Buckeye Florida
Route 3, Box 260 • Perry, Florida 32347
Telephone: (904) 584-0121

August 3, 1994

Mr. Robert J. Leetch, P.E.
District Air Program
Florida Department of
Environmental Protection
Suite B-200
7825 Baymeadows Way
Jacksonville, FL 32256-7577

RE: Buckeye Florida, Limited Partnership
Project: #1 Bleach Plant
Application No: 253917
Additional Requested Information

Dear Mr. Leetch:

We are submitting four copies of the information you requested in your letter dated July 22, 1994. The information includes the following amended pages from the referenced application package: Page 5 of 12 of the "Application"; Table III-C; Table III-H; Figure 2; Figure 3; Attachment 1; Confidential Attachment 3; Appendix Pages 1,2,3,4, and 8 through 22, and new page 4a. In addition, pages 8 through 22 have been reordered according to the Vent ID numbers.

We believe that we have amended these pages to include all of the information you requested. We would like to reiterate that the existing and proposed process flow diagrams of Attachment 3 are regarded as highly "Confidential" information. If you need additional information or have any questions, please contact Bruce Harding at 904-584-1106.

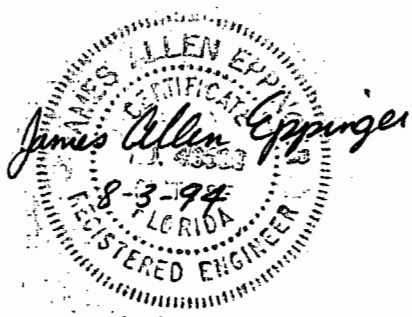
Sincerely,

BUCKEYE FLORIDA, LIMITED PARTNERSHIP

for J A Floyd Plant Operations Manager
C.S. Aiken
Plant Manager

I certify that the attached information is consistent with the proposed project and application No. 253917

James Allen Eppinger, P.E.
Florida Registration No. 46588



Department of Environmental Protection

Lawton Chiles
Governor

Northeast District
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590

Virginia B. Wetherell
Secretary

CERTIFIED - RETURN RECEIPT July 22, 1994

Mr. Bruce Harding, Environmental Control Manager
Buckeye Florida, Limited Partnership
Route 3, Box 260
Perry, Florida 32347

Dear Mr. Harding:

Taylor County - AP
Buckeye Florida, Limited Partnership

ID #	Project	Application No.
----	#1 Bleach Plant	253917

In accordance with Section 17-4.055(1), Florida Administrative Code (FAC), and Chapter 120, Florida Statutes, (F.S.), the Department has reviewed the subject application and has determined that the following information is needed before the application can be further processed:

1. Figure 3 reference numbers must be on the existing & proposed flow diagrams and in Attachment 1.
2. On the flow diagrams, where does/will the vents listed below exhaust to:

	existing	proposed
1. #1 mill vent fans	8	11
2. washer vent fans	2	1

3. On the flow diagrams, the existing & proposed process units ID's are not the same when the units appear to be the same units. The units ID's must be coordinated throughout the application.
4. In the Appendix on page 4, explain 2)a) and use exlicit references in 2)b).
5. Figure 2 must be legible.

The subject application can not be processed until the above requested information is provided or corrected and will be held in abeyance until 08-15-94.

All information requested must be submitted by the applicant or authorized representative and certified by the professional engineer named in the application. Four copies of the requested information must be submitted.

If you have any questions concerning this matter, please contact Johnny Cole at (904) 448-4310, Ext. 236.

Sincerely,

Robert J. Leetch, P.E.
District Air Program

RJL:JC

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
chilled water scrubber	ClO2 , Cl2	95%, 70%	NA	NCASI TB 616
S-2 on flow diagram				P.46 Table 12
white liquor scrubber	ClO2, Cl2	60%, 60%	NA	Vendor Est.
S-1 on flow diagram				

E. Fuels

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

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

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

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average _____ Maximum _____

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

Effluent liquids are routed to the NPDES primary and secondary treatment system

TABLE III-C

VENT IDENTIFICATION & POTENTIAL EMISSIONS

		POTENTIAL EMISSIONS[1] POUNDS/HOUR			
VENT[2]	NAME	Chlorine	Chlorine Dioxide	Chloroform	Methanol
1-1	#5 Vacuum Pump Vent	0.007	0.005	0.149	0.006
1-2	Hypo Mix Tank[3] Vent	0.811	0.003	0.009	0.009
1-3	#1 BP Exhaust Vent	0.349	0.397	5.63	0.158
1-4	Washer #8 Vent	0.033	0.083	0.005	0.021
1-5	#1 BP Scrubber[4] Vent	0.271	3.52	1.00	0.833
1-6	Center Vacuum Pump Vent	0.033	0.021	0.623	0.476

Footnotes:

1 - Based on Weston Emissions Data of May 1993. See Appendix for summary of the test data and the calculations.

2 - Refer to Figure 3

3 - Sodium Hypochlorite is made from chlorine and caustic, no chlorine dioxide is expected. No data on Methanol, basis #1 BP Scrubber at 1/100th of the volumetric flow.

4 - Scrubber to be modified by changing the scrubber medium to white liquor and adding the vent gases from Washer 11 (VENT 1-8) and Tower 10 Scrubber (VENT 1-7).

TABLE III-H

EMISSION STACK GEOMETRY AND FLOW CHARACTERISTICS[1]

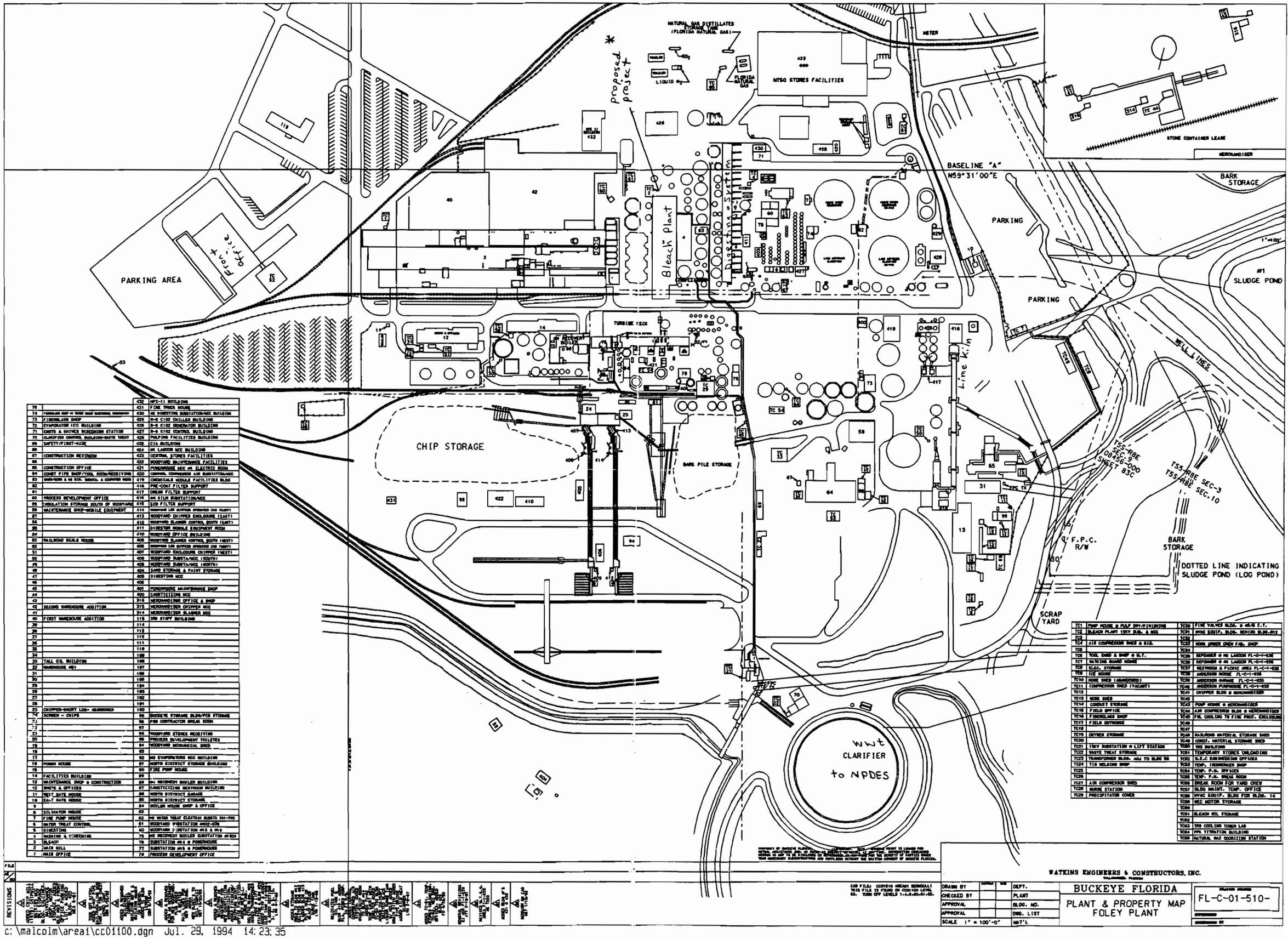
NAME	HEIGHT Feet	DIAMETER Inches	VELOCITY Feet/Sec	FLOW ACFM	FLOW DSCFM	MOISTURE %	TEMPERATURE Deg F[2]
#5 Vacuum Pump VENT 1-1	100.2	7.75	39.2	800	711	6.1	98
Hypo Mix Tank VENT 1-2	102.3	19.50	0.60	80	70	7.4	105
#1 BP Exhaust VENT 1-3	110.3	44.00	32.4	20,500	19,000	4.4	88
Washer #8 VENT 1-4	103.2	13.75	44.0	2,720	2,560	4.2	86
#1 BP Scrubber[3] VENT 1-5	105.9	41.50	22.2	12,500	10,600	9.2	112
Center Vacuum Pump VENT 1-6	103.1	12.50	77.0	3,940	3,330	9.2	112

Footnotes:

1 - From Weston test data, May 1993

2 - Degrees Fahrenheit, note these are so close to ambient temperature that they may be impacted significantly by ambient temperature.

