**

Best Available Copy



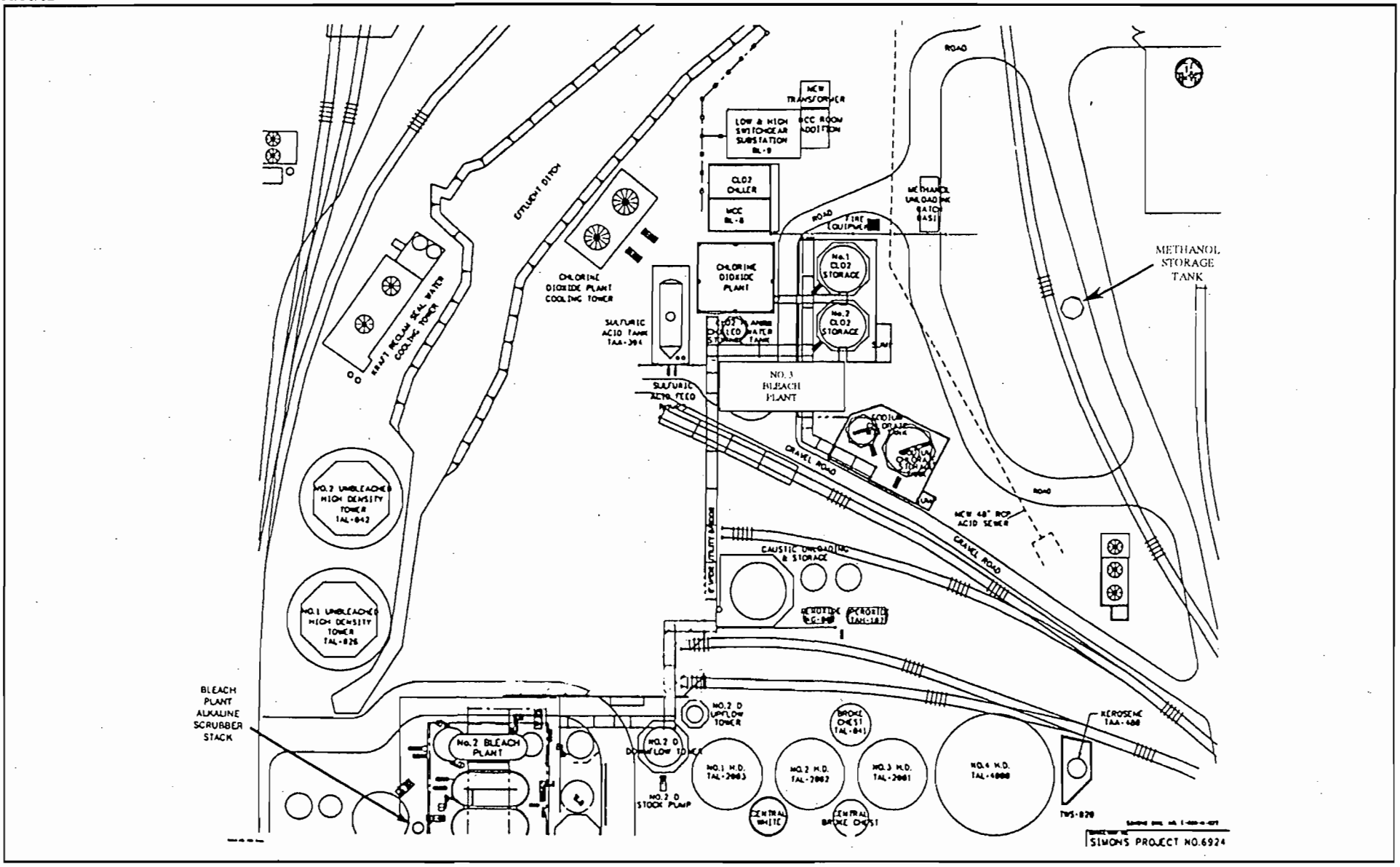

Attachment GP-FI-E2a
Plot Plan

Source: Georgia Pacific, 1998.

Golder Associates

Best Available Copy





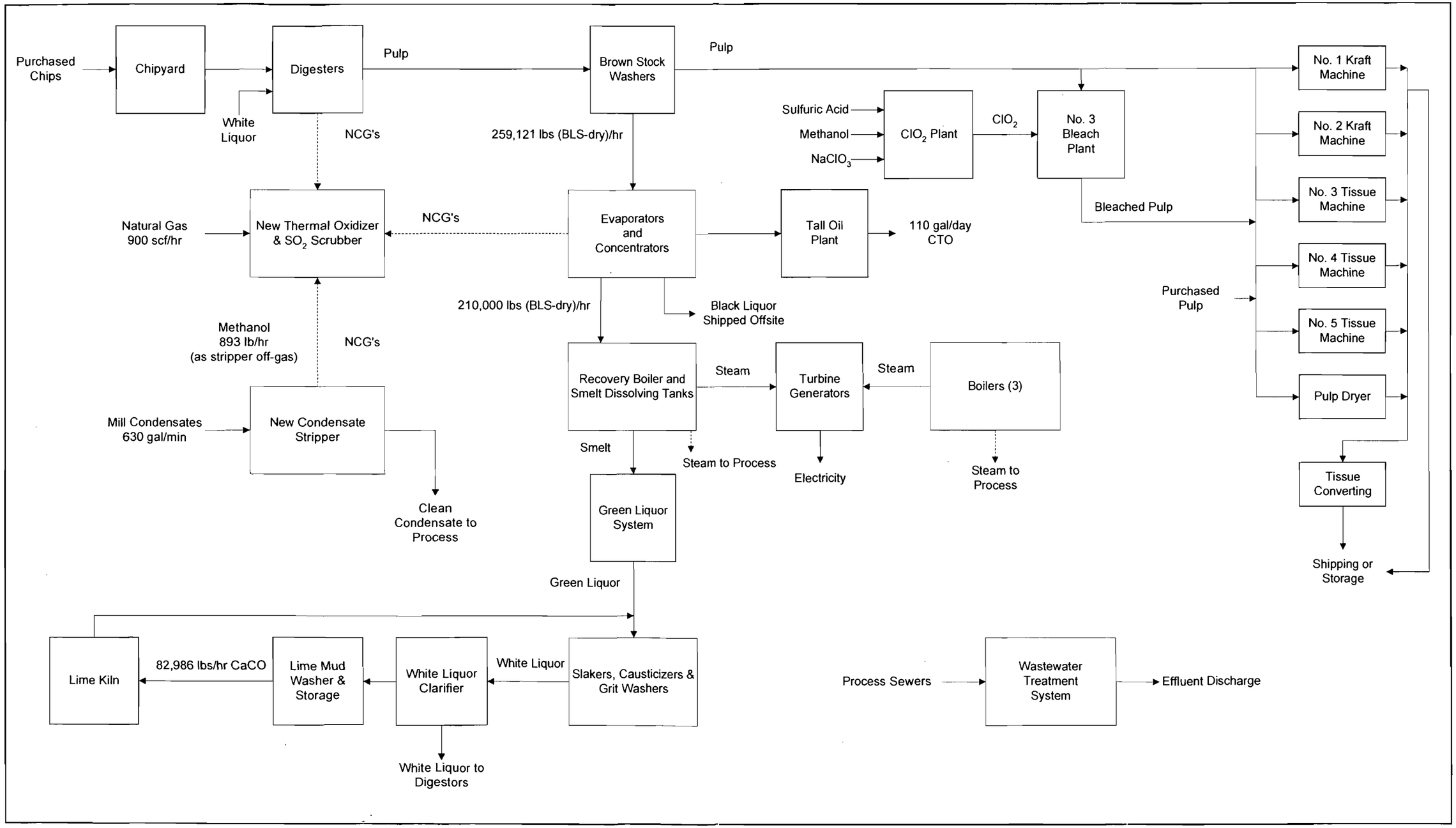

Attachment GP-FI-C2b
Plot Plan

Source: Golder, 2001.

Golder Associates

**ATTACHMENT GP-FI-C3**

**PROCESS FLOW DIAGRAM**




Attachment GP-FI-C3
Facility Process Flow Diagram
Georgia-Pacific Palatka Operations
Palatka, Florida

**Notes:**
ADUP = Air Dried Unbleached Pulp
CTO = Crude Tall Oil
Solid/Liquid →
Gas ⇢

Filename: 0237561\4\4.4\4.4.1\GP-FI-C3.VSD

Date: 11/11/02

Golder Associates

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

### A. GENERAL EMISSIONS UNIT INFORMATION
### (All Emissions Units)

**Emissions Unit Description and Status**

1. Type of Emissions Unit Addressed in This Section: (Check one)

[ X ] This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

[ ] This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Regulated or Unregulated Emissions Unit? (Check one)

[ X ] The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

[ ] The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):
**Elemental Chlorine Free (ECF) No. 3 Bleach Plant**

4. Emissions Unit Identification Number:
ID: **036**
[ ] No ID
[ ] ID Unknown

| 5. Emissions Unit Status Code: | 6. Initial Startup Date: | 7. Emissions Unit Major Group SIC Code: | 8. Acid Rain Unit? |
|---|---|---|---|
| **A** | **2/15/2001** | **26** | [ ] |

9. Emissions Unit Comment: (Limit to 500 Characters)

## Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   **Packed-Gas Adsorption Column**

2. Control Device or Method Code(s): **050**

## Emissions Unit Details

1. Package Unit:
   Manufacturer: Model Number:
2. Generator Nameplate Rating: MW
3. Incinerator Information:
   Dwell Temperature: °F
   Dwell Time: seconds
   Incinerator Afterburner Temperature: °F

## B. EMISSIONS UNIT CAPACITY INFORMATION
## (Regulated Emissions Units Only)

**Emissions Unit Operating Capacity and Schedule**

| | | | | |
|---|---|---|---|---|
| 1. Maximum Heat Input Rate: | | | | mmBtu/hr |
| 2. Maximum Incineration Rate: | | lbs/hr | | tons/day |
| 3. Maximum Process or Throughput Rate: | | | | |
| 4. Maximum Production Rate: | | **1,440 ADTPB/day** | | |
| 5. Requested Maximum Operating Schedule: | | | | |
| | **24** | hours/day | **7** | days/week |
| | **52** | weeks/year | **8,760** | hours/year |

6. Operating Capacity/Schedule Comment (limit to 200 characters):

**Maximum production rate refers to maximum daily production of air-dried tons of bleached pulp (ADTBP). Annual average permitted rate is 1,350 ADTBP/day.**

## C. EMISSIONS UNIT REGULATIONS
## (Regulated Emissions Units Only)

**List of Applicable Regulations**

See Attachment GP-EU1-C.

## D. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

**Emission Point Description and Type**

| | | |
|---|---|---|
| 1. Identification of Point on Plot Plan or Flow Diagram?<br>**Bleach Plant Alkaline Scrubber Stack** | 2. Emission Point Type Code:<br>**2** | |
| 3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): | | |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: | | |
| 5. Discharge Type Code:<br>**V** | 6. Stack Height:<br>**118** feet | 7. Exit Diameter:<br>**3.5** feet |
| 8. Exit Temperature:<br>**~85** °F | 9. Actual Volumetric Flow Rate:<br>**~15,400** acfm | 10. Water Vapor:<br>% |
| 11. Maximum Dry Standard Flow Rate:<br>dscfm | 12. Nonstack Emission Point Height:<br>feet | |
| 13. Emission Point UTM Coordinates:<br>Zone: East (km): North (km): | | |
| 14. Emission Point Comment (limit to 200 characters):<br>**Values representative of scrubber exhaust stack. Exit temperature and actual volumetric flow rate values are constantly changing with ambient conditions.** | | |

## E. SEGMENT (PROCESS/FUEL) INFORMATION
## (All Emissions Units)

**Segment Description and Rate:** Segment 1 of 1

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type) (limit to 500 characters):<br>**Pulp and Paper and Wood - Sulfate (Kraft) Pulping; Industrial processes. Sulfate (Kraft) Pulping Bleaching Reactors** | | |
| 2. Source Classification Code (SCC):<br>**3-07-001-14** | 3. SCC Units:<br>**Tons of air-dried unbleached pulp produced** | |
| 4. Maximum Hourly Rate:<br>**65.2** | 5. Maximum Annual Rate:<br>**535,598** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: |
| 10. Segment Comment (limit to 200 characters):<br>**See Attachment GP-EU1-E10. Maximum hourly rate based on 1,440 ADTBP/day. Maximum annual rate based on an average of 1,350 ADTBP/day. ADTBP÷0.92 = ADTUP.** | | |

**Segment Description and Rate:** Segment _____ of _____

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type ) (limit to 500 characters): | | |
| 2. Source Classification Code (SCC): | 3. SCC Units: | |
| 4. Maximum Hourly Rate: | 5. Maximum Annual Rate: | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: |
| 10. Segment Comment (limit to 200 characters): | | |

## F. EMISSIONS UNIT POLLUTANTS
**(All Emissions Units)**

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| VOC | 050 | | NS |
| HAPs | 050 | | WP |
| H115 | 050 | | NS |
| H043 | 050 | | WP |
| CO | | | EL |
| H038 | 050 | | EL |
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## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **VOC** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **20.4** lbs/hr **83.8** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: **NCASI** | 7. Emissions Method Code: **5** |
| 8. Calculation of Emissions (limit to 600 characters): **See Attachment GP-EU1-G8.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **VOCs are from bleach plant alkaline wet scrubber.** | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lbs/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **HAPS** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **18.8** lbs/hr **77.4** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: **Manuf. Info & NCASI** | 7. Emissions Method Code: **5** |
| 8. Calculation of Emissions (limit to 600 characters): **See Attachment GP-EU1-G8.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lbs/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **H115-Methanol** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **17.4** lbs/hr **71.5** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: **NCASI** | 7. Emissions Method Code: **5** |
| 8. Calculation of Emissions (limit to 600 characters): **See Attachment GP-EU1-G8.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lbs/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **H043-Chloroform** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.49** lbs/hr **2.02** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: **NCASI** | 7. Emissions Method Code: **5** |
| 8. Calculation of Emissions (limit to 600 characters): **See Attachment GP-EU1-G8.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lbs/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **CO** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **100** lbs/hr **324** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **1.68 lbs/ADTBP (100% softwood factor)** Reference: **See Attachment A** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **See Table 2-1 for presentation of emission rates. Detailed calculations provided in Appendix A to Attachment A.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **324 TPY** | 4. Equivalent Allowable Emissions: **100** lbs/hour **324** tons/year |
| 5. Method of Compliance (limit to 60 characters): **EPA Method 10** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **See Attachment A.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **H038-Chlorine** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.72** lbs/hr **3.14** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **10 ppmvd** Reference: **Permit No. 1070005-006-AC** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **See Attachment GP-EU1-G8.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **RULE** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **10 ppmvd** | 4. Equivalent Allowable Emissions: **0.72** lbs/hour **3.14** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Initial compliance testing by EPA Method 26A.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Permit No. 1070005-006-AC and 40 CFR 63, Subpart S.** | |

## H. VISIBLE EMISSIONS INFORMATION
### (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation 1 of 1

| | |
|---|---|
| 1. Visible Emissions Subtype: **VE20** | 2. Basis for Allowable Opacity: [ X ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: **20** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: **EPA Method 10** | |
| 5. Visible Emissions Comment (limit to 200 characters): **Based on Rules 62-296.320 and 62-296.404(2)(b), F.A.C., and Permit No. 1070005-006-AC; PSD-FL-264.** | |

## I. CONTINUOUS MONITOR INFORMATION
### (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 1 of 3

| | |
|---|---|
| 1. Parameter Code: **pH** | 2. Pollutant(s): |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information: Manufacturer: Model Number: | Serial Number: |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): **40 CFR 63.453(c)(1) requires pH monitoring of the gas scrubbing medium. G-P proposes to record pH data on a 3-hour average basis.** | |

## H. VISIBLE EMISSIONS INFORMATION
**(Only Regulated Emissions Units Subject to a VE Limitation)**

**Visible Emissions Limitation:** Visible Emissions Limitation _____ of _____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity:<br>[ ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
**(Only Regulated Emissions Units Subject to Continuous Monitoring)**

**Continuous Monitoring System:** Continuous Monitor 2 of 3

| | |
|---|---|
| 1. Parameter Code: **FLOW** | 2. Pollutant(s): |
| 3. CMS Requirement: | [X] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: Serial Number: | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters):<br>**40 CFR 63.453(c)(2) requires measurement of vent gas inlet flow rate. EPA approved an alternative monitoring plan to monitor fan amperage of the bleaching system vent gas fan. G-P proposes to record fan amperage on a 3-hour average basis.** | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation _____ of _____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 3 of 3

| | |
|---|---|
| 1. Parameter Code: **FLOW** | 2. Pollutant(s): |
| 3. CMS Requirement: | [ **X** ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: Serial Number: | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters):<br>**40 CFR 63.453(c)(3) requires measurement of the gas scrubber liquid flow rate. G-P will monitor the recirculation flow, which is the actual amount of liquid introduced to the scrubber. G-P proposes to record scrubber recirculation flow on a 3-hour average basis.** | |

## J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
## (Regulated Emissions Units Only)

**Supplemental Requirements**

| |
|---|
| 1. Process Flow Diagram<br>[ X ] Attached, Document ID: GP-EU1-J1 [ ] Not Applicable [ ] Waiver Requested |
| 2. Fuel Analysis or Specification<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 3. Detailed Description of Control Equipment<br>[ X ] Attached, Document ID: GP-EU1-J3 [ ] Not Applicable [ ] Waiver Requested |
| 4. Description of Stack Sampling Facilities<br>[ ] Attached, Document ID: _____ [ X] Not Applicable[ ] Waiver Requested |
| 5. Compliance Test Report<br>[ ] Attached, Document ID: _____<br>[ X ] Previously submitted, Date: 11 JUN 2001<br>[ ] Not Applicable |
| 6. Procedures for Startup and Shutdown<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 7. Operation and Maintenance Plan<br>[ X ] Attached, Document ID: GP-EU1-J7 [ ] Not Applicable [ ] Waiver Requested |
| 8. Supplemental Information for Construction Permit Application<br>[ X ] Attached, Document ID: Attachment A [ ] Not Applicable |
| 9. Other Information Required by Rule or Statute<br>[ X ] Attached, Document ID: GP-EU1-J9 [ ] Not Applicable |
| 10. Supplemental Requirements Comment: |

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

11. Alternative Methods of Operation
[ ] Attached, Document ID: _____ [ X ] Not Applicable

12. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID: _____ [ X ] Not Applicable

13. Identification of Additional Applicable Requirements
[ ] Attached, Document ID: _____ [ X ] Not Applicable

14. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID: _____ [ X ] Not Applicable

15. Acid Rain Part Application (Hard-copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID: _____

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID: _____

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID: _____

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID: _____

[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
Attached, Document ID: _____

[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
Attached, Document ID: _____

[ X ] Not Applicable

# ATTACHMENT GP-EU1-C

# LIST OF APPLICABLE REGULATIONS

## ATTACHMENT GP-EU1-C

## LIST OF APPLICABLE REGULATIONS

(Page 1 of 2)

| | |
|---|---|
| 40 CFR 63.445(a)(2) | Standards for the bleaching system |
| 40 CFR 63.445(b) | Standards for the bleaching system |
| 40 CFR 63.445(c)(1) | Standards for the bleaching system |
| 40 CFR 63.445(d) | Standards for the bleaching system |
| 40 CFR 63.450(a)-(d) | Standards for enclosures and closed-vent systems |
| 40 CFR 63.453(a) | Monitoring Requirements |
| 40 CFR 63.453(c)-(d) | Monitoring Requirements |
| 40 CFR 63.453(k) | Monitoring Requirements |
| 40 CFR 63.453(n)-(o) | Monitoring Requirements |
| 40 CFR 63.454(a)-(b) | Recordkeeping Requirements |
| 40 CFR 63.454(d) | Recordkeeping Requirements |
| 40 CFR 63.455(a) | Recordkeeping Requirements |
| 40 CFR 63.454(d) | Recordkeeping Requirements |
| 40 CFR 63.457(a)-(b) | Test Methods and Procedures |
| 40 CFR 63.457(d)-(e) | Test Methods and Procedures |
| 40 CFR 63.457(h)-(i) | Test Methods and Procedures |
| 62-212.400 | PSD |
| 62-210.700 | Excess Emissions |
| 40 CFR 63.1(a)(1)-(4) | Applicability |
| 40 CFR 63.1(a)(11)-(14) | Applicability |
| 40 CFR 63.1(b)(2)-(3) | Applicability |
| 40 CFR 63.1(c)(1)-(2) | Applicability |
| 40 CFR 63.1(c)(5) | Applicability |
| 40 CFR 63.1(e) | Applicability |
| 40 CFR 63.2 | Definitions |
| 40 CFR 63.3 | Units and Abbreviations |
| 40 CFR 63.4(a)(1) | Prohibited Activities and Circumvention |
| 40 CFR 63.4(a)(3) | Prohibited Activities and Circumvention |
| 40 CFR 63.4(a)(5) | Prohibited Activities and Circumvention |
| 40 CFR 63.4(b)-(c) | Prohibited Activities and Circumvention |
| 40 CFR 63.5(a) | Construction and Reconstruction |
| 40 CFR 63.5(b)(1) | Construction and Reconstruction |
| 40 CFR 63.5(b)(3)-(6) | Construction and Reconstruction |
| 40 CFR 63.5(d)(1) | Construction and Reconstruction |
| 40 CFR 63.5(d)(3)-(4) | Construction and Reconstruction |
| 40 CFR 63.5(e) | Construction and Reconstruction |
| 40 CFR 63.5(f) | Construction and Reconstruction |
| 40 CFR 63.6(a) | Compliance with Standards and Maintenance Requirements |
| 40 CFR 63.6(e)-(g) | Compliance with Standards and Maintenance Requirements |
| 40 CFR 63.6(i)-(j) | Compliance with Standards and Maintenance Requirements |
| 40 CFR 63.8(a)(1)-(2) | Monitoring Requirements |
| 40 CFR 63.8(a)(4) | Monitoring Requirements |
| 40 CFR 63.8(b)(1) | Monitoring Requirements |
| 40 CFR 63.8(b)(3) | Monitoring Requirements |
| 40 CFR 63.8(c)(1)-(3) | Monitoring Requirements |
| 40 CFR 63.8(c)(6)-(8) | Monitoring Requirements |

## ATTACHMENT GP-EU1-C

## LIST OF APPLICABLE REGULATIONS

(Page 2 of 2)

| | |
|---|---|
| 40 CFR 63.8(d) | Monitoring Requirements |
| 40 CFR 63.8(e) | Monitoring Requirements |
| 40 CFR 63.8(f)(1)-(5) | Monitoring Requirements |
| 40 CFR 63.8(g) | Monitoring Requirements |
| 40 CFR 63.9(a)-(b) | Notification Requirements |
| 40 CFR 63.9(c) | Notification Requirements |
| 40 CFR 63.9(g)(1) | Notification Requirements |
| 40 CFR 63.9(h)-(j) | Notification Requirements |
| 40 CFR 63.10(a)-(c) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(d)(1)-(2) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(d)(4)-(5) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(e)(1) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(e)(2)(i) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(e)(3) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.10(f) | Recordkeeping and Reporting Requirements |
| 40 CFR 63.12 | State Authority and Delegation |
| 40 CFR 63.13 | Addresses of State Air Pollution Control Agencies and EPA Regional Offices |
| 40 CFR 63.14 | Incorporations by References |
| 40 CFR 63.15 | Availability of Information and Confidentiality |

**ATTACHMENT GP-EU1-E10**

**SEGMENT COMMENT**

**ATTACHMENT GP-EU1-E10**

**SEGMENT COMMENT**

Maximum Annual Rate based on average monthly No. 3 Bleach plant production of 1,350 Air Dried Tons of Bleached Pulp (ADTBP) per day. Maximum hourly rate based on maximum daily production of 1440 ADTBP per day. Values converted to Air-Dried Tons Unbleached Pulp (ADTUP) using a conversion factor of Unbleached/Bleached = 1:0.92.

1,350 ADTBP ÷ 0.92 = 1,467 ADTUP (monthly average)

1,440 ADTBP ÷ 0.92 = 1,565 ADTUP (maximum daily)

Maximum Hourly Rate: 1,440 ADTBP per day ÷ 24 hrs/day = 60.0 ADTBP

60.0 ADTBP/hr ÷ 0.92 = 65.2 ADTUP/hr

Maximum Annual Rate: 1,350 ADTBP x 365 days/year = 492,750 ADTBP per year

492,750 ADTBP/yr ÷ 0.92 = 535,598 ADTUP/year

# ATTACHMENT GP-EU1-G8

# CALCULATION OF EMISSIONS

Attachment GP-EU1-G8. Estimated HAP and VOC Emissions From Proposed No. 3 Bleach Plant, Georgia Pacific, Palatka Florida (revised 11/8/02)

| Pollutant Name | HAP? | VOC? | Avg Factor (lb/ADTBP) (a) | Maximum ADTBP/hr (b) | Average ADTBP/hr (c) | Emissions lb/hr | Emissions TPY | HAP Emissions lb/hr | HAP Emissions TPY | VOC Emissions lb/hr | VOC Emissions TPY |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetaldehyde | YES | YES | ND | -- | -- | -- | -- | -- | -- | -- | -- |
| Benzene | YES | YES | 1.80E-04 | 60.0 | 56.3 | 0.01 | 0.04 | 0.01 | 0.04 | 0.01 | 0.04 |
| Carbon Tetrachloride | YES | NO | ND | -- | -- | -- | -- | -- | -- | -- | -- |
| Chlorine (d) | YES | NO | -- | -- | -- | 0.72 | 3.14 | 0.72 | 3.14 | -- | -- |
| Chlorine Dioxide (e) | NO | NO | -- | -- | -- | 2.14 | 9.38 | -- | -- | -- | -- |
| Chlorobenzene | YES | YES | 2.10E-04 | 60.0 | 56.3 | 0.01 | 0.05 | 0.01 | 0.05 | 0.01 | 0.05 |
| Chloroform (f) | YES | YES | 8.19E-03 | 60.0 | 56.3 | 0.49 | 2.02 | 0.49 | 2.02 | 0.49 | 2.02 |
| 1,2-Dichloroethane (Ethylene Dichloride) | YES | YES | ND | -- | -- | -- | -- | -- | -- | -- | -- |
| Dimethyl Sulfide | NO | YES | ND | -- | -- | -- | -- | -- | -- | -- | -- |
| Formaldehyde (g) | YES | YES | ND | -- | -- | -- | -- | -- | -- | -- | -- |
| Methanol | YES | YES | 2.90E-01 | 60.0 | 56.3 | 17.40 | 71.45 | 17.40 | 71.45 | 17.40 | 71.45 |
| Methyl Ethyl Ketone | YES | YES | 6.70E-04 | 60.0 | 56.3 | 0.04 | 0.17 | 0.04 | 0.17 | 0.04 | 0.17 |
| Methyl Isobutyl Ketone | YES | YES | 4.50E-04 | 60.0 | 56.3 | 0.03 | 0.11 | 0.03 | 0.11 | 0.03 | 0.11 |
| Methyl Mercaptan | NO | YES | 3.80E-02 | 60.0 | 56.3 | 2.28 | 9.36 | -- | -- | 2.28 | 9.36 |
| Methylene Chloride | YES | YES | ND | -- | -- | -- | -- | -- | -- | -- | -- |
| Alpha-Pinene | NO | YES | 4.70E-04 | 60.0 | 56.3 | 0.03 | 0.12 | -- | -- | 0.03 | 0.12 |
| Beta-Pinene | NO | YES | 2.20E-04 | 60.0 | 56.3 | 0.01 | 0.05 | -- | -- | 0.01 | 0.05 |
| Styrene | YES | YES | 3.50E-04 | 60.0 | 56.3 | 0.02 | 0.09 | 0.02 | 0.09 | 0.02 | 0.09 |
| Tetrachloroethyene | YES | YES | ND | -- | -- | -- | -- | -- | -- | -- | -- |
| Toluene | YES | YES | 1.70E-04 | 60.0 | 56.3 | 0.01 | 0.04 | 0.01 | 0.04 | 0.01 | 0.04 |
| 1,2,4-Trichlorobenzene | YES | YES | 5.00E-04 | 60.0 | 56.3 | 0.03 | 0.12 | 0.03 | 0.12 | 0.03 | 0.12 |
| 1,1,1-Trichloroethane (Methyl Chloroform) | YES | YES | ND | -- | -- | -- | -- | -- | -- | -- | -- |
| 1,1,2-Trichloroethane | YES | YES | ND | -- | -- | -- | -- | -- | -- | -- | -- |
| Trichloroethylene | YES | YES | ND | -- | -- | -- | -- | -- | -- | -- | -- |
| M&P-Xylene | YES | YES | 4.80E-04 | 60.0 | 56.3 | 0.03 | 0.12 | 0.03 | 0.12 | 0.03 | 0.12 |
| O-Xylene | YES | YES | 2.70E-04 | 60.0 | 56.3 | 0.02 | 0.07 | 0.02 | 0.07 | 0.02 | 0.07 |
| | | | | | | | Total = | 18.81 | 77.42 | 20.41 | 83.81 |

ND = Non Detectable
ADTBP = Air Dried Tons of Bleached Pulp
ODTBP = Oven Dried Tons of Bleached Pulp
lb/hr = pounds per hour
TPY = tons per year

(a) All emission factors (except chlorine, chlorine dioxide, chloroform and formaldehdye) based on data in NCASI Technical Bulletin No. 701: Compilation of Air Toxic and Total Hydrocarbon Emissions Data for Sources at Chemical Wood Pulp Mills. Mill Codes BPF and BPME1 are most representative of the proposed ECF bleach plant at Georgia Pacific's Palatka mill. If values were given for both mill codes, then the values were averaged. Non-detectable limits not used.

(b) Based on a maximum production rate of 1,440 ADTBP (short-term operation) per day divided by 24 hours per day operation. This value is used to calculate short-term emissions (lb/hr).

(c) Based on a maximum monthly average production rate of 1,350 ADTBP (long-term operation) per day divided by 24 hours per day operation. This value is used to calculate long-term emissions (TPY).

(d) Based on Permit No. 1070005-006-AC, Specific Condition 7.(a), 10 ppmvd limit for chlorinated HAPs (as chlorine) and flow rate of 13,000 dscfm (based on reent test data).