3 - Modifications to scrubber not expected to change flow characteristics significantly.



c:\malcolm\area1\cc01100.dgn Jul. 29, 1994 14:23:35

Figure 7

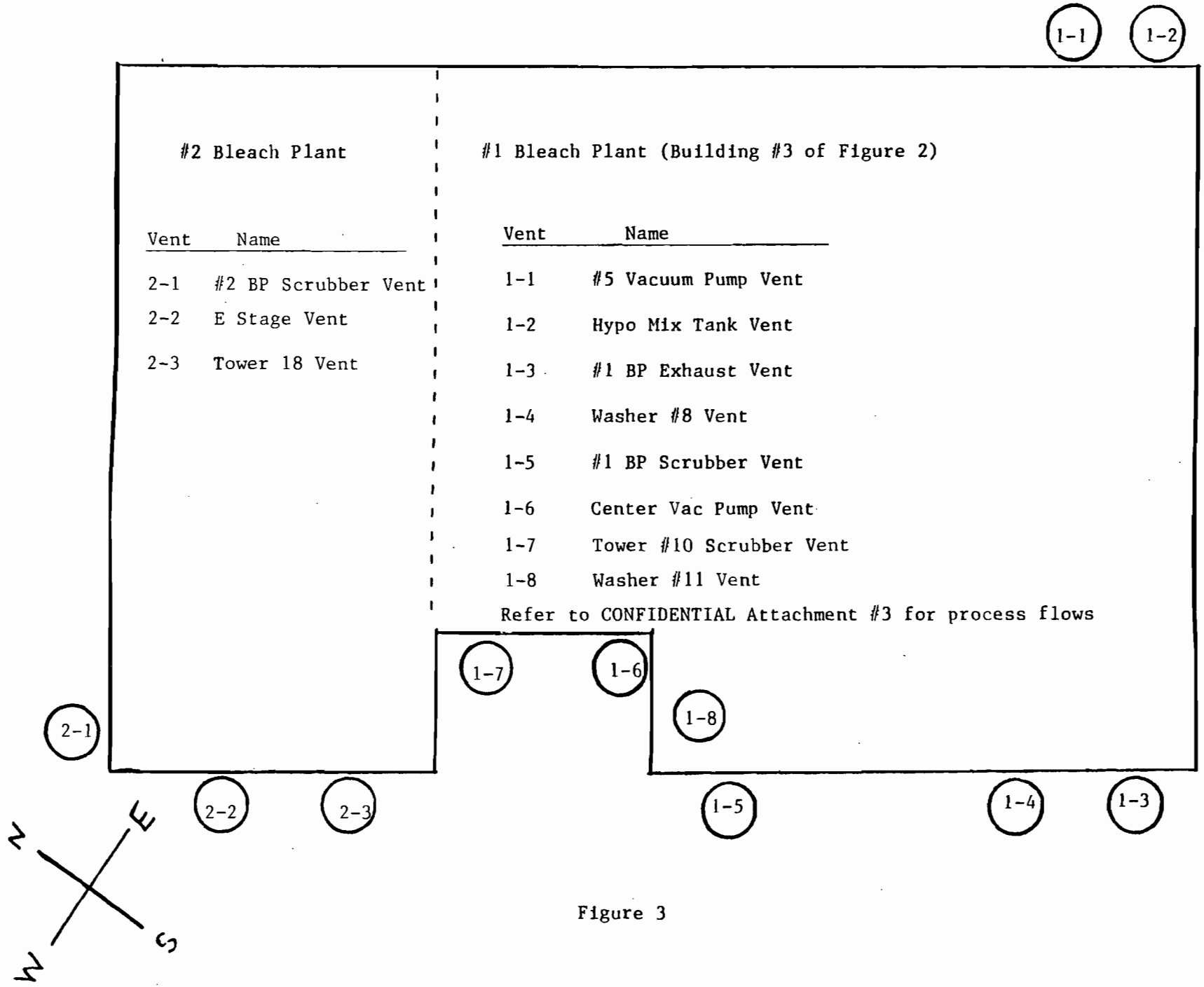

1-1
1-2
#2 Bleach Plant
#1 Bleach Plant (Building #3 of Figure 2)
Vent Name
2-1 #2 BP Scrubber Vent
2-2 E Stage Vent
2-3 Tower 18 Vent
Vent Name
1-1 #5 Vacuum Pump Vent
1-2 Hypo Mix Tank Vent
1-3 #1 BP Exhaust Vent
1-4 Washer #8 Vent
1-5 #1 BP Scrubber Vent
1-6 Center Vac Pump Vent
1-7 Tower #10 Scrubber Vent
1-8 Washer #11 Vent
Refer to CONFIDENTIAL Attachment #3 for process flows
1-7
1-6
1-8
2-1
2-2
2-3
1-5
1-4
1-3
N
E
W
S

Figure 3

ATTACHMENT 1

PROJECT DESCRIPTION

Background:

Buckeye Florida, Limited Partnership (Buckeye) operates a kraft pulp plant in Taylor County Florida. The plant has two separate mills that produce bleached market pulps and dissolving cellulose pulps. In the current #1 mill process, primarily chlorine is used in the first bleaching stage. Proposed regulations would require Buckeye to use a high level (up to 100%) of chlorine dioxide substitution in this chlorine stage, peroxide enhanced extraction, and hypochlorite stage modifications in the #1 mill process.

In light of these proposed regulations, Buckeye has been conducting laboratory scale experiments during the last year in order to determine the feasibility of operating the #1 mill process with these changes. The point has been reached where the laboratory scale findings must be tested in the production process. This project will allow Buckeye to run experimental process trials using these modifications in the #1 Bleach Plant. The normal operating mode of the #1 Bleach Plant will continue to be the current process. The production capacity of the #1 Bleach Plant will not increase as a result of this project.

Project Scope:

The project involves the modification of the first bleaching stage of the #1 Bleach Plant to allow for the substitution of up to 100% chlorine dioxide for chlorine. This will be accomplished by adding a retention tube to the first bleaching tower, a high shear mixer, and ancillary equipment. The resulting chlorine dioxide and chlorine emissions will be controlled by modifying the existing scrubber (S-1). In addition to these modifications, piping and ancillary equipment will be added to allow the use of hydrogen peroxide in the extraction stages.

Vent/Scrubber Modifications:

Reference "Proposed" and "Existing" #1 Bleach Plant Process Flow Diagrams in "CONFIDENTIAL" Attachment 3.

There are currently two existing scrubbers on the #1 Bleach Plant. Scrubber S-2 is a chilled water scrubber that controls the chlorine dioxide emissions from Tower 10 and will not undergo any modifications under the scope of this project. The scrubbing medium from S-2 is added back into Tower 10 in order to use the absorbed chlorine dioxide in the process. Air emissions from this scrubber are currently discharged to the atmosphere through Vent 1-7.

Upon completion of the project, Vent 1-7 will be replaced by piping that will route the air emissions from S-2 to the inlet of scrubber S-1. Air emissions from Washer 11, which immediately follows Tower 10, are presently discharged directly to the atmosphere through Vent 1-8. This vent will also be replaced by piping that will route the air emissions from Washer 11 to the inlet of scrubber S-1.

PROJECT DESCRIPTION:

Vent/Scrubber Modifications (continued):

Scrubber S-1 currently controls the chlorine emissions from Tower 1 and Washer 2, the washer that immediately follows. Scrubber S-1 will be modified by changing the scrubbing medium makeup from caustic to process white liquor. A Caustic or sodium hydroxide solution is a very effective scrubbing medium for removing chlorine but is less effective for chlorine dioxide. White liquor is a solution of sodium hydroxide and sodium sulfide and makes a very effective scrubbing medium for both chlorine dioxide and chlorine. The overflow from this scrubber will be routed the acid sewer. Air emissions from this scrubber will continue to discharge to the atmosphere through Vent 1-5.