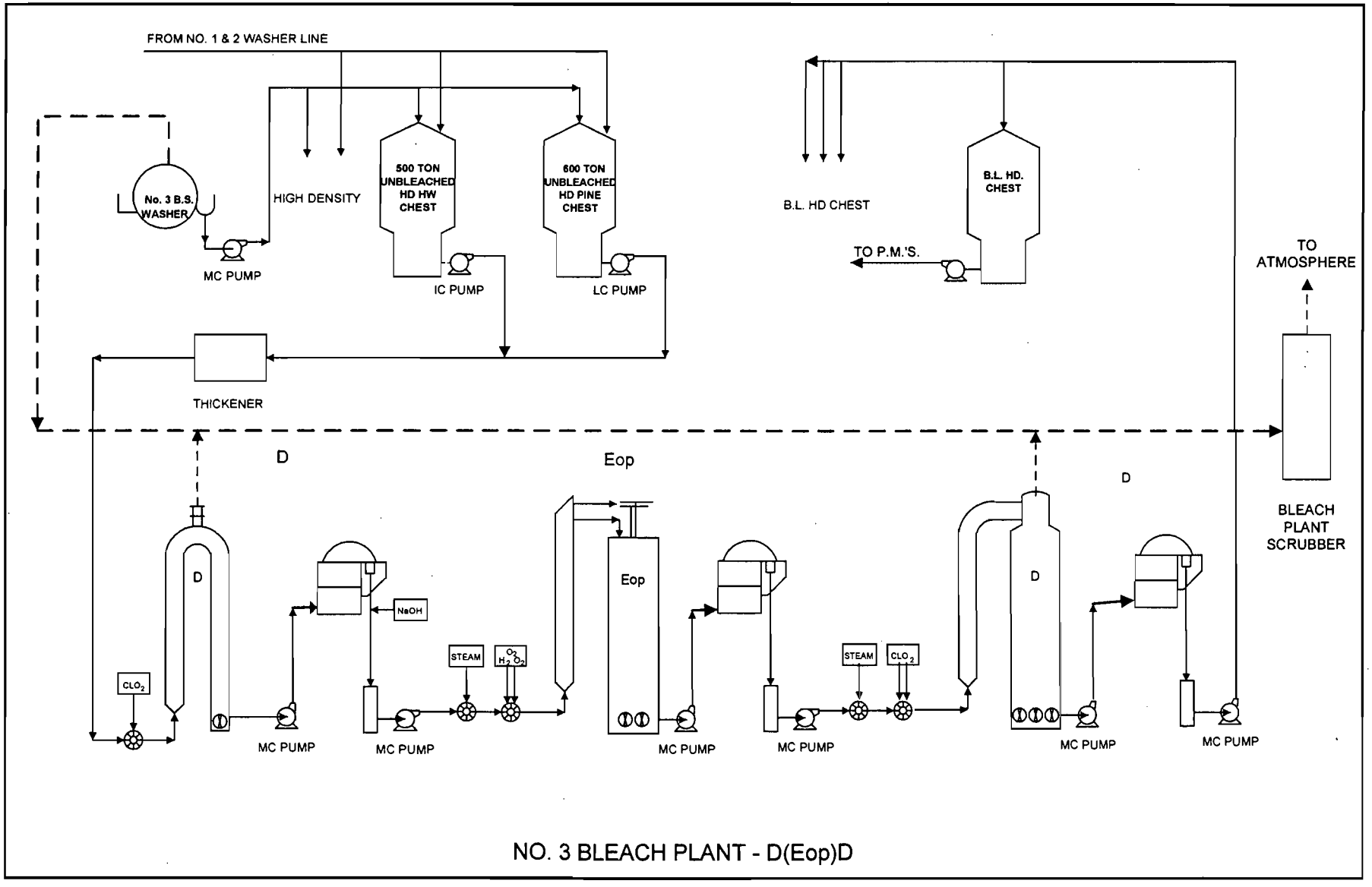
(e) Based on design information provided by scrubber manufacturer. Emissions based on 1,350 ADTBP/day and 214.25 lb/hr uncontrolled chlorine dioxide and 99% scrubber removal efficiency.

(f) Based on data in NCASI Technical Bulletin No. 679: Volatile Organic Emissions From Pulp and Paper Mill Sources, Part V - Kraft Mill Bleach Plants. Mill Code E "c" Line is most representative of the proposed ECF bleach plant at Georgia Pacific's Palatka mill. Chloroform emission factor converted to lb/ADTBP using the following formula: 9.1 e-3 lb/ODTBP * (0.90 ODTBP/ADTBP) = 8.19 e-3 lb/ADTBP.

(g) Based on data in NCASI Technical Bulletin No. 701: Compilation of Air Toxic and Total Hydrocarbon Emissions Data for Sources at Chemical Wood Pulp Mills. Formaldehyde data based on Mill Code BPMN.

**ATTACHMENT GP-EU1-J1**

**PROCESS FLOW DIAGRAM**




NO. 3 BLEACH PLANT - D(Eop)D

ATTACHMENT GP-EU1-J1
ECF BLEACH PLANT FLOW DIAGRAM

Source: Georgia-Pacific, 1998.

Process Flow Legend:
Solid / Liquid ——→
Gas ----------→

**Project:** 0237561\4\4.4\4.4.1
**Filename:** GP-EU1-J1.VSD
**Date:** 10/30/02

Golder Associates

# ATTACHMENT GP-EU1-J3

# DETAILED DESCRIPTION OF CONTROL EQUIPMENT

# ATTACHMENT GP-EU1-J3

## Georgia-Pacific Corporation Palatka Facility

## No. 3 Bleach Plant

## Alkaline Scrubber Equipment Design Parameters

| | |
|---|---|
| Scrubber Type | Packed Bed Wet Scrubber |
| Scrubbant | Alkaline Liquid |
| Packing Material | No. 2 Super Interlocks |
| Packing Arrangement | Two 25-ft beds |
| Outlet Gas Temp (°F) | 85 |
| Outlet Gas Flow Rate (ACFM) | 15,400 |
| Average Scrubbant pH | >7.0 |
| Scrubbant Flow Rate (gpm) | >1,200 |

# ATTACHMENT GP-EU1-J7

# OPERATION AND MAINTENANCE PLAN

# No. 3 Bleach Plant
# O & M Plan

## Plant Overview

The Georgia-Pacific Palatka Operations mill uses a Prewash-$D_o$-$E_{op}$-$D_1$ bleaching sequence.

In simple terms, the bleaching sequence is:

**Prewash Stage** - provides final washing and consistency control of the pulp before starting the bleaching process.

**$D_o$ Stage** - the first bleaching stage, where chlorine dioxide ($D_o$; $ClO_2$) followed by washing. This stage solubilizes most of the remaining lignin.

**$E_{op}$ Stage** -the second bleaching stage, where the sequential addition of caustic (E; NaOH), then hydrogen peroxide (p; $H_2O_2$) and oxygen (0; $O_2$) takes place, followed by washing. This stage dissolves the soluble lignin and removes it at the stage's wash press.

**$D_1$ Stage** - the final bleaching stage, where the true bleaching of the pulp occurs using chlorine dioxide ($D_1$; $ClO_2$), followed by washing. In this stage, the pulp is bleached to the desired brightness and the impact of impurities (wood dirt, shives) is greatly reduced.

The main objective of bleaching is to increase the brightness (whiteness) of the pulp while still maintaining good physical strength properties. The pulp is then used by the paper mill to manufacture a wide variety of consumer goods.

When bleaching pulp, there are a number of key parameters that influence the results of the chemical reactions and the effectiveness of each treatment. To obtain optimal bleaching results, specific conditions need to be met in each stage. The chemicals used in the different bleaching stages vary in their selectivity when reacting with cellulose and lignin as well as their ability to brighten the pulp.

The four key parameters for all bleaching stages are:

1) chemical dosage
2) reaction time
3) reaction temperature
4) stock pH.

All bleaching chemicals react according to the same principle with a fast initial reaction phase and then a slower subsequent phase. Chlorine dioxide ($ClO_2$) is unique, however, having an almost instantaneous reaction with pulp.

In order to take advantage of this known reaction mechanism, a typical bleaching stage usually involves chemical addition, a chemical/pulp mixer, reaction in a tower to provide retention time, followed by washing to remove the excess chemicals and reaction products.

The Palatka facility utilizes this type of equipment for the bleaching of both hardwoods and softwoods in the same and only bleach plant. The physical equipment operation is fundamentally the same for both species with different targeted values for the four key parameters mentioned above.

The following are examples of the type of instrumentation used to assure a safe, effective, and efficient bleaching process:

- Flow Indication for stock, water, effluent, chemicals, and steam.
- Consistency meters prior to each beaching sequence for chemical addition.
- Temperatures for all flows in all stages of the process.
- pH probes for stock and effluent throughout the process.
- Chemical residual analyzers for stock streams throughout process. >- Stock Kappa analyzer at each stage for chemical addition.
- Brightness instrumentation at each stage for brightness development and chemical addition.
- Fiber length analyzers for accurate species tracking and correct chemical addition.
- $ClO_2$ strength analyzer for maximizing $ClO_2$ addition on stock.
- Local and DCS gas emission alarms strategically placed throughout all levels of the operation.
- Conductivity probes in sewer effluent.

Operator training consisted of the following:

- 24 hours of Computer Based Training
- 16 hours of Class Room Training
- 16 hours of in the Field Training
- 40 hours of one on one Running the Plant Training.

The operating staff of this equipment utilizes sophisticated Digital Controls Systems via remote PC to monitor and make every control adjustment to the key parameters.

Operators maintain a log sheet that contains critical operating data. A shift by shift equipment checklist is completed each day for equipment lubrication, vibration, noise, and temperature. A multitude of alarm limits and safety interlocks also help to assure that the four key parameters are kept in check.

In an effort to verify that the control instrumentation is correct, operating staff complete manual test verification log sheets periodically during the day. Deviations from field instrumentation are adjusted as needed and calibrations are made as soon as possible.

To minimize the need for frequent adjustments, field instrumentation is inspected, cleaned, replaced and/or calibrated on either a daily, weekly, or monthly basis.

All environmental, safety, or major pieces of equipment have written maintenance procedures and parts lists readily available to the maintenance staff. Preventative Maintenance routes are completed routinely via either vender recommendations or historical performance. All maintenance work on any piece of equipment is tracked electronically for repetitive issue resolution.

# ATTACHMENT GP-EU1-J9

# OTHER INFORMATION REQUIRED BY RULE OR STATUTE

## ATTACHMENT GP-EU1-J9

This application is being submitted to revise the PSD Permit (Permit No. 1070005-010-AC) to increase the CO emission rate for the No. 3 Bleach Plant at Georgia-Pacific (G-P) Palatka.

Specific Condition 3 of Permit No. 1070005-010-AC requires that an Operation and Maintenance (O&M) Plan for the No. 3 Bleach Plant be submitted which sets forth the practices which are employed to result in efficient bleaching operations. The required O & M Plan is contained in Attachment GP-EU1-J7.

As per Specific Condition 12 of Permit No. 1070005-010-AC, G-P operates continuous monitors for pH of the gas scrubber liquid, the gas scrubber liquid recirculation flow rate, and gas scrubber vent inlet flow rate. The monitoring of the fan loading is an alternative to the continuous monitoring of the gas scrubber vent inlet flow rate. The EPA letter of approval for use of alternative monitoring is attached. Monitoring fan loading insures that gas is flowing to the scrubber. Monitoring pH insures heat gas scrubber liquid is the appropriate strength to control emissions from the vent gas. Monitoring the scrubber recirculation flow ensures that scrubber liquid is actually flowing into the scrubber.

As required, G-P has established parametric monitoring values based on the compliance test conducted on the No. 3 Bleach Plant. These values are presented as follows:

- Fan loading - 85 percent,
- pH - 9.5, and
- Scrubber recirculation flow rate - 1,500 gpm.

G-P proposes to collect this data on a 3-hour average basis. G-P requests that any condition placed on the Title V permit to require minimum or maximum scrubber operating parameters state the following: "Such parameters remain valid until a compliance test demonstrates that compliance can be achieved at lower or higher values. Upon such demonstration, the lower or higher values become the new limitations for the gas scrubber."

JET

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

DEC 2 ? 2000

received
12-27-00

4APT-ARB

Myra J. Carpenter
Superintendent, Environmental Affairs
Georgia-Pacific Corporation
P. O. Box 919
Palatka, Florida 32178-0919

Dear Ms. Carpenter:

Thank you for your letter dated December 1, 2000, regarding a request from the Georgia-Pacific Corporation, Palatka, Florida, for approval of a bleach plant alternative monitoring parameter pursuant to the Pulp & Paper MACT standard. Section 63.453(c)(2) of the MACT requires subject mills to continuously monitor the gas scrubber vent gas inlet flow rate. However, the facility states that because the inlet to the gas scrubber is a very corrosive, moist environment, it is not conducive to continuous flow measurement and therefore Georgia-Pacific is seeking approval of a system to continuously monitor operation of the fan used to convey hazardous air pollutants to the bleach plant scrubber.

Based on the discussion of the alternative monitoring parameter issue in the Environmental Protection Agency's (EPA's) Q&A Document for the Pulp & Paper MACT (Volume 1, Page 8 - 10), Region 4 concurs that adequate rationale for using an alternative parameter (as required in 63.453(n)), has been demonstrated. Therefore, Region 4 concurs with the Georgia-Pacific request to substitute vent gas fan data (i.e., install, calibrate, operate and properly maintain a continuous monitoring system to monitor the fan amperage of the bleaching system vent gas fan) as an alternative monitoring parameter to 63.453(c)(2) and accordingly approves this specific request.

If further assistance is needed, please contact Lee Page of the EPA Region 4 staff at (404) 562-9131.

Sincerely,

Paul Hagen

R. Douglas Neeley
Chief
Air and Radiation Technology Branch
Air, Pesticides and Toxics
Management Division

cc: Howard Rhodes, FL DEP

# ATTACHMENT A

# SUPPLEMENTAL INFORMATION FOR CONSTRUCTION PERMIT APPLICATION

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A DERIVATION OF PROPOSED CO EMISSION FACTORS

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# 1.0 INTRODUCTION

Georgia-Pacific Corporation (G-P) operates a Kraft pulp mill located in Palatka, Florida. As part of the paper making process, pulp bleaching is conducted at the facility. In 1999, G-P applied for a construction permit to construct an elemental chlorine-free (ECF) three-stage bleach plant. On June 30, 1999, the Florida Department of Environmental Protection (FDEP) issued G-P a Prevention of Significant Deterioration (PSD) permit to construct the No. 3 Bleach Plant. Construction for the No. 3 Bleach Plant was completed by February 15, 2001 and the bleach plant is now operational. Based on initial test data from the new bleach plant, G-P believes that the carbon monoxide (CO) emission limit that the bleach plant is subject to does not adequately reflect process variability of the bleach plant.

G-P is now submitting this application to revise the CO emission limit in the No. 3 Bleach Plant PSD permit, Permit No. 1070005-006-AC; PSD-FL-264. The current permit limit is 46 pounds per hour (lbs/hr) and 201 tons per year (TPY). G-P is proposing to increase the CO emission limit to 100 lbs/hr and 324 TPY. This increase in emissions reflects the potential for 100 percent softwood processing on a short-term (daily) basis, as well as increased application of chlorine dioxide to the pulp compared to what was originally proposed in the PSD permit application. G-P believes that the revised emission estimate is more representative of potential CO emissions from the No. 3 Bleach Plant. It should be noted that G-P estimated an average hourly CO emission rate of 63.4 lbs/hr in the original PSD application, based on processing 65 percent softwood and 35 percent hardwood. The revised potential CO emissions contained in this application, reflects the scenario of 100 percent softwood production on a short-term (daily) basis.

This report contains background information relating to the CO emissions, an update on Best Available Control Technology (BACT), and a modeling analysis showing that the proposed higher emission rate for CO will not have any adverse air quality impacts.

# 2.0 PROJECT DESCRIPTION

## 2.1 BACKGROUND

G-P operates a Kraft pulp and paper mill located in Palatka, Florida. Processes and systems at the mill include a batch digester system, multiple effect evaporator (MEE) system, condensate stripper system, recovery boiler and smelt dissolving tanks, lime kiln, tall oil plant, utilities, bleach plant, chlorine dioxide plant, and other equipment to produce finished paper products from virgin wood.

Prior to the construction of the No. 3 Bleach Plant, G-P operated two bleach plants, the No. 1 and No. 2 Bleach Plants. These bleach plants used a combination of chlorine dioxide ($ClO_2$) and elemental chlorine to bleach pulp. The No. 3 Bleach Plant was constructed to replace the No. 1 and the No. 2 Bleach Plants and to help G-P meet the Maximum Achievable Control Technology (MACT) Standards promulgated for the pulp and paper industry (40 CFR Part 63, Subpart S) by converting the bleaching system to a totally ECF process.

The No. 3 Bleach Plant has the ability to bleach either softwood or hardwood pulp. The bleach plant operates in three stages, with a prewash prior to the front sequence. The three stages consist of a $D_0$ stage (chlorine dioxide stage), an $E_{OP}$ stage (caustic extraction with oxygen and peroxide), and a $D_1$ stage (chlorine dioxide stage), resulting in a $D_0(E_{OP})D_1$ sequence. Pulp is supplied to the bleach plant from the No. 2 High Density (HD) chest for hardwood and from the No. 3 HD chest for softwood. The bleach plant is designed for a maximum daily production rate of 1,440 air-dried tons of bleached pulp (ADTBP) per day and an average daily production rate of 1,350 ADTBP per day.

## 2.2 PROJECTED CO EMISSIONS

### 2.2.1 ORIGINAL CONSTRUCTION PERMIT APPLICATION

When G-P applied for the PSD construction permit for the bleach plant, G-P did not have specific data for its three stage bleaching plant on which to base CO emissions. CO emissions from the No. 3 Bleach Plant were estimated based on emissions presented in technical literature. Specifically, National Council for Air and Stream Improvement, Inc. (NCASI) Technical Bulletin No. 760 was used to estimate emissions from the No. 3 Bleach Plant.

As discussed further in the Technical Bulletin, the NCASI data indicated that CO emissions from softwood bleaching are dependent on the rate of $ClO_2$ application to the pulp, but CO emissions from

hardwood bleaching are not dependent on $ClO_2$ application rate. To estimate CO emissions from softwood bleaching in the No. 3 Bleach Plant, an interpolation of the presented data was performed using estimated peak and average $ClO_2$ application rates (see Appendix A to the original permit application). CO emissions from hardwood bleaching were estimated by averaging the limited data available in the Technical Bulletin (see Appendix A of the original permit application).

The projected CO emissions from softwood bleaching were estimated as 1.03 lbs/ADTBP for short-term emissions and 0.91 lbs/ADTBP for long-term emissions. The projected CO emissions from hardwood bleaching were estimated as 0.64 lbs/ADTBP. Maximum hourly emissions from the No. 3 Bleach Plant were based on a projected maximum pulp production rate of 1,702 ADTBP per day and a processing ratio of 65 percent softwood and 35 percent hardwood. Annual emissions were based on a projected daily average pulp production rate of 1,350 ADTBP per day and a processing ratio of 65 percent softwood and 35 percent hardwood. This resulted in an hourly emission rate of 63.4 lbs/hr and an annual emission rate of 201 TPY. These derivations can be found in Appendix A of the original PSD application.

### 2.2.2 REVISED PROJECTIONS BASED ON OPERATIONAL DATA

Since the bleach plant is now operating, G-P has actual operating experience with the No. 3 Bleach Plant. Furthermore, as actually constructed, G-P now believes the maximum hourly throughput that can be achieved by the No. 3 Bleach Plant is 60 ADTBP per hour (1,440 ADTBP per day). G-P believes that the average daily throughput rate, on an annual basis, that was presented in the original application (1,350 ADTBP per day) is still representative.

A series of test runs were recently conducted (October 2002) to measure actual CO emissions from the No. 3 Bleach Plant when processing 100 percent softwood. Of nine test runs conducted over a three-day period, six of the runs were conducted at throughput rates approaching 50 ADTBP per hour or higher. As such, these six runs were thought to be most representative of future operating conditions. The remaining three runs were conducted at lower throughput rates of 35 ADTBP per hour or less. These data are presented in Appendix A.

The average CO emission factor that was calculated from the six "representative" test runs was 1.32 lbs/ADTBP. In order to account for the limited data set, the scatter of the data, and the potential for process variation (*e.g.*, Kappa number, chlorine dioxide application rate, etc.), G-P has utilized a 95-

percent confidence level (statistically corresponding to two standard deviations) in computing a final emission factor of 1.68 lbs/ADTBP for softwood. This results in a maximum, hourly CO emission rate of approximately 100 lbs/hour.

The annual CO emission rate that is being proposed is based on a wood species mix of 65% softwood and 35% hardwood on an annual basis. This is consistent with the assumption that was presented in the original PSD permit application. The Mill-derived factor of 1.68 lbs/ADTBP is utilized for calculating the annual CO emissions attributable to softwood processing. Due to the lack of Mill-specific data for hardwood processing, G-P is continuing to utilize the average NCASI emission factor (0.64 lb/ADTBP) as represented in the original permit application (see Appendix A of the original application). The use of these factors and assumptions results in an annual CO emission rate of 324 TPY. The detailed calculations are presented in Appendix A to this permit application.

## 2.3 SUMMARY

Based on the information presented above, G-P is requesting a higher emission limit for CO for the No. 3 Bleach Plant. G-P is requesting a CO emission limit of 100 lbs/hr and 324 TPY. The derivation of these emission rates is summarized in Appendix A of this application. The short-term and annual CO emissions for the No. 3 Bleach Plant are summarized in Table 2-1.

Table 2-1. Revised Maximum CO Emissions for the No. 3 Bleach Plant

| Averaging Period | Wood Species | Emission Factor (lbs/ADTBP) (a) | Throughput Rate | Emission Rate |
|---|---|---|---|---|
| Short-Term (Hourly) | Softwood | 1.68 | 60 ADTBP/hour | 100.8 lbs/hour (d) |
| Long-Term (Annual) | Softwood | 1.68 | 320,287.5 ADTBP/year (b) | 269.0 tons/year |
| | Hardwood | 0.64 | 172,462.5 ADTBP/year (c) | 55.2 tons/year |
| | | | | |
| | Total (Long-Term) | 1.32<br>(1.45 lbs/ODTBP) | 492,750 ADTBP/year<br>447,955 ODTBP/year | 324.2 tons/year |

(a) Refer to Appendix A for derivation of softwood and hardwood emission factors.

(b) Based on an average daily throughput of 1,350 ADTBP and assuming 65% softwood on an annual basis (1,350 ADTBP/day x 365 days/year x 0.65 = 320,287.5 ADTBP/year).

(c) Based on an average daily throughput of 1,350 ADTBP and assuming 35% hardwood on an annual basis (1,350 ADTBP/day x 365 days/year x 0.35 = 172,462.5 ADTBP/year).

(d) Actual calculated value is 100.8 lbs/hour; G-P is proposing a maximum hourly permitted rate for CO of 100 lbs/hour.

Note: ADTBP = air-dried tons of bleached pulp.

ODTBP = oven-dried tons of bleached pulp.

## 3.0 AIR QUALITY MONITORING REQUIREMENTS

In accordance with requirements of 40 CFR 52.21(m) and FDEP Rule 62-212.400(5)(f), F.A.C., any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility potentially would emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate.

Ambient air monitoring for a period of up to 1 year is generally appropriate to satisfy the PSD monitoring requirements. A minimum of 4 months of data is required. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided in the U.S. Environmental Protection Agency's (EPA's) Ambient Monitoring Guidelines for Prevention of Significant Deterioration (EPA, 1987a).

FDEP may exempt a proposed major stationary facility or major modification from the monitoring requirements with respect to a particular pollutant if the emissions increase of the pollutant from the facility or modification would cause, in any area, air quality impacts less than the *de minimis* monitoring levels (FDEP Rule 62-212.400, F.A.C.). Presented in Table 3-1 is a comparison of the maximum future CO impact of the No. 3 Bleach Plant to the CO *de minimis* monitoring concentration. Since the maximum 8-hour CO concentration of 293 micrograms per cubic meter ($\mu g/m^3$) is less than the 8-hour *de minimis* monitoring concentration of 575 $\mu g/m^3$, the proposed project is exempt from monitoring requirements for CO.

Table 3-1. Comparison of Maximum Future Impact of the No. 3 Bleach Plant to the *De Minimis* Monitoring Concentration

| Pollutant | Impact Due to Future Proposed Project [a] ($\mu g/m^3$) | *De Minimis* Monitoring Concentration ($\mu g/m^3$) | Preconstruction Ambient Monitoring Analysis Required? |
|---|---|---|---|
| Carbon Monoxide | 293, 8-hour | 575, 8-hour | No |

[a] Impact presented is for maximum hourly CO emissions from the No. 3 Bleach Plant.

Source: Golder Associates Inc., 2002.

## 4.0 BEST AVAILABLE CONTROL TECHNOLOGY REQUIREMENTS

In the case of the Bleach Plant addition at G-P, only CO required a BACT analysis for the proposed No. 3 Bleach Plant. The following section presents a summary and update to the BACT analysis for CO.

### 4.1 BACT FOR CO FROM THE NO. 3 BLEACH PLANT

CO is a byproduct that is formed when bleaching pulp in a pulp mill. It has been known for some time that CO is formed in the stages of a chlorine, caustic extraction, and chlorine dioxide (CEDED) bleaching sequence. This sequence is similar to the sequence used in G-P's existing bleaching process. However, until recently, it was not known how much CO formation could be expected from bleaching using up to 100 percent chlorine dioxide ($ClO_2$) substitution (National Council for Air and Stream Improvement Inc. (NCASI) Technical Bulletin 760, 1998).

Based on studies performed by NCASI, it has been postulated that CO formation from $ClO_2$ substitution occurs as a result of the synergistic reaction between $ClO_2$ and certain precursors formed from bleaching with chlorine. The results of the studies do not show a correlation between CO formation and percent $ClO_2$ substitution. However, there is evidence to show that, when using 100 percent $ClO_2$ substitution, CO emissions appear to increase linearly with the total percent $ClO_2$ applied on the pulp. Therefore, it would appear that when bleaching using an ECF bleaching process (*i.e.,* 100 percent $ClO_2$ substitution), CO formation may be reduced be reducing the amount of $ClO_2$ applied to the pulp. This would suggest that CO emissions from the ECF bleaching process could be "controlled" by maintaining the percentage of $ClO_2$ applied to the pulp at minimum levels that would ensure proper bleaching of the pulp. Thus, ensuring efficient use of $ClO_2$ and efficient operation of the bleaching process would minimize CO emissions.

In addition to reviewing the EPA BACT Clearinghouse database, FDEP has requested that G-P address various oxidation techniques in a BACT analysis. In an April 24, 1999 submission to FDEP, Golder Associates presented generic cost information for thermal and catalytic oxidation. In this update, G-P applied the updated emission rate and refined costs for three oxidation techniques: thermal, catalytic, and incineration in a boiler. Three factors account for the more accurate costs presented in Appendix B. First, G-P has gained recent experience with incinerators and the selection of chlorine-resistant materials of construction. Over the past 18 months, incinerators and associated

equipment to meet the High-Volume Low-Concentration (HVLC) emission standards of the Cluster Rule have been specified and costed for various G-P operations in the U.S. Thus, the approach to estimating costs is very specific to our recent experience, and reflects "as-built" costs for equipment. Second, the refined costs estimates also reflect recent experience with costing gas-conditioning systems for incinerators. Third, the refined costs reflect materials of construction specifically for bleach plant exhaust service. Because of the corrosive nature of chlorine compounds, the updated costs reflect more suitable materials. The refined BACT analysis is presented in Appendix B.

As presented in Appendix B, G-P still asserts that "efficient bleaching operations" as a work practice to minimize CO emissions represents BACT for the No. 3 Bleach Plant. No other technically or economically feasible means of CO emissions control or reduction have been demonstrated to control bleach plant CO emissions.

# 5.0 AIR QUALITY MODELING ANALYSIS

## 5.1 INTRODUCTION

To demonstrate that the increased CO emissions will not have an adverse affect on air quality, a modeling analysis for CO was performed. Except as noted below, this analysis was performed in the same manner as the modeling performed in the original construction permit application that was submitted in 1999 for the No. 3 Bleach Plant, except as discussed below. The latest version of the Industrial Source Complex Short-Term [(ISCST3), Version 02035] dispersion model (EPA, 2002) was used to evaluate the CO impacts due to the proposed project in areas within 50 kilometers (km) of the proposed facility. A listing of ISCST3 model features is presented in Table 5-1.

A different receptor grid was used in this modeling analysis. To determine the CO significant impact area for the proposed project, concentrations were predicted using polar grids. The receptor grids, comprised of 36 radials spaced at 10-degree intervals, began at the plant property and extended out to a distance of 5.5 km. An additional 334 Cartesian grid receptors, spaced at 100-meter (m) intervals, were used to predict impacts along the fence line areas. A summary of the fence line receptors is presented in Table 5-2.

At the off-property areas between the fence line and the outermost ring distance of 5.5 km, 205 discrete polar receptors were used, spaced at 10-degree intervals at ring distances of 0.5, 0.6, 0.7, 1.0, 2.0, 3.0, 4.0, 4.5, 5.0, and 5.5 km from the origin. All receptor locations are relative to the former TRS Incinerator stack location, an origin that was used for the modeling in the original PSD application. The radial and property line receptors are presented in Figure 5-1.

Eleven receptors were used to predict the CO concentrations at the Okefenokee and Wolf Island National Wilderness Area (NWA) PSD Class I areas. Ten of the 11 receptors were located along the southern and eastern boundaries of Okefenokee NWA. One additional receptor was located at the Wolf Island NWA. A list of these receptors is presented in Table 5-3. Because allowable PSD increments do not exist for CO, the Class I modeling analysis was performed only for the air quality related value (AQRV) assessment.

## 5.2 EMISSION INVENTORY

The maximum short-term CO emissions for the No. 3 Bleach Plant are 100 lbs/hr as presented in Section 2.0. The maximum CO impacts due to these future maximum CO emissions from the No. 3 Bleach Plant were compared to the CO significant impact levels. The stack parameters for the bleach plant scrubber used in the modeling analysis are presented in Table 5-4. Since the original PSD application was submitted prior to construction of the No. 3 Bleach Plant, some of the stack parameters varied slightly from the original design parameters.

## 5.3 BUILDING DOWNWASH EFFECTS

The potential for building downwash to occur was evaluated for all source/structure combinations at the G-P Palatka facility. A total of 12 building structures were evaluated. All building structures were processed in the EPA Building Input Profile (BPIP, Version 95086) program to determine direction-specific building heights and projected widths for each 10-degree azimuth direction for the bleach plant scrubber. The evaluated structures are presented in Table 5-5. A plot plan showing building and stack locations is presented in Attachments GP-FI-C2a and GP-FI-C2b.

## 5.4 MODEL RESULTS - SIGNIFICANT IMPACT ANALYSIS

Results of the significant impact screening analyses for CO are summarized in Table 5-6. The maximum 8-hour and 1-hour CO impacts of 293 and 1,096 $\mu g/m^3$, respectively, are below the significant impact levels of 500 and 2,000 $\mu g/m^3$, respectively. Because the maximum predicted impacts from the screening analysis were less than 60 percent of the EPA significant impact levels, additional refinements were not performed. Furthermore, since the predicted CO impacts do not exceed the significant impact levels, an additional analysis comparing the CO impacts to the ambient air quality standards (AAQS) is not required.

Table 5-1. Major Features of the ISCST3 Model

| ISCST3 Model Features |
|---|
| • Polar or Cartesian coordinate systems for receptor locations. |
| • Rural or one of three urban options which affect wind speed profile exponent, dispersion rates, and mixing height calculations. |
| • Plume rise due to momentum and buoyancy as a function of downwind distance for stack emissions (Briggs, 1969, 1971, 1972, and 1975; Bowers *et al.*, 1979). |
| • Procedures suggested by Huber and Snyder (1976); Huber (1977); and Schulman and Scire (1980) for evaluating building wake effects. |
| • Procedures suggested by Briggs (1974) for evaluating stack-tip downwash. |
| • Separation of multiple emission sources. |
| • Consideration of the effects of gravitational settling and dry deposition on ambient particulate concentrations. |
| • Capability of simulating point, line, volume, area, and open pit sources. |
| • Capability to calculate dry and wet deposition, including both gaseous and particulate precipitation scavenging for wet deposition. |
| • Variation of wind speed with height (wind speed-profile exponent law). |
| • Concentration estimates for 1 hour to annual average times. |
| • Terrain-adjustment procedures for elevated terrain including a terrain truncation algorithm for ISCST3; a built-in algorithm for predicting concentrations in complex terrain. |
| • Consideration of time-dependent exponential decay of pollutants. |
| • The method of Pasquill (1976) to account for buoyancy-induced dispersion. |
| • A regulatory default option to set various model options and parameters to EPA recommended values (see text for regulatory options used). |
| • Procedure for calm-wind processing including setting wind speeds less than 1 m/s to 1 m/s. |

Note: ISCST3 = Industrial Source Complex Short-Term.