The air emissions from Tower 3, Tower 2, and Washer 1, the washer immediately preceding Tower 2, are currently routed to this scrubber primarily to provide air balance for the scrubber fan. These sources, which are not chlorine or chlorine dioxide sources, will be re-routed to Vent 1-3. This will allow the chlorine dioxide emissions from existing Vent 1-7 and Vent 1-8 to be piped to scrubber S-1 while maintaining the air balance for the scrubber fan.

Emissions Impact:

The project is expected to reduce the cumulative total of the emissions of chlorine, chlorine dioxide, chloroform, and methanol from the #1 Bleach Plant Vents 1-1, 1-2, 1-3, 1-4, 1-5, and 1-6 relative to current levels. When the #1 Bleach Plant is operating in the normal mode, the total emissions will be reduced by the additional control of the chlorine dioxide emissions from existing Vents 1-7 and 1-8 by modified scrubber S-1. During the experimental process trials, chlorine and chloroform emissions are expected to decrease from Vents 1-1, 1-2, 1-3, 1-4, 1-5, and 1-6. Chlorine dioxide emissions have the potential to increase from Vent 1-5 due to the increased use in the process and the additional chlorine dioxide load to scrubber S-1 from existing Vents 1-7 and 1-8. However, the decrease in chlorine and chloroform emissions is greater than the potential increase in chlorine dioxide emissions and the cumulative total of all emissions is expected to be lower than the current total. Emissions of Methanol are not expected to change as a result of this project. See Appendix Page 3 for the emissions totals.

WESTON TEST DATA MAY 1993

SUMMARY OF EMISSIONS

MEAN EMISSIONS RATES POUNDS/HOUR

VENT[1]	NAME	Chlorine	Chlorine Dioxide	Chloroform	Methanol
1-1	#5 Vacuum Pump Vent	<0.006	<0.004	0.123	<0.005
1-2	Hypo Mix Tank[2] Vent	<0.668	<0.002	0.007	0.007
1-3	#1 BP Exhaust Vent	<0.287	<0.327	4.63	<0.130
1-4	Washer #8 Vent	<0.027	<0.068	0.004	<0.017
1-5	#1 BP Scrubber[3] Vent	<0.223	<2.90	0.826	0.686
1-6	Center Vacuum Pump Vent	<0.027	<0.017	0.513	0.392

Average unbleached pulp input rate to #1 Bleach Plant during the testing was 48,000 lbs/hr.
Maximum unbleached pulp input rate to #1 Bleach Plant 58,333 lbs/hr.

Footnotes:

< - indicates that some detection limits (non-detect) were used in calculating the mean

1 - Refer to Figure 3

2 - Sodium Hypochlorite is made from chlorine and caustic, no chlorine dioxide is expected. No data on Methanol, basis #1 BP Scrubber at 1/100th of the volumetric flow.

3 - Scrubber to be modified by changing the scrubber medium to white liquor and adding the vent gases from Washer 11 (VENT 1-8) and Tower 10 Scrubber (VENT 1-7). The emissions calculations for this source and all assumptions are on a separate page.

POTENTIAL EMISSIONS[1]

MAXIMUM EMISSIONS RATES POUNDS/HOUR

VENT[2]	NAME	Chlorine	Chlorine Dioxide	Chloroform	Methanol
1-1	#5 Vacuum Pump Vent	<0.007	<0.005	0.149	<0.006
1-2	Hypo Mix Tank[3] Vent	<0.811	<0.003	0.009	0.009
1-3	#1 BP Exhaust Vent	<0.349	<0.397	5.63	<0.158
1-4	Washer #8 Vent	<0.033	<0.083	0.005	<0.021
1-5	#1 BP Scrubber[4] Vent	<0.271	<3.52	1.00	0.833
1-6	Center Vacuum Pump Vent	<0.033	<0.021	0.623	0.476

Footnotes:

< - indicates that some detection limits (non-detect) were used in calculating the Mean.

1 - Basis: Mean emissions rate from Weston Data projected to the maximum pulp input rate; Potential Emissions Rate = Mean Emissions Rate x (58,333 lbs/hr)/(48,000 lbs/hr)

2 - Refer to Figure 3

3 - Sodium Hypochlorite is made from chlorine and caustic, no chlorine dioxide is expected. No data on Methanol, basis #1 BP Scrubber at 1/100th of the volumetric flow.

4 - Scrubber to be modified by changing the scrubber medium to white liquor and adding the vent gases from Washer 11 (VENT 1-8) and Tower 10 Scrubber (VENT 1-7). The emissions calculations for this source and all assumptions are on a separate page.

PROJECTED[1] EMISSION LEVELS FROM #1 BLEACH PLANT

EMISSION POINT	CURRENT	NON-OP[2] FUTURE	OPERAT.[3] FUTURE	COMMENT
CHLORINE	lbs/hour	lbs/hour	lbs/hour	
Vent 1-1	<0.006	<0.006	<0.006	
Vent 1-2	<0.668	<0.668	<0.668	
Vent 1-3	<0.287	<0.287	<0.287	
Vent 1-4	<0.027	<0.027	<0.027	
Vent 1-5	<0.091	<0.223	<0.223	60% reduction in scr.
Vent 1-6	<0.027	<0.027	<0.027	
Vent 1-7	0.126	**	**	
Vent 1-8	<0.011	**	**	
Total	<1.243	<1.238	<1.238	
CHLORINE DIOXIDE				
Vent 1-1	<0.004	<0.004	<0.004	
Vent 1-2	<0.002	<0.002	<0.002	
Vent 1-3	<0.327	<0.327	<0.327	
Vent 1-4	<0.068	<0.068	<0.068	
Vent 1-5	<0.058	<0.265	<2.896	60% reduction in scr.
Vent 1-6	<0.017	<0.017	<0.017	
Vent 1-7	0.336	**	**	40% increase in vol.
Vent 1-8	<0.049	**	**	
Total	<0.861	<0.683	<3.314	
CHLOROFORM				
Vent 1-1	0.123	0.123	0.012	
Vent 1-2	0.007	0.007	0.007	from process changes
Vent 1-3	4.63	4.63	0.463	90% reduction
Vent 1-4	0.004	0.004	0.004	
Vent 1-5	0.808	0.811	0.019	
Vent 1-6	0.513	0.513	0.051	
Vent 1-7	<0.001	**	**	
Vent 1-8	0.002	**	**	
Total	<6.088	<6.088	<0.556	
METHANOL	No Change expected			
Vent 1-1	<0.005	<0.005	<0.005	
Vent 1-2	0.007	0.007	0.007	
Vent 1-3	<0.130	<0.130	<0.130	
Vent 1-4	<0.017	<0.017	<0.017	
Vent 1-5	<0.676	<0.686	<0.686	
Vent 1-6	0.392	0.392	0.392	
Vent 1-7	<0.001	**	**	
Vent 1-8	<0.009	**	**	
Total	<1.237	<1.237	<1.237	
TOTAL (ALL FOUR)	lbs/hour	lbs/hour	lbs/hour	
	9.43	9.25	6.35	

Footnotes:
1 - Maximum potential emissions = projected emissions x 1.215
2 - Normal Operation after modification (5% ClO2 substitution)
3 - 100% ClO2 Substitution after modification
** routed to scrubber S-1 after modification

Emissions Calculation for Modified Scrubber S-1 (VENT 1-5)

1) Influent load made up from the following sources

   a) Vent 1-7 (Scrubber S-2 Effluent)
   b) Vent 1-8 (Washer 11 Effluent)
   c) Tower 1 Effluent

2) Assumptions using Weston data of May 1993 as basis

   a) *ClO2 emissions from Vent 1-7 (chilled water scrubber S-2) will increase by 40% {see explanation on following page}*

      0.336 lbs/hour + 40% = 0.470 lbs/hour ClO2

   b) *Tower 1 effluent will be similar to Tower 10 effluent where Tower 10 effluent = scrubber S-2 influent*

      calculate scrubber influent using effluent data for scrubber S-2 at 95% removal efficiency for ClO2 {NCASI Technical Bulletin #616, page 46, Table 12}

      0.336 lbs/hour = (0.05) x (influent lbs/hour)

      influent = 6.72 lbs/hour ClO2

      calculate scrubber influent using effluent data for scrubber S-2 at 70% removal efficiency for Cl2 {NCASI Technical Bulletin #616, page 46, Table 12}

      0.126 lbs/hour = (0.30) x (influent lbs/hour)

      influent = 0.42 lbs/hour Cl2

3) Vent 1-5 Effluent Calculation

   a) *total influent load at 60% removal for ClO2 and Cl2: basis vendor estimate for modified scrubber*

      Vent 1-7 Effluent = 0.470 lbs ClO2/hour
      0.126 lbs Cl2/hour

      Vent 1-8 Effluent = 0.049 lbs ClO2/hour
      0.011 lbs Cl2/hour

      Tower 1 Effluent = 6.72 lbs ClO2/hour
      0.42 lbs Cl2/hour

      7.239 lbs ClO2/hour x 0.40 = 2.90 lbs/hour ClO2

      0.557 lbs Cl2/hour x 0.40 = 0.223 lbs/hour Cl2

   b) *Assume potential emissions at 1.215 times these levels based on actual test rate versus maximum rate*

      2.90 lbs/hour x 1.215 = 3.52 lbs/hour ClO2

      0.223 lbs/hour x 1.215 = 0.271 lbs/hour Cl2

EXPLANATION OF ITEM 2)a):

The flow of air from Tower 10 will increase due to connecting it to a larger fan resulting in an increase in induced draft and flow is expected to increase from 56 to 100 CFM.