References:

Bowers, J.F., J.R. Bjorklund and C.S. Cheney. 1979. Industrial Source Complex (ISC) Dispersion Model User's Guide. Volume I, EPA-450/4-79-030; Volume II. EPA-450/4-79-031. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

Briggs, G.A. 1969. Plume Rise, USAEC Critical Review Series, TID-25075. National Technical Information Service, Springfield, Virginia 22161.

Briggs, G.A. 1972. Discussion on Chimney Plumes in Neutral and Stable Surroundings. *Atmos. Environ.*, Q, 507-510.

Briggs, G.A. 1974. Diffusion Estimation for Small Emissions. *In*: ERL, ARL USAEC Report ATDL-106. U.S. Atomic Energy Commission, Oak Ridge, Tennessee.

Briggs, G.A. 1975. Plume Rise Predications. In Lectures on Air Pollution and Environmental Impact Analysis. American Meteorological Society, Boston, Massachusetts.

Briggs, G.A. 1979. Some Recent Analyses of Plume Rise Observations. *In*: Proceedings of the Second International Clean Air Congress. Academic Press, New York.

Huber, A.H. 1977. Incorporating Building/Terrain Wake Effects on Stack Effluents. Preprint Volume for the Joint Conference on Applications of Air Pollution Meteorology, American Meteorological Society, Boston, Massachusetts.

Huber, A.H. and W.H. Snyder. 1976. Building Wake Effects on Short Stack Effluents. Preprint Volume for the Third Symposium on Atmospheric Diffusion and Air Quality, American Meteorological Society, Boston, Massachusetts.

Pasquill, F. 1976. Atmospheric Dispersion Parameters in Gaussian Plume Modeling - Part II. Possible Requirements for Change in the Turner Workbook Values. EPA-600/4-76-030b, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

Schulman, L.L. and J.S. Scire. 1980. Buoyant Line and Point Source (BLP) Dispersion Model User's Guide. Document P-7304B, Environmental Research and Technology, Inc., Concord, MA.

Table 5-2. Property Boundary Receptors Used in the G-P Modeling Analysis

| Coordinates (m) | | Coordinates (m) | | Coordinates (m) | | Coordinates (m) | | Coordinates (m) | | Coordinates (m) | | Coordinates (m) | | Coordinates (m) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X | Y | X | Y | X | Y | X | Y | X | Y | X | Y | X | Y | X | Y |
| -311.0 | -1781.0 | -3231.4 | -279.6 | -4162.2 | 2413.6 | -3944.5 | 3977.0 | -1217.8 | 4808.0 | 1914.3 | 4492.0 | 1574.6 | 2851.9 | 1248.5 | 842.0 |
| -402.0 | -1739.6 | -3331.4 | -276.3 | -4168.3 | 2513.4 | -4044.5 | 3977.0 | -1117.8 | 4808.6 | 1911.6 | 4392.0 | 1527.7 | 2763.6 | 1348.5 | 842.0 |
| -493.1 | -1698.2 | -3431.3 | -273.0 | -4174.5 | 2613.3 | -4144.5 | 3977.0 | -1017.8 | 4809.3 | 1908.9 | 4292.0 | 1480.8 | 2675.3 | 1448.5 | 842.0 |
| -584.1 | -1656.9 | -3531.3 | -269.7 | -4180.6 | 2713.1 | -4185.0 | 4036.5 | -917.8 | 4809.9 | 1906.3 | 4192.1 | 1433.9 | 2587.0 | 1548.5 | 842.0 |
| -675.1 | -1615.5 | -3631.2 | -266.4 | -4186.8 | 2812.9 | -4185.0 | 4136.5 | -817.8 | 4810.5 | 1903.6 | 4092.1 | 1341.7 | 2574.0 | 1648.5 | 842.0 |
| -766.2 | -1574.1 | -3731.1 | -263.1 | -4193.0 | 2912.7 | -4185.0 | 4236.5 | -717.8 | 4811.2 | 1826.1 | 4069.0 | 1241.7 | 2574.0 | 1740.2 | 832.5 |
| -857.2 | -1532.7 | -3831.1 | -259.8 | -4199.1 | 3012.5 | -4161.5 | 4313.4 | -617.8 | 4811.8 | 1739.0 | 4081.9 | 1141.7 | 2574.0 | 1737.6 | 740.0 |
| -948.3 | -1491.3 | -3931.0 | -256.5 | -4205.3 | 3112.3 | -4061.5 | 4315.0 | -517.8 | 4812.5 | 1739.0 | 4181.9 | 1116.1 | 2482.6 | 1657.5 | 680.0 |
| -1039.3 | -1450.0 | -3894.6 | -190.3 | -4211.4 | 3212.1 | -3961.5 | 4316.6 | -417.8 | 4813.1 | 1739.0 | 4281.9 | 1095.9 | 2384.7 | 1577.5 | 620.1 |
| -1130.3 | -1408.6 | -3832.3 | -112.1 | -4217.6 | 3311.9 | -3861.6 | 4318.3 | -317.8 | 4813.7 | 1739.0 | 4381.9 | 1075.6 | 2286.8 | 1497.4 | 560.2 |
| -1221.4 | -1367.2 | -3769.9 | -33.9 | -4176.6 | 3360.5 | -3761.6 | 4319.9 | -217.8 | 4814.4 | 1739.0 | 4481.9 | 1055.4 | 2188.8 | 1417.4 | 500.2 |
| -1312.4 | -1325.8 | -3707.6 | 44.3 | -4077.7 | 3346.0 | -3661.6 | 4321.5 | -117.8 | 4815.0 | 1739.0 | 4581.9 | 1035.1 | 2090.9 | 1337.3 | 440.3 |
| -1403.4 | -1284.4 | -3651.2 | 125.9 | -3978.8 | 3331.6 | -3561.6 | 4323.2 | -17.9 | 4815.7 | 1739.0 | 4681.9 | 1033.7 | 2027.3 | 1257.3 | 380.4 |
| -1494.5 | -1243.1 | -3613.9 | 218.7 | -3879.8 | 3317.1 | -3461.6 | 4324.8 | 82.1 | 4816.3 | 1642.1 | 4685.0 | 1105.3 | 2097.0 | 1177.2 | 320.4 |
| -1585.5 | -1201.7 | -3576.7 | 311.5 | -3780.9 | 3302.6 | -3361.6 | 4326.4 | 182.1 | 4816.9 | 1542.1 | 4685.0 | 1177.0 | 2166.7 | 1097.2 | 260.5 |
| -1676.5 | -1160.3 | -3562.9 | 403.3 | -3681.9 | 3288.1 | -3261.6 | 4328.1 | 282.1 | 4817.6 | 1442.1 | 4685.0 | 1248.7 | 2236.4 | 1017.1 | 200.6 |
| -1767.6 | -1118.9 | -3608.6 | 492.2 | -3583.0 | 3273.7 | -3161.6 | 4329.7 | 382.1 | 4818.2 | 1410.0 | 4624.5 | 1320.4 | 2306.2 | 937.1 | 140.6 |
| -1858.6 | -1077.5 | -3654.2 | 581.2 | -3484.0 | 3259.2 | -3087.4 | 4349.2 | 482.1 | 4818.9 | 1421.4 | 4525.2 | 1392.1 | 2375.9 | 857.0 | 80.7 |
| -1949.7 | -1036.2 | -3732.9 | 616.0 | -3385.1 | 3244.7 | -3120.8 | 4443.5 | 582.1 | 4819.5 | 1432.8 | 4425.8 | 1466.0 | 2440.6 | 777.0 | 20.7 |
| -2040.7 | -994.8 | -3832.9 | 616.0 | -3286.1 | 3230.2 | -3154.1 | 4537.8 | 682.1 | 4820.1 | 1444.3 | 4326.5 | 1565.7 | 2448.5 | 696.9 | -39.2 |
| -2131.7 | -953.4 | -3924.1 | 634.0 | -3187.2 | 3215.8 | -3187.4 | 4632.1 | 782.1 | 4820.8 | 1455.7 | 4227.1 | 1615.7 | 2396.7 | 616.9 | -99.1 |
| -2222.8 | -912.0 | -3985.8 | 712.8 | -3088.2 | 3201.3 | -3220.7 | 4726.4 | 882.1 | 4821.4 | 1467.2 | 4127.8 | 1625.9 | 2297.2 | 536.8 | -159.1 |
| -2313.8 | -870.6 | -4039.0 | 789.7 | -2989.3 | 3186.8 | -3217.8 | 4795.2 | 982.1 | 4822.1 | 1478.6 | 4028.4 | 1636.0 | 2197.8 | 456.8 | -219.0 |
| -2404.8 | -829.3 | -3951.2 | 837.5 | -2890.3 | 3172.3 | -3117.8 | 4795.8 | 1082.1 | 4822.7 | 1490.0 | 3929.1 | 1646.2 | 2098.3 | 376.7 | -278.9 |
| -2495.9 | -787.9 | -3863.4 | 885.4 | -2806.0 | 3174.8 | -3017.8 | 4796.5 | 1182.1 | 4823.3 | 1551.6 | 3886.0 | 1656.4 | 1998.8 | 296.7 | -338.9 |
| -2586.9 | -746.5 | -3831.0 | 966.1 | -2806.0 | 3274.8 | -2917.8 | 4797.1 | 1282.1 | 4824.0 | 1651.6 | 3886.0 | 1666.6 | 1899.3 | 216.6 | -398.8 |
| -2678.0 | -705.1 | -3831.0 | 1066.1 | -2806.0 | 3374.8 | -2817.8 | 4797.7 | 1382.1 | 4824.6 | 1751.6 | 3886.0 | 1676.8 | 1799.8 | 169.7 | -483.4 |
| -2769.0 | -663.7 | -3899.1 | 1098.0 | -2806.0 | 3474.8 | -2717.8 | 4798.4 | 1482.1 | 4825.3 | 1851.6 | 3886.0 | 1687.0 | 1700.4 | 134.9 | -577.2 |
| -2860.0 | -622.4 | -3999.1 | 1098.0 | -2806.0 | 3574.8 | -2617.8 | 4799.0 | 1582.1 | 4825.9 | 1951.6 | 3886.0 | 1625.4 | 1642.7 | 100.2 | -671.0 |
| -2940.6 | -573.9 | -4082.1 | 1116.1 | -2806.0 | 3674.8 | -2517.8 | 4799.7 | 1682.1 | 4826.5 | 2051.6 | 3886.0 | 1537.4 | 1600.6 | 65.5 | -764.7 |
| -2945.1 | -474.0 | -4088.3 | 1215.9 | -2806.0 | 3774.8 | -2417.8 | 4800.3 | 1782.1 | 4827.2 | 2076.0 | 3837.1 | 1549.7 | 1501.3 | 30.7 | -858.5 |
| -2949.7 | -374.1 | -4094.4 | 1315.7 | -2860.4 | 3831.0 | -2317.8 | 4800.9 | 1882.1 | 4827.8 | 2034.9 | 3745.9 | 1562.0 | 1402.1 | -4.0 | -952.3 |
| -2954.3 | -274.2 | -4100.6 | 1415.5 | -2958.1 | 3852.7 | -2217.8 | 4801.6 | 1982.1 | 4828.5 | 1993.9 | 3654.8 | 1617.3 | 1369.0 | -38.8 | -1046.1 |
| -2958.8 | -174.3 | -4106.8 | 1515.3 | -3055.7 | 3874.3 | -2117.8 | 4802.2 | 2082.1 | 4829.1 | 1952.8 | 3563.6 | 1696.5 | 1367.8 | -73.5 | -1139.8 |
| -2963.4 | -74.4 | -4112.9 | 1615.2 | -3153.4 | 3895.9 | -2017.8 | 4802.9 | 2182.1 | 4829.7 | 1911.7 | 3472.4 | 1723.6 | 1271.6 | -108.2 | -1233.6 |
| -2968.0 | 25.5 | -4119.1 | 1715.0 | -3251.0 | 3917.5 | -1917.8 | 4803.5 | 2282.1 | 4830.4 | 1940.0 | 3383.5 | 1641.3 | 1229.4 | -143.0 | -1327.4 |
| -3004.4 | 92.0 | -4125.2 | 1814.8 | -3348.6 | 3939.1 | -1817.8 | 4804.1 | 2376.0 | 4830.1 | 1924.8 | 3291.7 | 1548.4 | 1192.5 | -177.7 | -1421.1 |
| -3104.4 | 92.0 | -4131.4 | 1914.6 | -3446.3 | 3960.7 | -1717.8 | 4804.8 | 2280.4 | 4801.0 | 1875.8 | 3209.6 | 1457.8 | 1152.2 | -212.4 | -1514.9 |
| -3190.0 | 77.6 | -4137.5 | 2014.4 | -3544.5 | 3977.0 | -1617.8 | 4805.4 | 2184.7 | 4771.8 | 1787.8 | 3162.1 | 1389.9 | 1078.8 | -247.2 | -1608.7 |
| -3190.0 | -22.4 | -4143.7 | 2114.2 | -3644.5 | 3977.0 | -1517.8 | 4806.1 | 2107.3 | 4712.3 | 1699.8 | 3114.6 | 1322.0 | 1005.4 | -281.9 | -1702.5 |
| -3190.0 | -122.4 | -4149.9 | 2214.0 | -3744.5 | 3977.0 | -1417.8 | 4806.7 | 2036.6 | 4641.6 | 1654.9 | 3033.7 | 1254.1 | 931.9 | | |
| -3190.0 | -222.4 | -4156.0 | 2313.8 | -3844.5 | 3977.0 | -1317.8 | 4807.3 | 1965.9 | 4570.9 | 1621.5 | 2940.2 | 1186.2 | 858.5 | | |

Note: All coordinates are relative to old TRS incinerator stack location.

Table 5-3. Class I Area Receptors Used in the Modeling Analysis

| PSD Class I Area | UTM Coordinates | |
|---|---|---|
| | East (km) | North (km) |
| Wolf Island NWA | 470.5 | 3459.0 |
| Okefenokee NWA | 391.0 | 3417.0 |
| Okefenokee NWA | 390.0 | 3410.0 |
| Okefenokee NWA | 392.0 | 3400.0 |
| Okefenokee NWA | 390.0 | 3395.0 |
| Okefenokee NWA | 391.0 | 3390.0 |
| Okefenokee NWA | 390.0 | 3384.0 |
| Okefenokee NWA | 383.0 | 3382.0 |
| Okefenokee NWA | 378.0 | 3382.0 |
| Okefenokee NWA | 374.0 | 3383.0 |
| Okefenokee NWA | 370.0 | 3383.0 |

NWA = National Wilderness Area

Table 5-4. No. 3 Bleach Plant Source Location and Operating Parameters Used in Modeling Analysis

| Source | ISCST Source ID | CO Emissions | | Stack Height | | Stack Diameter | | Gas Flow Rate | Gas Exit Temperature | | Velocity | | Location [a] X Coordinate | | Location [a] Y Coordinate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | lb/hr | g/sec | ft | m | ft | m | acfm | °F | K | ft/sec | m/sec | ft | m | ft | m |
| No. 3 Bleach Plant | BLEACH | 126.6 | 16.0 | 118 | 36.0 | 3.5 | 1.07 | 15,400 | 85 | 302.6 | 26.7 | 8.13 | 358.6 | 109.3 | 464.2 | 141.5 |

[a] Relative to the old TRS incinerator stack and to true north.