The increased flow is expected to reduce the absolute pressure in the tower and thereby allow more ClO2 to evolve from the pulp.

Assuming that the concentration of the additional 44 CFM will be 50% of the original concentration (623 ppm @ 56 CFM, 82 Degrees F, 3.9% moisture) then the final concentration (Y) is expected to be:

(56 CFM)(623 ppm) + (44 CFM)(623 ppm)(0.50) = (100 CFM)(Y)

Y = 486 ppm @ 100 CFM

We expect a slight increase in average stack temperature due to the increased flow. Lets assume 88 Degrees F since that is the midpoint between the high and the mean temperature measured during the testing:

For 88 Degrees F at saturation and 29.92 Inches of Mercury: % moisture = 4.4

Then for Standard Conditions :

(100 CFM)(528R/548R)(1-.044) = 92 DSCFM

Calculate mass emissions rate:

$$\frac{(486/1{,}000{,}000)(67.45 \text{ lbs ClO2/lbmole})(92 \text{ DSCFM})(60 \text{ M/Hr})}{(385.16 \text{ DSCF/lbmole})} =$$

= 0.470 lbs/hr

Calculate the percent increase:

0.470 lbs/hr - 0.336 lbs/hr = 0.134 lbs/hr

$$\frac{0.134 \text{ lbs/hr}}{0.336 \text{ lbs/hr}} = 0.399 \text{ or } \textbf{40\% increase}$$

VENT # 1-1 of Figure 3

TABLE 2.5. Cl2, ClO2, AND CHCl3 EMISSION DATA - NO. 5 VACUUM PUMP VENT

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	MEAN
Date	5/11/93	5/11/93	5/12/93	5/12/93	5/13/93	5/13/93	----
Time Began	1313	1751	0734	1525	0753	1258	----
Time Ended	1343	1821	0804	1555	0823	1328	----
Stack Gas							
Temperature, °F	98	98	98	98	95	97	97
Velocity, ft/sec	38.9	38.3	38.3	39.2	36.4	36.9	38.0
Moisture, %	6.0	6.0	6.1	6.1	5.6	6.0	6.0
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	790	778	779	796	744	758	774
at Standard Conditions*	706	696	696	711	664	671	691
Chlorine							
Concentration, ppm	< 0.768	< 0.783	< 0.744	< 0.777	< 0.756	< 0.767	< 0.766
Emission Rate, lb/hr	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006
Chlorine Dioxide							
Concentration, ppm	< 0.512	< 0.522	< 0.496	< 0.518	< 0.504	< 0.511	< 0.510
Emission Rate, lb/hr	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Chloroform							
Concentration, ppm	10.6	6.54	8.07	9.17	13.4	9.86	9.61
Emission Rate, lb/hr	0.139	0.085	0.104	0.121	0.166	0.123	0.123

* 68 F, 29.92 in. Hg

less than sign indicates that emissions were non-detect at levels indicated

VENT # 1-1 of Figure 3

TABLE 2.6. ACETONE, METHANOL, AND MEK EMISSION DATA - NO. 5 VACUUM PUMP VENT

	RUN 1	RUN 2*	RUN 3*	MEAN
Date	5/11/93	5/11/93	5/11/93	----
Time Began	1329	1452	1628	----
Time Ended	1429	1552	1728	----
Stack Gas				
Temperature, °F	98	98	98	98
Velocity, ft/sec	38.9	38.6	38.6	38.7
Moisture, %	6.0	6.0	6.0	6.0
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	790	784	784	786
at Standard Conditions**	706	701	701	703
Acetone				
Concentration, ppm	< 0.850	0.921	< 0.876	< 0.882
Emission Rate, lb/hr	< 0.005	0.006	< 0.006	< 0.006
Methanol				
Concentration, ppm	< 1.41	< 1.41	< 1.46	< 1.43
Emission Rate, lb/hr	< 0.005	< 0.005	< 0.005	< 0.005
Methyl Ethyl Ketone				
Concentration, ppm	< 0.627	< 0.628	< 0.647	< 0.634
Emission Rate, lb/hr	< 0.005	< 0.005	< 0.005	< 0.005

*Average of two velocity runs shown.

** 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

VENT # 1-2 of Figure 3

TABLE 2.10. Cl2, ClO2, AND CHCl3 EMISSION DATA - HYPO MIX VENT

	RUN 2*	RUN 3	RUN 4	RUN 5	RUN 6	RUN 7	MEAN
Date	5/11/93	5/12/93	5/13/93	5/13/93	5/13/93	5/13/93	----
Time Began	1637	1430	0720	1121	1522	1922	----
Time Ended	1646	1500	0750	1151	1552	1952	----
Stack Gas							
Temperature, °F	105	104	93	93	97	98	98
Velocity, ft/sec	0.5	0.6	0.6	0.6	0.6	0.6	0.6
Moisture, %	7.4	7.3	5.3	5.3	5.9	6.1	6.2
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	69	72	73	73	76	79	74
at Standard Conditions**	60	63	66	66	67	70	65
Chlorine							
Concentration, ppm	6040	9.89	< 0.754	< 0.778	1.44	1.38	< 1010
Emission Rate, lb/hr	4.00	0.007	< 0.001	< 0.001	0.001	0.001	< 0.668
Chlorine Dioxide							
Concentration, ppm	17.1	< 0.529	< 0.503	< 0.519	< 0.535	< 0.513	< 3.28
Emission Rate, lb/hr	0.011	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002
Chloroform							
Concentration, ppm	5.16	1.78	4.65	3.13	18.3	3.04	6.01
Emission Rate, lb/hr	0.006	0.002	0.006	0.004	0.023	0.004	0.007

*Run 1 was voided due to process problem.

** 68°F, 29.92 in. Hg.

Note: no chlorine dioxide is used in this process

less than sign indicates that emissions were non-detect at level indicated

VENT # 1-3 of Figure 3

TABLE 2.3. Cl2, ClO2, AND CHCl3 EMISSION DATA - NO. 1 MILL EXHAUST VENT

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	MEAN
Date	5/11/93	5/11/93	5/12/93	5/12/93	5/13/93	5/13/93	----
Time Began	1255	1715	0745	1145	0950	1400	----
Time Ended	1325	1745	0815	1215	1020	1430	----
Stack Gas							
Temperature, °F	88	87	83	84	84	87	86
Velocity, ft/sec	32.4	31.8	31.0	31.3	31.1	31.3	31.5
Moisture, %	4.4	4.3	3.8	3.9	4.0	4.3	4.1
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	20500	20100	19600	19800	19700	19800	19900
at Standard Conditions*	19000	18700	18400	18600	18300	18200	18600
Chlorine							
Concentration, ppm	4.50	< 0.768	< 0.743	< 0.773	< 0.761	< 0.778	< 1.39
Emission Rate, lb/hr	0.945	< 0.159	< 0.151	< 0.159	< 0.154	< 0.156	< 0.287
Chlorine Dioxide							
Concentration, ppm	7.37	< 0.512	< 0.495	< 0.515	< 0.508	< 0.519	< 1.65
Emission Rate, lb/hr	1.47	< 0.101	< 0.096	< 0.101	< 0.098	< 0.099	< 0.327
Chloroform							
Concentration, ppm	10.6	9.13	8.69	8.22	9.73	34.7	13.5
Emission Rate, lb/hr	3.74	3.17	2.97	2.84	3.31	11.8	4.63

* 68 F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at level indicated

VENT # 1-3 of Figure 3

TABLE 2.2. ACETONE, METHANOL, AND MEK EMISSION DATA - NO. 1 MILL EXHAUST VENT

	RUN 1	RUN 2	RUN 3	MEAN
Date	5/11/93	5/11/93	5/12/93	----
Time Began	1240	1700	0730	----
Time Ended	1340	1800	0830	----
Stack Gas				
Temperature, °F	88	87	83	86
Velocity, ft/sec	32.4	31.8	31.0	31.7
Moisture, %	4.4	4.3	3.8	4.2
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	20500	20100	19600	20100
at Standard Conditions*	19000	18700	18400	18700
Acetone				
Concentration, ppm	< 0.846	< 0.846	< 0.820	< 0.837
Emission Rate, lb/hr	< 0.145	< 0.143	< 0.136	< 0.142
Methanol				
Concentration, ppm	< 1.41	< 1.41	< 1.36	< 1.39
Emission Rate, lb/hr	< 0.133	< 0.131	< 0.125	< 0.130
Methyl Ethyl Ketone				
Concentration, ppm	< 0.625	< 0.625	< 0.605	< 0.618
Emission Rate, lb/hr	< 0.133	< 0.131	< 0.125	< 0.130