Table 5-5. Structure Dimensions Used in the Georgia-Pacific Modeling Analysis

| Structure | Height | | Length | | Width | |
|---|---|---|---|---|---|---|
| | ft | m | ft | m | ft | m |
| RB4 Precipitator | 85 | 25.9 | 130 | 39.6 | 59 | 18.0 |
| RB4 Boiler Building | 193.7 | 59.0 | 104 | 31.7 | 90 | 27.4 |
| Power Plant Building | 107.6 | 32.8 | 92 | 28.0 | 92 | 28.0 |
| Pulp Dryer No. 3 | 84.5 | 25.8 | 263 | 80.2 | 147 | 44.8 |
| Pulp Dryer No. 5 | 70.5 | 21.5 | 306 | 93.3 | 95 | 29.0 |
| Pulp Dryer No. 4 | 73 | 22.3 | 242 | 73.8 | 127 | 38.7 |
| Warehouse Complex 1 | 62.67 | 19.1 | 1,382 | 421.2 | 411 | 125.3 |
| Warehouse Complex 2 | 46.8 | 14.3 | 852 | 259.7 | 370 | 112.8 |
| Nos. 1 and 2 Machines, Storage | 71.16 | 21.7 | 232 | 70.7 | 412 | 125.6 |
| Kraft Converting and Storing | 60.75 | 18.5 | 264 | 80.5 | 516 | 157.3 |
| Kraft Warehouse and Multi-Wall | 56.7 | 17.3 | 274 | 83.5 | 507 | 154.5 |
| Digester | 62.2 | 19.0 | 264 | 80.5 | 32 | 9.8 |

Table 5-6. Maximum Predicted CO Concentrations for the No. 3 Bleach Plant Predicted in the Plant Vicinity, Georgia Pacific, Palatka

| Averaging Time | Concentration [a] ($\mu g/m^3$) | Receptor Location [b] X (m) | Receptor Location [b] Y (m) | Time Period (YYMMDDHH) [c] |
|---|---|---|---|---|
| Annual | 11.7 | 492 | -180 | 84123124 |
| | 11.1 | 542 | -109 | 85123124 |
| | 11.1 | 431 | -242 | 86123124 |
| | 15.2 | 536.8 | -159.1 | 87123124 |
| | 14.3 | 456.8 | -219 | 88123124 |
| High 24-Hour | 180 | 296.7 | -338.9 | 84011424 |
| | 119 | 616.9 | -99.1 | 85070824 |
| | 162 | 169.7 | -483.4 | 86121524 |
| | 140 | 492 | -180 | 87102724 |
| | 157 | 492 | -180 | 88022124 |
| High 8-Hour | 278 | 216.6 | -398.8 | 84011308 |
| | 251 | 536.8 | -159.1 | 85071716 |
| | 266 | 134.9 | -577.2 | 86121524 |
| | 279 | 359 | -292 | 87110508 |
| | 293 | 431 | -242 | 88042808 |
| High 3-Hour | 416 | 296.7 | -338.9 | 84011703 |
| | 398 | 456.8 | -219 | 85062612 |
| | 463 | 431 | -242 | 86051309 |
| | 574 | 431 | -242 | 87072509 |
| | 444 | 231 | -548 | 88011003 |
| High 1-Hour | 700 | 359 | -292 | 84112008 |
| | 785 | 376.7 | -278.9 | 85072002 |
| | 861 | 376.7 | -278.9 | 86082921 |
| | 1,096 | 296.7 | -338.9 | 87012008 |
| | 715 | 456.8 | -219 | 88091822 |

[a] Predicted on 5-year meteorological record, Jacksonville and Waycross, 1984 to 1988.

[b] All receptor coordinates are relative to the old TRS incinerator stack location.

[c] YYMMDDHH = Year, Month, Day, Hour Ending

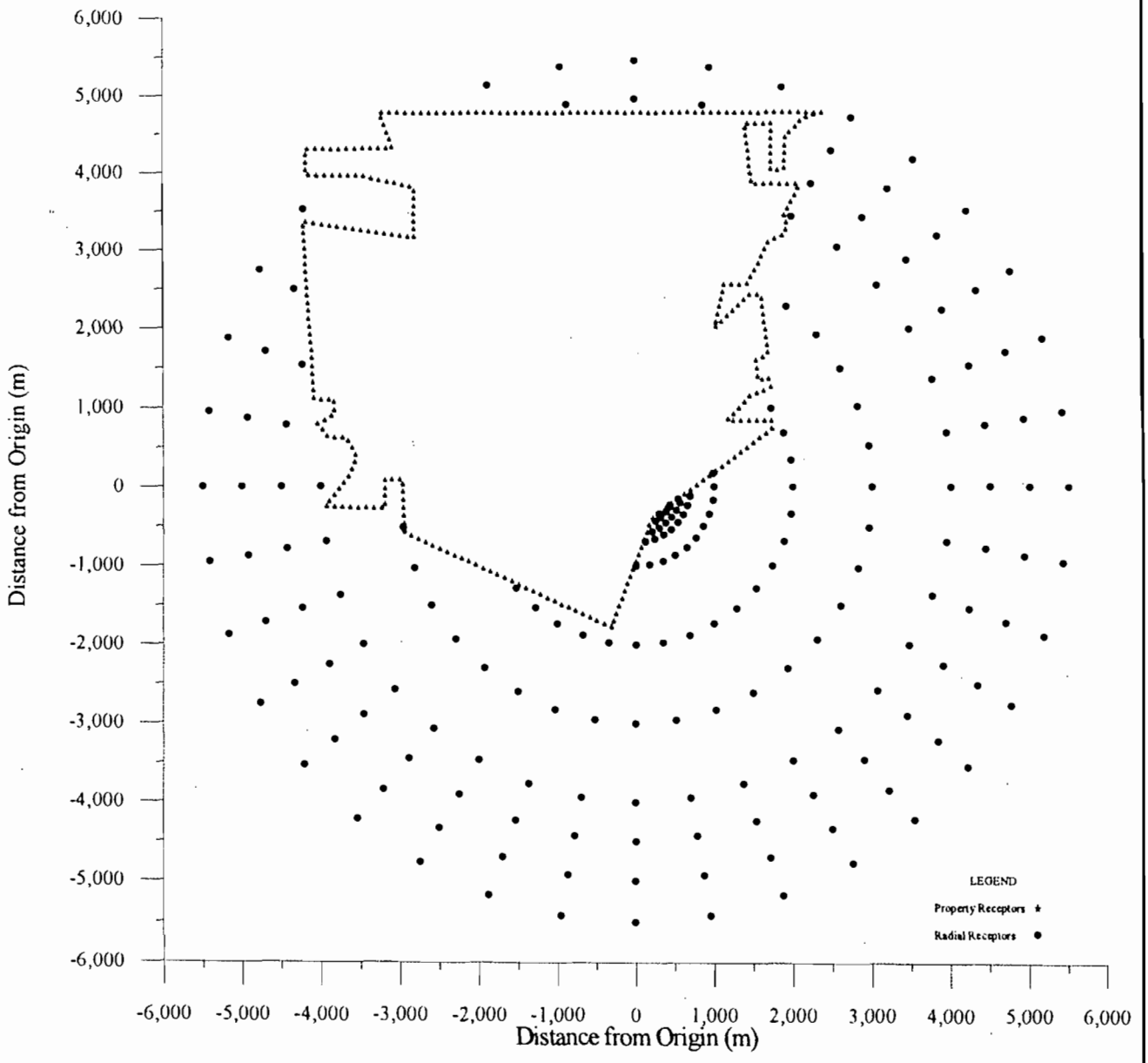



Figure 5-1. Property and Radial Receptors Used in Modeling Analysis
Georgia-Pacific, Palatka Mill

Source: Golder, 2002.

# 6.0 ADDITIONAL IMPACT ANALYSIS

## 6.1 INTRODUCTION

The additional impact analysis and the Class I area analysis address CO. The analysis addresses the potential impacts on vegetation, soils, and wildlife in the surrounding area and at the nearest two PSD Class I areas due to the increase in allowable CO emissions at G-P's Palatka Mill. Due to the distance from G-P, the Okefenokee NWA area would potentially receive much higher impacts than would the Wolf Island NWA. Therefore, only the Okefenokee NWA is addressed in this analysis.

A full CO impact analysis was performed for the initial PSD application. It was demonstrated that the predicted impacts due to the No. 3 Bleach Plant would not have any adverse affects on visibility, soil, vegetation, and wildlife at the G-P plant site and the Okefenokee NWA area. All of the predicted impacts were well below any reported levels of adverse affects. This analysis will compare the predicted impacts of the PSD application with the predicted impacts of the increased CO emissions to demonstrate that the increase in CO emissions will not have any adverse affects on the G-P plant site and the Okefenokee NWA Class I area.

## 6.2 PREDICTED IMPACTS IN VICINITY OF G-P PLANT

In the foregoing analysis, the maximum air quality impacts predicted to occur in the vicinity of the Georgia-Pacific plant and in the Class I area due to the No. 3 Bleach Plant are used. The ISCST3 model (Version 02035) was used to compute maximum concentrations. Maximum impacts in the vicinity of the G-P plant and in the Class I areas were predicted as discussed in Section 5.0. Meteorological data used in the ISCST3 consisted of the same 5-year record as used in the air quality analysis that was performed in support of the original PSD Permit Application. Emissions and stack data for the No. 3 Bleach Plant are presented in Section 5.0.

The results of the CO air quality modeling for the No. 3 Bleach Plant, predicted in the vicinity of the plant are presented in Table 6-1. Maximum predicted CO concentrations are presented for the annual, 24-hour, 8-hour, 3-hour, and 1-hour averaging times. This table presents a comparison of the updated modeling results included in the original PSD Permit Application submittal. As expected, the predicted impacts due to the increase in CO emissions are higher than those predicted in the original PSD application. Although the predicted impacts are higher, the predicted impacts are still less than the lowest reported concentration that has had detrimental affects on vegetation

($1.15 \times 10^5$ $\mu g/m^3$) (EPA, 1978a). In addition, there are no reports of CO effects on soils, so no additional impacts to soils from CO are predicted. Therefore, the increase in CO should not have any adverse affects in the vicinity of G-P plant site.

Furthermore, there will be no significant increase in permanent employment at G-P as a result of the installation of the new bleach plant. Therefore, there will be no anticipated permanent impacts on air quality caused by associated population growth.

## 6.3 PREDICTED IMPACTS TO THE OKEFENOKEE NWA CLASS I AREA

The results of the revised Class I area air quality modeling for the higher CO emissions are presented in Table 6-2. Predicted air quality concentrations of CO are presented for the Okefenokee NWA for the annual, 24-hour, 8-hour, 3-hour, and 1-hour averaging times. These concentrations reflect the total revised CO emissions due to the No. 3 Bleach Plant.

A comparison of the impacts from the original PSD application and the impacts due to the revised CO emissions is presented in Table 6-3. As expected, the impacts resulting from the revised CO emissions are higher than the impacts presented in the original PSD application. Although, the predicted impacts for the increase in CO emissions are higher, the impacts are still extremely low and are not expected to cause any adverse affects on the Class I area.

Table 6-1. Comparison of Maximum Predicted CO Concentrations from the No. 3 Bleach Plant Only in the Vicinity of the G-P Plant Site

| Averaging Time | CO Concentration ($\mu g/m^3$) | |
|---|---|---|
| | 1999 PSD Application | 2002 Proposed PSD Revision |
| Highest 1-hour | 367 | 1,096 |
| Highest 3-hour | 220 | 574 |
| Highest 8-hour | 182 | 293 |
| Highest 24-hour | 107 | 180 |
| Annual | 8 | 15 |

Table 6-2. Maximum Predicted CO Concentrations due to the No. 3 Bleach Plant at the Okefenokee NWA Class I Area

| Averaging Time | Concentration ($\mu g/m^3$) [a] | Receptor Location [b] | | Time Period (YYMMDDHH) [c] |
|---|---|---|---|---|
| | | UTM-E (m) | UTM-N (m) | |
| Annual | 0.015 | 374000 | 3383000 | 84123124 |
| | 0.013 | 391000 | 3390000 | 85123124 |
| | 0.015 | 383000 | 3382000 | 86123124 |
| | 0.013 | 378000 | 3382000 | 87123124 |
| | 0.012 | 370000 | 3383000 | 88123124 |
| High 24-Hour | 0.35 | 383000 | 3382000 | 84102224 |
| | 0.38 | 370000 | 3383000 | 85072624 |
| | 0.39 | 390000 | 3384000 | 86041424 |
| | 0.43 | 378000 | 3382000 | 87070224 |
| | 0.51 | 370000 | 3383000 | 88050324 |
| High 8-Hour | 0.97 | 374000 | 3383000 | 84080208 |
| | 1.23 | 374000 | 3383000 | 85012808 |
| | 1.16 | 390000 | 3384000 | 86041424 |
| | 1.33 | 378000 | 3382000 | 87070208 |
| | 1.14 | 370000 | 3383000 | 88050324 |
| High 3-Hour | 1.88 | 392000 | 3400000 | 84080403 |
| | 2.45 | 374000 | 3383000 | 85012809 |
| | 2.05 | 383000 | 3382000 | 86082221 |
| | 2.40 | 378000 | 3382000 | 87070206 |
| | 2.09 | 390000 | 3395000 | 88102803 |
| High 1-Hour | 5.65 | 392000 | 3400000 | 84080401 |
| | 7.35 | 374000 | 3383000 | 85012808 |
| | 6.15 | 383000 | 3382000 | 86082220 |
| | 4.79 | 383000 | 3382000 | 87070206 |
| | 5.82 | 370000 | 3383000 | 88050321 |

[a] Predicted on 5-year meteorological record, Jacksonville and Waycross, 1984 to 1988.

[b] All receptor coordinates are reported in Universal Transverse Mercator (UTM) Coordinates.

[c] YYMMDDHH = Year, Month, Day, Hour Ending

Table 6-3. Comparison of Maximum Predicted CO Concentrations from the No. 3 Bleach Plant Only at the Okefenokee NWA Area

| Averaging Time | CO Concentration ($\mu g/m^3$) | |
|---|---|---|
| | 1999 PSD Application | 2002 Proposed PSD Revision |
| Highest 1-hour | 3.9 | 7.4 |
| Highest 3-hour | 1.8 | 2.5 |
| Highest 8-hour | 0.9 | 1.3 |
| Highest 24-hour | 0.3 | 0.5 |
| Annual | 0.007 | 0.015 |

# APPENDIX A

# DERIVATION OF PROPOSED CO EMISSION FACTORS

# Appendix A
# Derivation of Proposed CO Emission Factors

## Derivation of Short-Term (hourly) Emission Estimate

| | | | | |
|---|---|---|---|---|
| Test Runs | 10/28/02 | Run 1 | 49.7 ADTBP/hour | 1.08 lbs/ADTBP |
| | | Run 2 | 49.7 ADTBP/hour | 1.28 lbs/ADTBP |
| | 10/29/02 | Run 1 | 49.8 ADTBP/hour | 1.16 lbs/ADTBP |
| | 10/31/02* | Run 1 | 50.0 ADTBP/hour | 1.45 lbs/ADTBP |
| | | Run 2 | 50.2 ADTBP/hour | 1.48 lbs/ADTBP |
| | | Run 3 | 50.1 ADTBP/hour | 1.49 lbs/ADTBP |
| | Average Emission Factor | | | 1.32 lbs/ADTBP |
| | Standard Deviation | | | 0.18 lbs/ADTBP |
| | Two Standard Deviations (95% Confidence Level) | | | 0.36 lbs/ADTBP |
| | Average + Two Standard Deviations | | | 1.68 lbs/ADTBP |

60 ADTBP/Hour (maximum throughput) x 1.68 lbs/ADTBP = 100.8 lbs/hour (proposed limit = 100 lbs/hour)

## Derivation of Long-Term (annual) Emission Estimate

From Appendix A of the original PSD permit application and based on NCASI Technical Bulletin 760:

| | | |
|---|---|---|
| CO Emissions from Hardwood Bleaching | Mill B | 0.63 lb/ADTBP |
| | Mill C | 0.84 lb/ADTBP |
| | Mill SA12 | 0.52 lb/ADTBP |
| | Mill SE2 | 0.62 lb/ADTBP |
| | Mill SH2 | 0.61 lb/ADTBP |
| | Average | 0.64 lb/ADTBP |

(1,350 ADTBP/day x 1.68 lbs/ADTBP x 0.65 (softwood percentage)) + (1,350 ADTBP/day x 0.64 lb/ADTBP x 0.35 (hardwood percentage)) x 365 days/year = 324.2 tons per year

* $ClO_2$ generator tail gas scrubber was in operation during these runs. This source always vents to the bleach plant scrubber.