* 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at level indicated

VENT # 1-4 of Figure 3

TABLE 2.8. Cl2, ClO2, AND CHCl3 EMISSION DATA - WASHER 8 VENT

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	MEAN
Date	5/11/93	5/11/93	5/12/93	5/12/93	5/13/93	5/13/93	----
Time Began	1135	1600	0900	1310	0855	1300	----
Time Ended	1205	1630	0930	1340	0925	1330	----
Stack Gas							
Temperature, °F	86	86	82	84	81	84	84
Velocity, ft/sec	37.8	44.0	43.9	43.6	41.5	42.1	42.1
Moisture, %	4.2	4.2	3.7	3.9	3.6	4.0	3.9
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	2360	2720	2710	2700	2570	2610	2610
at Standard Conditions*	2200	2540	2560	2530	2400	2420	2440
Chlorine							
Concentration, ppm	2.46	< 0.768	< 0.753	< 0.773	< 0.756	< 0.774	< 1.05
Emission Rate, lb/hr	0.060	< 0.022	< 0.021	< 0.022	< 0.020	< 0.021	< 0.027
Chlorine Dioxide							
Concentration, ppm	14.7	< 0.512	< 0.502	< 0.515	< 0.504	< 0.516	< 2.88
Emission Rate, lb/hr	0.341	< 0.014	< 0.013	< 0.014	< 0.013	< 0.013	< 0.068
Chloroform							
Concentration, ppm	0.232	0.030	0.162	0.028	0.055	0.055	0.094
Emission Rate, lb/hr	0.009	0.001	0.008	0.001	0.002	0.002	0.004

* 68 F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

VENT # 1-4 of Figure 3

TABLE 2.12. ACETONE, METHANOL, AND MEK EMISSION DATA - WASHER 8 VENT

	RUN 1	RUN 2	RUN 3	MEAN
Date	5/11/93	5/11/93	5/12/93	----
Time Began	1120	1545	0845	----
Time Ended	1220	1645	0945	----
Stack Gas				
Temperature, °F	86	86	82	85
Velocity, ft/sec	37.8	44.0	43.9	41.9
Moisture, %	4.2	4.2	3.7	4.0
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	2360	2720	2710	2600
at Standard Conditions*	2200	2540	2560	2430
Acetone				
Concentration, ppm	< 0.846	**	< 0.829	< 0.838
Emission Rate, lb/hr	< 0.017	**	< 0.019	< 0.018
Methanol				
Concentration, ppm	< 1.41	**	< 1.38	< 1.39
Emission Rate, lb/hr	< 0.015	**	< 0.018	< 0.017
Methyl Ethyl Ketone				
Concentration, ppm	< 0.625	**	< 0.612	< 0.618
Emission Rate, lb/hr	< 0.015	**	< 0.018	< 0.017

* 68°F, 29.92 in. Hg.

**Run 2 sample vial broken.

less than sign indicates that emissions were non-detect at levels indicated

VENT # 1-5 of Figure 3

TABLE 2.4. Cl2, ClO2, AND CHCl3 EMISSION DATA - NO. 1 MILL Cl2 SCRUBBER VENT

	RUN 1	RUN 2	RUN 3*	RUN 5**	RUN 6	RUN 7***	MEAN
Date	5/11/93	5/11/93	5/12/93	5/13/93	5/13/93	5/13/93	----
Time Began	1304	1700	1300	0740	1140	1540	----
Time Ended	1334	1730	1325	0810	1210	1610	----
Stack Gas							
Temperature, °F	112	112	111	112	112	112	112
Velocity, ft/sec	22.1	22.2	20.7	22.2	22.2	22.2	21.9
Moisture, %	9.1	9.1	8.8	9.2	9.2	9.2	9.1
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	12500	12500	11700	12500	12500	12500	12400
at Standard Conditions****	10500	10600	9890	10400	10400	10400	10400
Chlorine							
Concentration, ppm	< 0.772	< 0.780	< 0.937	< 0.760	< 0.765	< 0.776	< 0.798
Emission Rate, lb/hr	< 0.089	< 0.091	< 0.102	< 0.087	< 0.088	< 0.089	< 0.091
Chlorine Dioxide							
Concentration, ppm	< 0.515	< 0.520	< 0.625	< 0.507	< 0.510	< 0.517	< 0.532
Emission Rate, lb/hr	< 0.057	< 0.058	< 0.065	< 0.055	< 0.056	< 0.056	< 0.058
Chloroform							
Concentration, ppm	4.66	3.87	2.14	5.26	4.85	4.30	4.18
Emission Rate, lb/hr	0.908	0.762	0.392	1.02	0.938	0.831	0.808

*Average of two velocity runs shown.

** Run 4 was voided due to process problem.

***Average of two morning velocity runs shown.

**** 68 F, 29.92 in. Hg.

Note: this source to pick up Tower 10 and Washer 11 upon modification
Vent 1-7 and Vent 1-8 will be routed to inlet of this scrubber

less than sign indicates that emissions were non-detect at level indicated

VENT # 1-5 of Figure 3

TABLE 2.4. ACETONE, METHANOL, AND MEK EMISSION DATA - NO. 1 MILL Cl2 SCRUBBER VENT

	RUN 1	RUN 2	RUN 3*	MEAN
Date	5/13/93	5/13/93	5/13/93	----
Time Began	0730	1020	1130	----
Time Ended	0830	1120	1230	----
Stack Gas				
Temperature, °F	112	112	112	112
Velocity, ft/sec	22.2	22.2	22.2	22.2
Moisture, %	9.2	9.2	9.2	9.2
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	12500	12500	12500	12500
at Standard Conditions**	10400	10400	10400	10400
Acetone				
Concentration, ppm	< 0.837	< 0.843	< 0.843	< 0.841
Emission Rate, lb/hr	< 0.079	< 0.079	< 0.079	< 0.079
Methanol				
Concentration, ppm	12.2	12.8	14.1	13.0
Emission Rate, lb/hr	0.633	0.664	0.730	0.676
Methyl Ethyl Ketone				
Concentration, ppm	< 0.618	< 0.623	< 0.623	< 0.621
Emission Rate, lb/hr	< 0.072	< 0.073	< 0.073	< 0.073

*Run 2 velocity data repeated for Run 3.

** 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

VENT # 1-6 of Figure 3

TABLE 2.6. Cl2, ClO2, AND CHCl3 EMISSION DATA - CENTER VACUUM PUMP VENT

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	MEAN
Date	5/11/93	5/11/93	5/12/93	5/12/93	5/13/93	5/13/93	----
Time Began	1010	1420	0745	1440	0945	1345	----
Time Ended	1040	1450	0815	1510	1015	1415	----
Stack Gas							
Temperature, °F	92	92	112	112	112	112	105
Velocity, ft/sec	69.3	71.1	69.5	74.2	72.3	77.0	72.2
Moisture, %	5.0	5.0	9.1	9.1	9.2	9.2	7.8
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	3540	3630	3560	3800	3700	3940	3690
at Standard Conditions*	3250	3330	3010	3210	3090	3290	3190
Chlorine							
Concentration, ppm	< 0.772	< 0.777	< 0.746	< 0.781	< 0.767	< 0.774	< 0.770
Emission Rate, lb/hr	< 0.028	< 0.029	< 0.025	< 0.028	< 0.026	< 0.028	< 0.027
Chlorine Dioxide							
Concentration, ppm	< 0.515	< 0.518	< 0.498	< 0.521	< 0.511	< 0.516	< 0.513
Emission Rate, lb/hr	< 0.018	< 0.018	< 0.016	< 0.018	< 0.017	< 0.018	< 0.017
Chloroform							
Concentration, ppm	5.79	3.58	3.73	5.65	4.59	27.7	8.52
Emission Rate, lb/hr	0.350	0.221	0.209	0.337	0.264	1.70	0.513

* 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

VENT # 1-6 of Figure 3

TABLE 2.8. ACETONE, METHANOL, AND MEK EMISSION DATA - CENTER VACUUM PUMP VENT

	RUN 1	RUN 2	RUN 3	MEAN
Date	5/11/93	5/11/93	5/12/93	----
Time Began	0955	1415	0735	----
Time Ended	1055	1515	0835	----
Stack Gas				
Temperature, °F	92	92	112	99
Velocity, ft/sec	69.3	71.1	69.5	70.0
Moisture, %	5.0	5.0	9.1	6.4
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	3540	3630	3560	3580
at Standard Conditions*	3250	3330	3010	3200
Acetone				
Concentration, ppm	0.921	< 0.857	< 0.822	< 0.867
Emission Rate, lb/hr	0.027	< 0.026	< 0.022	< 0.025
Methanol				
Concentration, ppm	13.7	28.9	31.5	24.7
Emission Rate, lb/hr	0.223	0.480	0.473	0.392
Methyl Ethyl Ketone				
Concentration, ppm	< 0.628	< 0.633	< 0.607	< 0.623
Emission Rate, lb/hr	< 0.023	< 0.024	< 0.021	< 0.022

* 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

VENT # 1-7 of Figure 3

TABLE 2.9. Cl2, ClO2, AND CHCl3 EMISSION DATA - TOWER 10 SCRUBBER VENT

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	MEAN
Date	5/11/93	5/11/93	5/12/93	5/12/93	5/13/93	5/13/93	----
Time Began	1005	1430	1015	1415	0745	1145	----
Time Ended	1035	1500	1045	1445	0815	1215	----
Stack Gas							
Temperature, °F	94	94	71	82	70	82	82
Velocity, ft/sec	1.2	1.1	1.3	1.2	1.1	1.2	1.2
Moisture, %	5.4	5.4	2.5	3.7	2.5	3.7	3.9
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	58	54	58	58	52	56	56
at Standard Conditions*	52	49	56	55	50	52	52
Chlorine							
Concentration, ppm	333	163	255	240	170	135	216
Emission Rate, lb/hr	0.191	0.088	0.158	0.146	0.094	0.078	0.126
Chlorine Dioxide							
Concentration, ppm	451	514	459	235	1850 **	228	623
Emission Rate, lb/hr	0.246	0.264	0.270	0.136	0.973	0.124	0.336
Chloroform							
Concentration, ppm	0.388	0.298	0.047	0.155	0.229	0.231	0.225
Emission Rate, lb/hr	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

* 68 F, 29.92 in. Hg.

**Duplicate shown in Table 3.1 confirms the high result.

Note: this source to be routed to the No.1 BP Scrubber after modification (S-1)

less than sign indicates that emissions were non-detect at level indicated

VENT # 1-7 of Figure 3

TABLE 2.14. ACETONE, METHANOL, AND MEK EMISSION DATA - TOWER 10 SCRUBBER VENT

	RUN 1	RUN 2	RUN 3	MEAN
Date	5/11/93	5/11/93	5/12/93	----
Time Began	0950	1415	1000	----
Time Ended	1050	1515	1100	----
Stack Gas				
Temperature, °F	94	94	71	86
Velocity, ft/sec	1.2	1.1	1.3	1.2
Moisture, %	5.4	5.4	2.5	4.4
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	58	54	58	57
at Standard Conditions*	52	49	56	52
Acetone				
Concentration, ppm	< 0.846	< 0.846	< 0.849	< 0.847
Emission Rate, lb/hr	< 0.001	< 0.001	< 0.001	< 0.001
Methanol				
Concentration, ppm	< 1.41	< 1.41	< 1.41	< 1.41
Emission Rate, lb/hr	< 0.001	< 0.001	< 0.001	< 0.001
Methyl Ethyl Ketone				
Concentration, ppm	< 0.625	< 0.625	< 0.627	< 0.625
Emission Rate, lb/hr	< 0.001	< 0.001	< 0.001	< 0.001

* 68°F, 29.92 in. Hg.

Note: this source to be routed to the No. 1 BP Scrubber after modification (S-1)

less than sign indicates that the emission were non-detect at level indicated

VENT # 1-8 of Figure 3

TABLE 2.7. Cl2, ClO2, AND CHCl3 EMISSION DATA - WASHER 11 VENT

	RUN 1	RUN 2	RUN 3	RUN 5*	RUN 6	RUN 7**	MEAN
Date	5/11/93	5/11/93	5/12/93	5/13/93	5/13/93	5/13/93	----
Time Began	1130	1538	0900	0845	1245	1645	----
Time Ended	1200	1608	0930	0915	1315	1715	----
Stack Gas							
Temperature, °F	91	91	87	90	90	90	90
Velocity, ft/sec	42.3	42.2	36.6	37.2	39.9	38.6	39.5
Moisture, %	4.9	4.9	4.3	4.8	4.8	4.8	4.8
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	1530	1520	1320	1340	1440	1390	1420
at Standard Conditions***	1400	1400	1230	1220	1310	1260	1300
Chlorine							
Concentration, ppm	< 0.772	< 0.780	< 0.754	< 0.760	< 0.769	< 0.776	< 0.768
Emission Rate, lb/hr	< 0.012	< 0.012	< 0.010	< 0.010	< 0.011	< 0.011	< 0.011
Chlorine Dioxide							
Concentration, ppm	< 0.515	< 0.520	7.84	4.66	3.59	5.38	< 3.75
Emission Rate, lb/hr	< 0.008	< 0.008	0.101	0.060	0.049	0.071	< 0.049
Chloroform							
Concentration, ppm	0.132	0.038	0.113	0.047	0.048	0.025	0.067
Emission Rate, lb/hr	0.003	0.001	0.003	0.001	0.001	0.001	0.002

* Run 4 was voided due to process problem.

** Average of two earlier velocity runs shown.

*** 68 F, 29.92 in. Hg.

Note: this source to be routed to No. 1 BP Scrubber after modification (S-1)

less than sign indicates that emissions were non-detect at levels indicated

VENT # 1-8 of Figure 3

TABLE 2.10. ACETONE, METHANOL, AND MEK EMISSION DATA - WASHER 11 VENT

	RUN 1	RUN 2	RUN 3	MEAN
Date	5/11/93	5/11/93	5/12/93	----
Time Began	1115	1515	0900	----
Time Ended	1215	1615	1000	----
Stack Gas				
Temperature, °F	91	91	87	90
Velocity, ft/sec	42.3	42.2	36.6	40.4
Moisture, %	4.9	4.9	4.3	4.7
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	1530	1520	1320	1460
at Standard Conditions*	1400	1400	1230	1340
Acetone				
Concentration, ppm	0.886	< 0.860	< 0.830	< 0.859
Emission Rate, lb/hr	0.011	< 0.011	< 0.009	< 0.010
Methanol				
Concentration, ppm	< 1.41	< 1.43	< 1.38	< 1.41
Emission Rate, lb/hr	< 0.010	< 0.010	< 0.008	< 0.009
Methyl Ethyl Ketone				
Concentration, ppm	< 0.628	< 0.635	< 0.613	< 0.625
Emission Rate, lb/hr	< 0.010	< 0.010	< 0.008	< 0.009

* 68°F, 29.92 in. Hg.

Note: this source to be routed to No. 1 BP Scrubber after modification (S-1)

less than sign indicates that emissions were non-detect at levels indicated

BUCKEYE FLORIDA, LIMITED PARTNERSHIP
ROUTE 3 BOX 260
PERRY, FLORIDA 32347

PERMIT APPLICATION PACKAGE

RELATED CORRESPONDENCE

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

TABLE III-A: RAW MATERIALS AND CHEMICALS USED

TABLE III-C: VENT IDENTIFICATION & POTENTIAL EMISSIONS

TABLE III-H: EMISSION STACK GEOMETRY AND FLOW CHARACTERISTICS

FIGURE 1: LOCATION MAP

FIGURE 2: SITE PLOT PLAN

FIGURE 3: VENT LOCATION

ATTACHMENT 1: PROJECT DESCRIPTION

ATTACHMENT 2: EXISTING PERMIT

ATTACHMENT 3: CONFIDENTIAL PROCESS FLOW DIAGRAMS (SEPARATE)

APPENDIX: TEST DATA AND EMISSIONS CALCULATIONS

TEST METHODOLOGY

RELATED CORRESPONDENCE

Buckeye Florida
Route 3, Box 260 • Perry, Florida 32347
Telephone: (904) 584-0121

July 9, 1994

Mr. Robert J. Leetch, P.E.
Northeast District
Florida Department of Environmental Protection
7825 Baymeadows Road
Jacksonville, FL 32256-7577

RE: Buckeye Florida, Limited Partnership
Facility: 31JAX620001
#1 Bleach Plant Proposed Process Modification

Dear Mr. Leetch:

We appreciated the opportunity to discuss proposed changes to the Buckeye Florida, Limited Partnership #1 Bleach Plant with the Department on June 27, 1994. In accordance with the results of our meeting, we are hereby submitting a completed Construction Permit Application for our #1 Bleach Plant modifications. Our application consists of two parts: the Permit Application Package; and Attachment III - a confidential section containing proprietary information. We trust that the confidential section will be handled accordingly. In addition to our completed permit application, a check in the amount of $1000 has been enclosed for permit processing as prescribed in Chapter 17-4.050(4).

As we discussed with you at our June 27th meeting, time is of considerable importance as we are in need of commencing with changes during September to meet potential European market demands and EPA expectations in 1995. As we informed you, we have agreed with the United States Environmental Protection Agency to conduct tests regarding these process changes and the effects on air and effluent emissions. As requested, we have enclosed a copy of the letter of agreement with the U.S. EPA for your information. Note that we have not included copies of the comprehensive plan submitted to EPA, as these are confidential and sensitive documents. However, if needed by your agency, these documents can be provided.