# APPENDIX B

# BEST AVAILABLE CONTROL TECHNOLOGY (BACT) ANALYSIS

# APPENDIX B
# BACT ANALYSIS
# GEORGIA-PACIFIC CORPORATION
# PALATKA, FL OPERATIONS
# NO. 3 BLEACH PLANT

## INTRODUCTION

Pursuant to the Prevention of Significant Deterioration (PSD) regulations (40 CFR 52.21) and the Regulations of the Florida Department of Environmental Protection (FDEP), Division of Air Resources Management, a Best Available Control Technology (BACT) analysis is a required part of a PSD permit application for each new or modified emissions unit. The following statement is provided in the federal regulation in regard to this requirement:

> *A major modification shall apply best available control technology for each pollutant subject to regulation under the Act for which it would result in a significant net emissions increase at the source. This requirement applies to each proposed emissions unit at which a net emissions increase in the pollutant would occur as a result of a physical change or change in the method of operation of the unit. (See 40 CFR 52.21(j)(3)).*

The requirements for BACT were promulgated within the framework of the PSD program in the 1977 Amendments to the Clean Air Act [Public Law 95-95; Part C, Section 165(a)(4)]. The primary purpose of BACT is to optimize consumption of PSD air quality increments and thereby enlarge the potential for future economic growth without significantly degrading air quality (EPA, 1978; 1980). Guidelines for the evaluation of BACT can be found in EPA's Guidelines for Determining Best Available Control Technology (BACT) (EPA, 1978) and in the PSD Workshop Manual (EPA, 1990). These guidelines were drafted by the United States Environmental Protection Agency (EPA) to provide a consistent approach to BACT and to ensure that the impacts of alternative emission control systems are measured by the same set of parameters. In addition, through implementation of these guidelines, BACT in one area of the country may not be identical to BACT in another area. According to EPA (1980):

> *BACT analyses for the same types of emissions unit and the same pollutants in different locations or situations may determine that different control strategies*

*should be applied to the different sites, depending on site-specific factors. Therefore, BACT analyses must be conducted on a case-by-case basis.*

The BACT requirements are intended to ensure that the control systems incorporated in the design of proposed equipment reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the facility. BACT must, at a minimum, demonstrate compliance with New Source Performance Standards (NSPS) for a source (if applicable). An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction than the proposed control technology, is required. The cost-benefit analysis requires the documentation of the materials, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A decision on BACT is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts (EPA, 1978).

An integral part of the BACT analysis is a search of the EPA's RACT/BACT/LAER Clearing- house (RBLC).

The BACT analysis in this application follows the "top-down" approach. The following are the five basic steps of a "top-down" BACT analysis:

Step 1: Identify all control technologies
Step 2: Eliminate technically or economically infeasible options
Step 3: Rank remaining control technologies by control effectiveness
Step 4: Evaluate most effective controls and document results
Step 5: Select BACT

**PROCESS DESCRIPTION**

The No. 3 Bleach Plant was constructed to replace the No. 1 and the No. 2 Bleach Plants and to aid G-P in meeting the Maximum Achievable Control Technology (MACT) Standards promulgated for the pulp and paper industry (40 CFR Part 63, Subpart S) by converting the bleaching system to a totally elemental chlorine-free (ECF) process. The No. 3 Bleach Plant is a three-stage ECF system. The bleaching sequence design is

First Stage: Chlorine dioxide ($ClO_2$) addition

Second Stage: Caustic extraction and hydrogen peroxide addition

Final Stage: $ClO_2$ addition

This sequence is known as "$D_0(E_{OP})D_1$".

The first bleaching stage adds chlorine dioxide and sulfuric acid as necessary to adjust the pulp pH. Caustic, hydrogen peroxide, and oxygen are used in the second bleaching stage. The third stage uses $ClO_2$, with caustic or acid added as necessary to adjust the bleached pulp pH. The No. 3 Bleach Plant vent ties into the existing bleach plant scrubber system. The scrubber system uses sodium hydrogen sulfide (NaSH) and sodium hydroxide (NaOH) to control chlorine and chlorine dioxide emissions. The proposed revised CO emissions rate is 100 pounds per hour (lbs/hr), or approximately 800 parts per million (ppm) in the Bleach Plant exhaust gases. G-P also estimates that the bleach plant exhaust contains the following constituents:

Approximately 3 lbs/hr of chlorine compounds (Cl and $ClO_2$)

Approximately 20 lbs/hr of total VOC (primarily methanol), and

Approximately 2 lbs/hr of methyl mercaptan

## BACT ANALYSIS FOR CARBON MONOXIDE (CO)

### Identification of Applicable NSPS Emission Limits

There is no applicable NSPS for any pollutant for bleach plants.

### Top-Down BACT Analysis

#### Step 1: Identify All Control Technologies

As part of the BACT analysis, EPA's BACT Clearinghouse database was searched for instances of similar BACT determinations for CO emissions from bleach plants. Other than G-P's original BACT determination for the No. 3 Bleach Plant, only three other such determinations were found. A summary of these determinations is provided in Table B-1. The determinations were made for two different Weyerhaeuser facilities, located in North Carolina and Mississippi. The BACT determinations were 2.2 pounds CO per oven-dried ton (lbs/ODT) and 0.98 lb/ODT, respectively, for these two facilities. There were no add-

on control technologies associated with these BACT determinations. The Mississippi Weyerhaeuser facility's BACT determination was based on efficient operations of the bleach plant. G-P's proposed annual average CO limit is equivalent to 1.45 lbs/oven-dried ton of bleached pulp (ODTBP), which falls within the range of previous determinations.

Beyond the RBLC database, potential control technologies for the control of CO emissions from bleach plants include the following: efficient bleach plant practices, thermal incineration, and catalytic incineration. Two additional oxidation technologies are incineration (with and without a catalyst) in a combustion source and chemical scrubbing. The common technical issue for all add-on control technologies is the need to pre-treat the Bleach Plant emissions to remove chlorine compounds and methyl mercaptan. Each of these options is discussed further in the following sections.

Efficient Bleach Plant Practices: Carbon monoxide is a product of complex reactions between the $ClO_2$, formed chloroform, and lignin in the stock. The results of the studies by NCASI do not show a correlation between CO formation and percent $ClO_2$ substitution. However, there is evidence to show that, when using 100 percent $ClO_2$ substitution, CO emissions appear to increase linearly with the total percent $ClO_2$ applied on the pulp. Therefore, it would appear that when bleaching using an ECF bleaching process (*i.e.*, 100 percent $ClO_2$ substitution), CO formation may be reduced be reducing the amount of $ClO_2$ applied to the pulp. This would suggest that CO emissions from the ECF bleaching process could be "controlled" by maintaining the percentage of $ClO_2$ applied to the pulp at minimum levels that would ensure proper bleaching of the pulp. Thus, ensuring efficient use of $ClO_2$ and efficient operation of the bleaching process would minimize CO emissions.

Thermal Incineration: Thermal incineration generally consists of an auxiliary fuel-fired burner and a combustion chamber. The principle of destruction is to raise the exhaust gases to a sufficiently high temperature, for an adequate retention time, so that oxidation occurs. Regenerative thermal oxidizers (RTOs) build on the principle of thermal oxidation, but with enhanced fuel efficiency. An RTO consists of two or more heat exchangers connected by a common combustion zone. The heat exchangers use beds of ceramic beads to store and release heat recovered from the oxidation process. The Bleach Plant exhaust air stream enters the first heat exchange bed where the air stream passes directly through the ceramic media where it is preheated before entering the combustion chamber. In the combustion

chamber, a burner is used to supply any heat necessary to reach the optimum combustion temperature (usually 1,400 degrees Fahrenheit or higher) and complete the oxidation process.

The cleaned air stream next enters a second heat exchanger where it passes directly through the ceramic media and is cooled, while simultaneously heating the media before the air stream is exhausted to the atmosphere. The air flow through the heat exchange beds is reversed at regular intervals to conserve the heat of combustion within the RTO. The thermal efficiency of the unit can be as high as 95%.

Catalytic Incineration: Catalytic incinerators use a bed of catalysts that facilitate the overall combustion of the gas in a similar manner as thermal incineration. In contrast to recuperative thermal oxidizers, recuperative catalytic oxidizer (RCO) systems use a catalyst to encourage the oxidation reaction instead of depending on heat alone. Reactions in a recuperative catalytic oxidizer usually take place between 500 and 600 degrees Fahrenheit. This creates the opportunity to reduce fuel expenses and material cost (since the materials of construction will be subjected to much lower temperatures). Of the two vendors contacted, only one vendor agreed that a catalytic system might be suitable for this type of application. These types of oxidizers are just as capable of oxidizing CO in a gas stream as an RTO. However, these systems have an additional operating issue for maintaining the catalyst.

Incineration in a Boiler: External combustion sources, such as a boiler, induct ambient air into the combustion zone of a primary fuel (*e.g.,* oil or bark) to produce heat and steam. The combustion zone of a boiler will oxidize CO to carbon dioxide. Possible combustion sources at the Mill include the Power Boiler and the Combination Boiler. The Recovery Boiler and Lime Kiln at the Mill combust and convert reactants to chemicals used in the Kraft process, and cannot accept chlorine-containing streams.

Chemical Scrubbing: Chemical scrubbing to oxidize CO can be achieved by using a non-selective oxidant, such as ozone in a scrubber system. The ozone will oxidize CO, and other reduced compounds, such as methyl mercaptan. This oxidation technology has been developed for oxidation of nitrogen oxides into a particulate ($N_2O_5$) that can then be scrubbed.

G-P conducted searches of the RBLC to identify control technologies for the control of carbon monoxide emissions from bleach plants. Searches were conducted for RBLC determinations added during or after January 1990, for historical determinations added before January 1990, and for New Source Review (NSR) early notification/under review determinations. As stated previously, the search results only yielded one technology as BACT: efficient bleach plant practices.

In addition, G-P interviewed NCASI on the experience of pulp and paper mills in North America and Metso Inc., the designers of the No.3 Bleach Plant. NCASI reports that no pulp and paper bleach plant in North America controls CO emissions with add-on controls and that all ECF bleach plants apply good bleach plant practices to minimize CO emissions. Metso Inc., which has designed over 50% of the world's operating bleach plants, (including over 25 in the past 10 years) also confirmed that none of its designed units are equipped with add-on control devices for CO.

**Step 2: Eliminate Technically Infeasible Options**

The most restrictive parameter that affects the feasibility of add-on oxidation controls is the presence of chlorine compounds in the exhaust gas stream. Chlorine, chloroform, and chlorine dioxide are present in the exhaust and can contaminate add-on control devices. Chlorine compounds in the exhaust stream will also react to form into hydrochloric acid that will attack metallic components of any collection and control system. Thus, significant conditioning of the bleach plant exhaust would be needed to accommodate any add-on controls. The options of thermal/catalytic/boiler incineration may be technically feasible. However, these options have never been demonstrated in North America, nor to our knowledge, in the world.

Chemical scrubbing with ozone also has never been demonstrated for oxidation of CO. While pilot systems have been trialed for control of nitrogen oxides, the vendors of these systems do not quantify or guarantee any level of CO reduction. The oxidation process using ozone is only theoretical. Further, ozone would first oxidize the hydrocarbons and chlorine in the gas stream. The relative reaction rate of conversion of CO to $CO_2$ is also less than $3 \times 10^{-11}$ cubic centimeters per mole per second. This slow rate would be substantially reduced further by the competition of the hydrocarbons. Thus, while streams of 100% CO gas may be oxidized with a large amount of ozone, this technology is neither

technically feasible, nor demonstrated for a complex stream, such as a bleach plant exhaust. An additional technical problem for such a system is the management of any ozone that breaks through and exits the stack.

Of the control options identified, one is demonstrated (efficient bleach plant operations) and three additional options may be technically feasible. The following sections rank and address the cost effectiveness of efficient bleach plant operations, thermal/catalytic incineration, and incineration in a boiler.

**Step 3: Rank Remaining Control Technologies by Control Effectiveness**

The next step in the BACT analysis is to rank the various control options not eliminated in the previous step. Incineration by a thermal incinerator or boiler will yield a control effectiveness of approximately 95%. A catalytic incinerator may yield a control effectiveness of up to 90%. The last option, efficient bleach plant operations, is a process-oriented pollution prevention technique that does not have a specific control effectiveness.

**Step 4: Evaluate Most Effective Controls and Document Results**

This step of the BACT process determines the economic impact of the feasible control options listed in Step 3 and then selects the most appropriate technology as BACT for the Bleach Plant. The economic analysis is based on cost data supplied by the equipment suppliers and the use of EPA's Office of Air Quality Planning & Standards (OAQPS) Control Cost Manual, 6$^{th}$ Edition, January 2002 (Chapter 2-Cost Estimating Methodology). Because of the corrosive nature of chlorine and sodium compounds, a gas conditioning system is necessary to protect the incineration source. Heating, cooling, demisting, and additional wet scrubbing are incorporated into the designs to reduce chlorine and sodium loads into the incineration points. Typical values were selected from the OAQPS Manual for the various parameters used to determine the cost effectiveness for reducing pollutant emissions. Note that these cost calculations reflect the scale of the project. While large construction projects offer a savings on mobilization and labor rates, the installation of a new oxidizer or a ducting project will only attract less-competitive, higher unit cost rates. To allow for the effect, G-P used a contingency allowance of 40% of direct costs. These technologies have never been demonstrated for a bleach plant, and may warrant even a higher allowance. Because no vendor has experience with this type of installation, the cost estimates may be conservatively low. Further, in order to be even more conservative, G-P

applied a 95 to 98% level of CO destruction for the cost effectiveness (*i.e.,* $/ton) calculations.

The annualized cost effectiveness calculations for three options (thermal incineration, catalytic incineration, and incineration in a boiler) are presented in Table B-2. The cost effectiveness values for these three techniques are $12,842/ton, $8,924/ton, and $8,074/ton, respectively. Each of these options is considered economically infeasible.

**Step 5: Select BACT**

Based on the preceding analysis, efficient bleach plant operations is selected as BACT for the CO emissions from the No. 3 Bleach Plant. An emission limit of 324 tons per year is selected as the BACT level for the No. 3 Bleach Plant. This equates to an annual average CO emission rate of 1.45 lbs/ODT, which is in the range of the RBLC entries. "Efficient bleach plant operations" is consistent with all of the entries for bleach plants in the RBLC.

Table B-1. Summary of BACT Determinations for Carbon Monoxide Emissions from Bleach Plants

| Company Name | State | RBLC ID | Permit Issue Date | Throughput Per Unit | Emission Limits As provided in BACT/LAER Clearinghouse | Emission Limits Converted to lb/hr [a] | Control Technology/Comment |
|---|---|---|---|---|---|---|---|
| Georgia-Pacific Corp. | FL | FL-0183 | 6/30/1999 | 1,532 ODT/D [b] | 0.71 lb/ODT | 46 | -- |
| Weyerhaeuser Company--Plymouth Pulp and Paper Mill | NC | NC-0070 | 11/25/1998 | 800 ODT/D | 2.2 lb/ODT | 73.3 | -- |
| Weyerhaeuser Company--Plymouth Pulp and Paper Mill | NC | NC-0070 | 11/25/1998 | 1,250 ODT/D | 2.2 lb/ODT | 114.6 | -- |
| Weyerhaeuser Company | MS | MS-0029 | 9/10/1996 | 1,685 ODT/D [b] | 0.98 lb/ODT | 69.0 | Efficient Operation |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2001
ADT/D = Air dried tons per day
ODT/D = Oven dried tons per day

[a] Calculating assuming 24 hour operation per day.