We feel that the proposed changes will ultimately lead toward overall reduced air and effluent emissions. Your efforts to review our application within the aggressive time frame are certainly recognized and appreciated. If any clarification or additional data are required, please contact either Ray Perry (904-584-1333) or Bruce Harding (094-584-1106). Thank you.

Sincerely,

C. S. Aiken

C.S. Aiken
Plant Manager

Attachments

File:PLCLO2B.doc

Buckeye Florida
Route 3, Box 260 • Perry, Florida 32347
Telephone: (904) 584-0121

June 7, 1994

Mr. Christopher L. Kirts, P.E.
District Air Program Administrator
Florida Department of
Environmental Protection
Suite B-200
7825 Baymeadows Way
Jacksonville, FL 32256-7577

RE: Buckeye Florida, Limited Partnership
Facility ID# 31JAX620001
#1 Bleach Plant Proposed Process Modification

Dear Mr. Kirts:

Buckeye Florida, Limited Partnership submitted the attached letter to the Department's Bureau of Air Regulation, Permitting and Standards Section on June 3, 1994. We have since been directed by Mr. John Reynolds, of the Permitting and Standards Section, to submit an "Application to Operate/Construct Air Pollution Sources" to the Department's Northeast District Office. In accordance with this direction, we have begun the process of preparing the application. Once we have the application completed, we would like to schedule an application submittal meeting with the District Office. We are currently projecting to have the application completed by late June or early July. If you have any questions or desire more information, please call me at (904) 584-0106 or Ray Perry at (904) 584-0333.

Sincerely,

BUCKEYE FLORIDA, LIMITED PARTNERSHIP

Bruce Harding

Bruce Harding
Environmental Control Manager

Buckeye Florida
Route 3, Box 260 • Perry, Florida 32347
Telephone: (904) 584-0121

June 3, 1994

Mr. Preston Lewis, P.E.
Permitting and Standards Section
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Buckeye Florida, Limited Partnership
Facility: 31JAX620001
#1 Bleach Plant Proposed Process Modification

Dear Mr. Lewis:

Our #1 Bleach Plant is used chiefly in the production of dissolving cellulose from our kraft process. Currently, we use primarily chlorine in the first stage of this bleaching process. As a result of the Environmental Protection Agency's "Cluster Rule" effort, proposed requirements for the Pulp & Paper Industry include high level substitution of chlorine dioxide for chlorine in the bleaching process. In addition, proposed environmental legislation in Germany will likely require the use of high levels of chlorine dioxide substitution. During the last year, we have been conducting laboratory scale research to determine the feasibility of such a process change. We have reached a point where the laboratory scale findings must be tested in our production process. This will allow us to verify whether the pulps produced with this process change will satisfy our customer's requirements. Therefore, in order to determine the feasibility of high level chlorine dioxide substitution in our process, we are proposing to modify the first stage of our #1 Bleach Plant to allow for the experimental use of up to 100% chlorine dioxide.

The proposed change would not increase the production capability of the #1 Bleach Plant. The proposed change would allow us to run experimental process trials using up to 100% chlorine dioxide in place of chlorine in the first stage of the bleaching process. In addition to the experimental use of high level chlorine dioxide substitution, we plan to test the use of hydrogen peroxide in the extraction stage and process modifications of the hypochlorite stage. These process changes have also been proposed by the "Cluster Rules". Based on our laboratory data and industry experience, we expect that relative to current levels, air emissions of chlorine and chloroform would decrease significantly during these experimental process trials. Additionally, this project includes the modification of the existing scrubber system that will also improve the overall control of chlorine and chlorine dioxide emissions during the normal operation of the #1 Bleach Plant. However, during the process trials, due to the increase in chlorine dioxide use, the air emissions of chlorine dioxide and methanol have the potential to increase relative to current levels. We are currently working to quantify these changes.

Initially, our plan is to produce up to 30,000 Equivalent Air Dry Metric Tons of experimental pulp or about 18% of the projected product for #1 Bleach Plant. Eventually, if we can make a product that meets the process requirements and quality demands of our customers, the "Cluster Rule" requirements will force us to go to a high level of chlorine dioxide substitution on a continuous basis. As you are aware, the "Cluster Rule" requirements will address additional emissions control measures for the parameters described above.

We would appreciate guidance from the Department regarding the potential permitting needs for this proposed project. As such, we would like to schedule a meeting with the Department at the earliest convenient time to discuss the project in more detail. Please give me a call at (904) 584-0106, or call Ray Perry at (904) 584-0333, so that we can schedule a meeting.

Sincerely,

BUCKEYE FLORIDA, LIMITED PARTNERSHIP

Bruce Harding

Bruce Harding
Environmental Control Manager

Buckeye Cellulose Corporation
1001 Tillman Street - P.O. Box 8407
Memphis, Tennessee 38108
Telephone 901-320-8100
Fax 901-320-8131

first in cellulose

January 13, 1994

Mr. Don Anderson
Engineering and Analysis Division (4303)
U.S. EPA
401 M Street, S.W.
Washington, D.C. 20460

Dear Mr. Anderson:

At our December 9 meeting in Washington, Buckeye committed to develop a detailed plan investigating the effects of process options on effluent/air emissions and product characteristics for the dissolving and specialty paper pulps manufactured at our Foley site. The primary objective is to ascertain the effect of three process changes--ClO_2 substitution, Eop, and modified hypo--on the twenty non-conventional pollutants.

Attached are two copies of this comprehensive plan. Ray Andreu and I are prepared to review the document and answer any questions on the afternoon of January 18 in Durham.

Sincerely,

W. D. McKinney

Attachments

CC: Mr. R. Andreu
Mr. G. B. Ellis
Mr. B. J. L. Huff

epa1129%/bsm

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Kraft Pulp & Paper [ ] New[1] [x] Existing[1]

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

COMPANY NAME: Buckeye Florida, Limited Partnership COUNTY: Taylor

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) No. 1 Bleach Plant

SOURCE LOCATION: Street 5 to 6 miles southeast of Perry City Perry

UTM: East 256,740 North 3,328,700

Latitude 30 ° 03 ' 59 "N Longitude 83 ° 33 ' 12 "W

APPLICANT NAME AND TITLE: C.S. Aiken, Plant Manager

APPLICANT ADDRESS: Route 3 Box 260, Perry, Florida 32347

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Buckeye Florida, Limited Partnership

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

*Attach letter of authorization

Previously submitted

Signed: C. S. Aiken

C.S. Aiken, Plant Manager
Name and Title (Please Type)

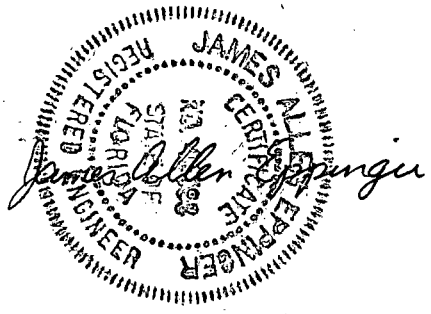
Date: 7/7/94 Telephone No. (904) 584-1121

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

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.



Signed _____

James Allen Eppinger
Name (Please Type)

Watkins Engineers & Constructors
Company Name (Please Type)

P.O. Box 2194 Tallahassee, FL 32304
Mailing Address (Please Type)

Florida Registration No. 46588 Date: 7-7-94 Telephone No. (904) 576-7181

SECTION II: GENERAL PROJECT INFORMATION

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

See Attachment 1

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

Start of Construction September 1994 Completion of Construction September 1995

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

Scrubber modification $200,000

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

#AO62-2383, Issued May 19,1975, Expiration: Upon modification of bleach plant

See Attachment 2

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52 ;

if power plant, hrs/yr_____; if seasonal, describe:_____

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

1. Is this source in a non-attainment area for a particular pollutant?	No
a. If yes, has "offset" been applied?	NA
b. If yes, has "Lowest Achievable Emission Rate" been applied?	NA
c. If yes, list non-attainment pollutants.	NA
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI.	No
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII.	No
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source?	No
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source?	No
H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source?	No
a. If yes, for what pollutants?	NA

b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

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

NA = Not Applicable

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

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

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
See Table III-A				

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

1. Total Process Input Rate (lbs/hr): 58,333 lbs/hr unbleached pulp

2. Product Weight (lbs/hr): _____

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

See Table III-C

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
chlorine	*	*	NA	NA	**	**	Figure 3
chlorine dioxide	*	*	NA	NA	**	**	Figure 3
chloroform	*	*	NA	NA	**	**	Figure 3
methanol	*	*	NA	NA	**	**	Figure 3

[1]See Section V, Item 2. See Appendix for emissions calculations and data

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

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

* See Table III-C

** Not applicable for majority of the vents.

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

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
chilled water scrubber	ClO2 , Cl2	95%, 70%	NA	NCASI TB 616
white liquor scrubber	ClO2, Cl2	60%, 60%	NA	Vendor Est.