[b] Converted from ADT/D to ODT/D using the conversion factor ADT/D = ODT/D x 1/0.90

Table B-2. Cost Effectiveness for Control CO Emissions From ECF Bleach Plant, Georgia Pacific, Palatka FL (revised November 2002)

| Cost Items | Cost Factors | Cost ($) 98% Thermal Ox | Cost ($) 98% RCO | Cost ($) 95% Duct to Boiler |
|---|---|---|---|---|
| DIRECT CAPITAL COSTS (DCC): | | | | |
| (1) Purchased Equipment Cost | | | | |
| (a) Oxidizer/Air Injection Equip/Services | Based on Vendor Quote | 2,500,000 | 1,163,400 | 100,000 |
| Gas conditioning equipment | Based on Vendor Quote | 2,000,000 | 2,000,000 | 2,000,000 |
| (b) New Stack (118 ft total) | Based On Cost Control Manual Ch. 10 | 159,121 | 159,121 | NA |
| (c) Ductwork and Electronic controls | Alloy20 10G 36" diameter based on GP exper. | 390,000 | 162,500 | 1,126,000 |
| (d) Structural Support | 0.1 x (1a..1c) ; use 0.2 for Duct to Boiler | 504,912 | 348,502 | 645,200 |
| (f) Exhaust Fan | G-P experience | 300,000 | 300,000 | 300,000 |
| (g) Freight (a) | 0.05 x (1a..1f) | 292,702 | 206,676 | 208,560 |
| (h) Sales Tax (Florida) | 0.06 x (1a..1g) | 368,804 | 260,412 | 262,786 |
| (i) Instrumentation | 0.1 x (1a..1f) | included | included | 417,120 |
| (j) Subtotal | (1a..1i) | 6,515,539 | 4,600,611 | 5,059,666 |
| (2) Direct Installation | 0.40 x (1j) | 2,606,216 | 1,840,244 | 2,023,866 |
| Total DCC: | (1i) + (2) | 9,121,754 | 6,440,856 | 7,083,532 |
| INDIRECT CAPITAL COSTS (ICC): | | | | |
| (3) Indirect Installation Costs | | | | |
| (a) Engineering | (0.12) x (DCC) | 912,175 | 644,086 | 708,353 |
| (b) Construction & Field Expenses | (0.05) x (DCC) | 456,088 | 322,043 | 354,177 |
| (c) Construction Contractor Fee | (0.10) x (DCC) | 912,175 | 644,086 | 708,353 |
| (d) Contingencies (b) | (0.40) x (DCC) | 3,648,702 | 2,576,342 | 2,833,413 |
| (4) Other Indirect Costs | | | | |
| (a) Startup | (0.05) x (DCC) | 456,088 | included | 354,177 |
| (a) Testing | (0.01) x (DCC) | 91,218 | 64,409 | 70,835 |
| (b) Working Capital | 30-day DOC | 54,781 | 42,425 | 1,539 |
| Total ICC: | (3) + (4) | 6,531,226 | 4,293,390 | 5,030,847 |
| TOTAL CAPITAL INVESTMENT (TCI): | DCC + ICC | 15,652,981 | 10,734,246 | 12,114,379 |
| DIRECT OPERATING COSTS (DOC): | | | | |
| (1) Operating Labor | | | | |
| Operator | $22/hr; 3,260 hr/yr | 71,720 | 71,720 | 3,212 |
| Supervisor | 15% of operator cost | 10,758 | 10,758 | 482 |
| (2) Maintenance | | | | |
| Labor (includes inspection of boiler) | 2 x Operating Labor | 164,956 | 82,478 | 7,388 |
| Materials | Equivalent to Maintenance Labor | 164,956 | 82,478 | 7,388 |
| (3) Utilities | | | | |
| (a) Electricity | $0.075/kWh;; 8,760 hr/yr 26.7 kwh RTO, 94 kwh RCO | 17,542 | 61,758 | NA |
| (b) Natural Gas | 5 MMBtu/hr RTO;2.8 MMBtu/hr RCO;$4.736/MMBtu | 207,437 | 116,579 | NA |
| (4) Chemicals and Materials | | | | |
| Catalyst Replacement | Once per 3 yrs @ $250,000 | NA | 83,333 | NA |
| Ceramic Bed Replacement | Once per 5 yrs @ $100,000 | 20,000 | NA | NA |
| Total DOC: | (1) + (2) + (3) + (4) | 657,369 | 509,105 | 18,469 |
| INDIRECT OPERATING COSTS (IOC): | | | | |
| (7) Overhead | 60% of oper. labor & maintenance | 247,434 | 148,460 | 11,081 |
| (8) Property Taxes | 1% of total capital investment | 156,530 | 107,342 | 121,144 |
| (9) Insurance | 1% of total capital investment | 156,530 | 107,342 | 121,144 |
| (10) Administration | 2% of total capital investment | 313,060 | 214,685 | 242,288 |
| Total IOC: | (7) + (8) + (9) + (10) | 873,553 | 577,830 | 495,657 |
| CAPITAL RECOVERY COSTS (CRC): | CRF of 0.1627 times TCI (10 yrs @ 10%) | 2,546,740 | 1,746,462 | 1,971,009 |
| ANNUALIZED COSTS (AC): | DOC + IOC + CRF | 4,077,662 | 2,833,397 | 2,485,135 |
| UNCONTROLLED CO EMISSIONS (TPY) | | 324 | 324 | 324 |
| TOTAL CO REMOVED: | | 318 | 318 | 308 |
| COST EFFECTIVENESS: | $ per ton of CO Removed | 12,842 | 8,924 | 8,074 |

Vendor quote basis: Thermal oxidizer - G-P experience
RCO- Pro-Environmental, Inc.

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Mr. Theodore D. Kennedy
Vice President
Georgia-Pacific Corporation -
Palatka Operations
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1. Article Addressed to:

Mr. Theodore D. Kennedy
Vice President, Operations
Georgia-Pacific Corporation
Post Office Box 919
Palatka, FL 32178-0919

***COMPLETE THIS SECTION ON DELIVERY***

A. Received by *(Please Print Clearly)* John Alexander B. Date of Delivery 4-15-03

C. Signature
X John Alexander ☐ Agent ☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. Article Number *(Copy from service label)*
7099 3400 0000 1449 5175

PS Form 3811, July 1999 Domestic Return Receipt 102595-00-M-0952

7099 3400 0000 1449 5175

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| Restricted Delivery Fee (Endorsement Required) | |
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*Name (Please Print Clearly) (to be completed by mailer)*
Theodore D. Kennedy
*Street, Apt. No.; or PO Box No.*
PO Box 919
*City, State, ZIP+4*
Palatka, FL 32178-0919

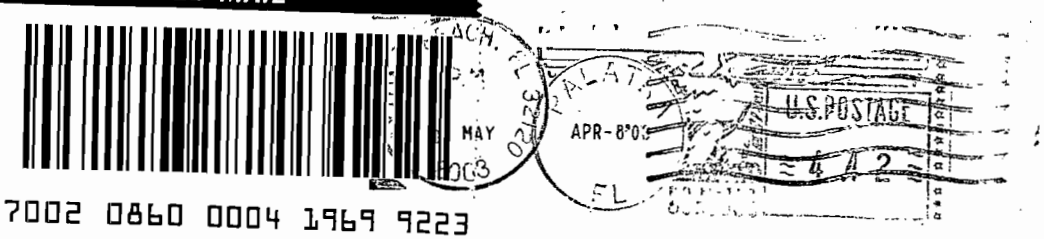
PS Form 3800, July 1999 See Reverse for Instructions

Georgia-Pacific

*Consumer Products Division*

P.O. Box 919
Palatka, FL 32178-0919

CERTIFIED MAIL




7002 0860 0004 1969 9223

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Christopher L. Kirts, P.E.
State of Florida
Department of Environmental Protection
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590

32256+7590

STATE OF FLORIDA

County of Putnam

The undersigned personally appeared before me, a Notary Public for the State of Florida, and deposes that the Palatka Daily News is a daily newspaper of general circulation, printed in the English language and published in the City of Palatka in said County and State; and that the attached order, notice, publication and/or advertisement:

PUBLIC NOTICE OF INTENT TO IS

Was published in said newspaper 1 time(s) with said being made on the following dates:

05/06/2003

The Palatka Daily News has been continuously published as a daily newspaper, and has been entered as second class matter at the post office at the City of Palatka, Putnam County, Florida, each for a period of more than one year next preceding the date of the first publication of the above described order, notice and/or advertisement.

Jessica Heaton

Sworn to and subscribed to before me this 6th day of May, 2003 by Jessica Heaton, administrative Assistant, of the Palatka Daily News, a Florida corporation, on behalf of the corporation.

Mary Kaye Wells

Mary Kaye Wells, Notary Public
My commission expires July 22, 2003

MARY KAYE WELLS
MY COMMISSION # CC 857333
EXPIRES: July 22, 2003
Bonded Thru Notary Public Underwriters

Notary Seal
Seal of Office:

____/____ Personally known to me, or
_____ Produced identification:
_____ Did take an oath

**PUBLIC NOTICE**

**PUBLIC NOTICE OF INTE
TO ISSUE PSD PERMIT MOD
FICATION**

**STATE OF FLORIDA
DEPARTMENT OF ENVIRO
MENTAL PROTECTION**

**DEP File No. 1070005-01
AC(PSD-FL-264A)
Putnam County, Florida**

**The Department of Enviro
mental Protection (Depa
ment) gives notice of its i
tent to issue a Prevention
Significant Deteriorati
(PSD) permit modification
Georgia-Pacific Corporatio
for the No. 3 Bleach Plant l
cated in Putnam County, Flo
ida. A construction perm
was issued to Georgia-Pacif
in June 1999 to replace tw
bleach plants with a new el
mental chlorine-free bleac
plant. The modification will
low increase of the Carbo
Monoxide emission rate a
reduce the daily maximu
production rate for the No.
Bleach Plant. A Best Avail
ble Control Technolo
(BACT) determination was
quired for carbon monoxi
(CO) pursuant to Rule 6
212.400, F.A.C.**

**The applicant's name and a
dress are Georgia-Pacif
Corporation, Post Office B
919, Palatka, Florida 3217
0919. The Palatka Mill is l
cated at North of CR 216 a
West of US 17, Palatka, Pu
nam County, Florida.**

**The Department review
BACT alternatives and cos
presented by Georgia-Pacif
CO including regenerati
thermal oxidation (RTO) a
incineration in an existi
boiler. The proposed (dra
BACT determination is th
emissions from the ne
bleach plant will be limited
100 pounds per hour by ef
cient bleaching operations.**

**The net emissions increas
due to the original proje
and its modification are 3
tons per year of CO. An a
quality impact analysis wa
conducted for carbon mono
ide. Emissions from the faci
ty will not significantly co
tribute to or cause a violati
of any state or federal amb
ent air quality standards.**

**The Department will issue t
Final PSD Permit Modificati
in accordance with the cond
tions of the Draft PSD Perm
Modification unless a
sponse received in accor
ance with the following pr
cedures results in a differe
decision or significa
change of terms or cond
tions. The permitting autho
ty has determined that a PS
Permit Modification is
quired.**

**The Department will acce
written comments and**

quests for a public meeting concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of "PUBLIC NOTICE OF INTENT TO ISSUE PSD PERMIT MODIFICATION." Written comments should be provided to the Department's Bureau of Air regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of general Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action; (f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action; and (g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday though Friday, except legal holidays, at:

Department of Environmental Protection
Bureau of Air Regulation
111 South Magnolia Drive, Suite 4
Tallahassee, Florida 32301
Telephone: 850/488-0114
Fax: 850/922-6979

Department of Environmental Protection
Northeast District Office
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256-7590
Telephone: 904/807-3233
Fax: 904/448-4363

The complete project file includes the application, technical evaluations, Draft Permit, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the Administrator, New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114, for additional information.

05/06/03

DEP ROUTING AND TRANSMITTAL SLIP

TO: (NAME, OFFICE, LOCATION)

1. Syed Arif - DARM
2. MS # 5500
3.
4.
5.

PLEASE PREPARE REPLY FOR:

____ SECRETARY'S SIGNATURE

____ DIV/DIST DIR SIGNATURE

____ MY SIGNATURE

____ YOUR SIGNATURE

____ DUE DATE _____

ACTION/DISPOSITION

____ DISCUSS WITH ME

____ COMMENTS/ADVISE

____ REVIEW AND RETURN

____ SET UP MEETING

____ FOR YOUR INFORMATION

____ HANDLE APPROPRIATELY

____ INITIAL AND FORWARD

____ SHARE WITH STAFF

X ____ FOR YOUR FILES

COMMENTS:

Proof for GP's No. 3 Black Plant

R

RECEIVED

MAY 14 2003

BUREAU OF AIR REGULATION

FROM: Rita Smith DATE: 5-9-03 PHONE: SC 803-3237

DEP 15-026 (12/93)

**SENDER: *COMPLETE THIS SECTION***

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Mr. Theodore D. Kennedy
Vice President, Operations
Georgia-Pacific Corporation
Post Office Box 919
Palatka, FL 32178-0919

***COMPLETE THIS SECTION ON DELIVERY***

A. Received by *(Please Print Clearly)*: John Alexander — B. Date of Delivery: 6-26-03

C. Signature: X John Alexander — ☐ Agent ☐ Addressee

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? *(Extra Fee)* ☐ Yes

2. 7001 0320 0001 3692 5672

PS Form 3811, July 1999 — Domestic Return Receipt — 102595-00-M-0952

**U.S. Postal Service**
**CERTIFIED MAIL RECEIPT**
***(Domestic Mail Only; No Insurance Coverage Provided)***

OFFICIAL USE

| | |
|---|---|
| Postage | $ |
| Certified Fee | |
| Return Receipt Fee (Endorsement Required) | |
| Restricted Delivery Fee (Endorsement Required) | |
| **Total Postage & Fees** | $ |

Postmark Here

Sent To: Theodore D. Kennedy
Street, Apt. No.; or PO Box No.: PO Box 919
City, State, ZIP+4: Palatka, FL 32178-0919

7001 0320 0001 3692 5672

PS Form 3800, January 2001 — See Reverse for Instructions

Table 2-2. Revised Maximum CO Emissions for No. 3 Bleach Plant, Georgia-Pacific

| Wood Type | Emission Factor [a] (lb/ADTBP) | Hourly Emissions | | Annual Emissions [c] | |
|---|---|---|---|---|---|
| | | Activity Factor [b] (ADTBP/hr) | Emission Rate (lb/hr) | Activity Factor (ADTBP/yr) | Emission Rate (TPY) |
| Hardwood: Short term | 0.64 | 0.0 | 0.0 | -- | -- |
| Softwood: Short term | 1.42 | 70.92 | 100 | -- | -- |
| Annual Average | 1.42 | -- | -- | 492,750 | 349 |

[a] Refer to Appendix A for derivation of emission factors.

[b] Based on a daily maximum of 1,702 ADTBP and 24 hr/day.

[c] Based on a monthly maximum of 1,350 ADTBP, 24 hr/day and 8,760 hr/yr. Based on a 100 percent softwood scenario.

## ATTACHMENT GP-EU1-J9

This application is being submitted to revise the PSD Permit (Permit No. 1070005-010-AC) to increase the CO emission rate for the No. 3 Bleach Plant at Georgia-Pacific (G-P) Palatka.

Specific Condition 3 of Permit No. 1070005-010-AC requires that an Operation and Maintenance (O&M) Plan for the No. 3 Bleach Plant be submitted which sets forth the practices which are employed to result in efficient bleaching operations. The required O & M Plan is contained in Attachment GP-EU1-J7.

As per Specific Condition 12 of Permit No. 1070005-010-AC, G-P operates continuous monitors for pH of the gas scrubber liquid, the gas scrubber liquid recirculation flow rate, and gas scrubber vent inlet flow rate. The monitoring of the fan loading is an alternative to the continuous monitoring of the gas scrubber vent inlet flow rate. The EPA letter of approval for use of alternative monitoring is attached. Monitoring fan loading insures that gas is flowing to the scrubber. Monitoring pH insures heat gas scrubber liquid is the appropriate strength to control emissions from the vent gas. Monitoring the scrubber recirculation flow ensures that scrubber liquid is actually flowing into the scrubber.

As required, G-P has established parametric monitoring values based on the compliance test conducted on the No. 3 Bleach Plant. These values are presented as follows:

- Fan loading - 85 percent,
- pH - 9.5, and
- Scrubber recirculation flow rate - 1,500 gpm.

G-P proposes to collect this data on a 3-hour average basis. G-P requests that any condition placed on the Title V permit to require minimum or maximum scrubber operating parameters state the following: "Such parameters remain valid until a compliance test demonstrates that compliance can be achieved at lower or higher values. Upon such demonstration, the lower or higher values become the new limitations for the gas scrubber."