E. Fuels

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

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ BTU/lb _____ BTU/gal

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

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average _____ Maximum _____

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

Effluent liquids are routed to the NPDES primary and secondary treatment system

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

Stack Height: See Table III-H ft. Stack Diameter: _____ ft.

Gas Flow Rate: _____ ACFM _____ DSCFM Gas Exit Temperature: _____ °F.

Water Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste _____

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

Approximate Number of Hours of Operation per day _____ day/wk _____ wks/yr. _____

Manufacturer _____

Date Constructed _____ Model No. _____

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

Stack Height: _____ ft. Stack Diamter: _____ Stack Temp. _____

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

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

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

_____

_____

_____

_____

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

_____

_____

_____

_____

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

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

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

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

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

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[ ] Yes [ ] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [ ] No

Contaminant	Rate or Concentration

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

Contaminant	Rate or Concentration

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

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

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

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy [2]

h. Maintenance Cost:

i. Availaoility of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1]Explain method of determining efficiency.
[2]Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

[1] Explain method of determining efficiency.
[2] Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

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

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. _____no. sites _____ TSP _____( ) SO^{2}* _____ Wind spd/dir

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

Other data recorded _____

Attach all data or statistical summaries to this application.

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

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

B. Meteorological Data Used for Air Quality Modeling

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

2. Surface data obtained from (location)_____

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

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

C. Computer Models Used

1. _____ Modified? If yes, attach description.

2. _____ Modified? If yes, attach description.

3. _____ Modified? If yes, attach description.

4. _____ Modified? If yes, attach description.

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

D. Applicants Maximum Allowable Emission Data

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

E. Emission Data Used in Modeling

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

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

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

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

TABLE III-A: RAW MATERIALS AND CHEMICALS USED

TABLE III-C: VENT IDENTIFICATION & POTENTIAL EMISSIONS

TABLE III-H: EMISSION STACK GEOMETRY AND FLOW CHARACTERISTICS

TABLE III-A

RAW MATERIALS AND CHEMICALS USED

RAW MATERIAL/CHEMICAL	FORMULA	MAXIMUM UTILIZATION RATE
Unbleached pulp	-----	58,333 pounds/hour[1]
Chlorine Dioxide	ClO2	1,655 pounds/hour
Chlorine	Cl2	6,510 pounds/hour
Sulfuric Acid	H2SO4	6,230 pounds/hour
Sodium Hydroxide	NaOH	4,265 pounds/hour
Hydrogen Peroxide	H2O2	520 pounds/hour
Sodium Hypochlorite	NaHOCl	2,325 pounds/hour
Sulfur Dioxide	SO2	160 pounds/hour

Footnote:

1 - 700 Bone Dry Short Tons per Day of unbleached feed to the bleach plant. In terms of the mill convention, 620 Equivalent Air Dry Metric Tons per Day off the paper machine.

TABLE III-C

VENT IDENTIFICATION & POTENTIAL EMISSIONS

	POTENTIAL EMISSIONS[1] POUNDS/HOUR				
ID	Chlorine	Chlorine Dioxide	Chloroform	Methanol	VENT[4]
#1 BP Exhaust Vent	0.349	0.397	5.63	0.158	1-3
#1 BP Scrubber[2] Vent	0.271	3.52	1.00	0.833	1-5
#5 Vacuum Pump Vent	0.007	0.005	0.149	0.006	1-1
Center Vacuum Pump Vent	0.033	0.021	0.623	0.476	1-6
Washer #8 Vent	0.033	0.083	0.005	0.021	1-4
Hypo Mix Tank[3] Vent	0.811	0.003	0.009	0.009	1-2

Footnotes:

1 - Based on Weston Emissions Data of May 1993. See Appendix for summary of the test data and the calculations.

2 - Scrubber to be modified by changing the scrubber medium to white liquor and adding the vent gases from Washer 11 and Tower 10 Scrubber.

3 - Sodium Hypochlorite is made from chlorine and caustic, no chlorine dioxide is expected. No data on Methanol, basis #1 BP Scrubber at 1/100th of the volumetric flow.

4 - Refer to Figure 3

TABLE III-H

EMISSION STACK GEOMETRY AND FLOW CHARACTERISTICS[1]

VENT	HEIGHT Feet	DIAMETER Inches	VELOCITY Feet/Sec	FLOW ACFM	FLOW DSCFM	MOISTURE %	TEMPERATURE Deg F[2]
#1 BP Exhaust	110.3	44.00	32.4	20,500	19,000	4.4	88
#1 BP Scrubber	105.9	41.50	22.2	12,500	10,600	9.2	112
#5 Vacuum Pump	100.2	7.75	39.2	800	711	6.1	98
Center Vacuum Pump	103.1	12.50	77.0	3,940	3,330	9.2	112
Washer #8	103.2	13.75	44.0	2,720	2,560	4.2	86
Hypo Mix Tank	102.3	19.50	0.60	80	70	7.4	105

Footnotes:

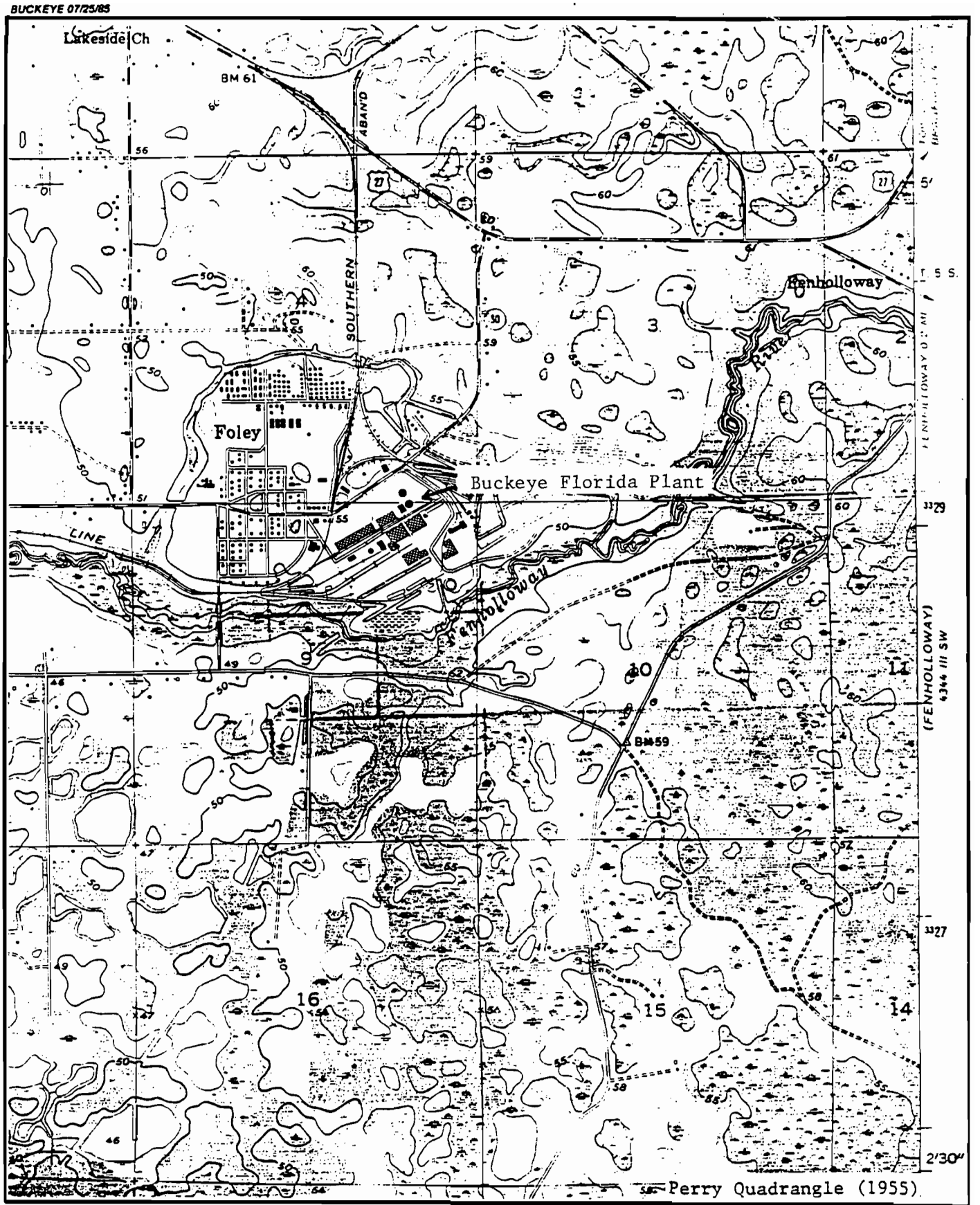
1 - From Weston test data, May 1993

2 - Degrees Fahrenheit, note these are so close to ambient temperature that they may be impacted significantly by ambient temperature.

FIGURE 1: LOCATION MAP

FIGURE 2: SITE PLOT PLAN

FIGURE 3: VENT LOCATION



LOCATION MAP

Figure 1

SOURCE: USGS, 1955.

Building #3 is the #1 Bleach Plant

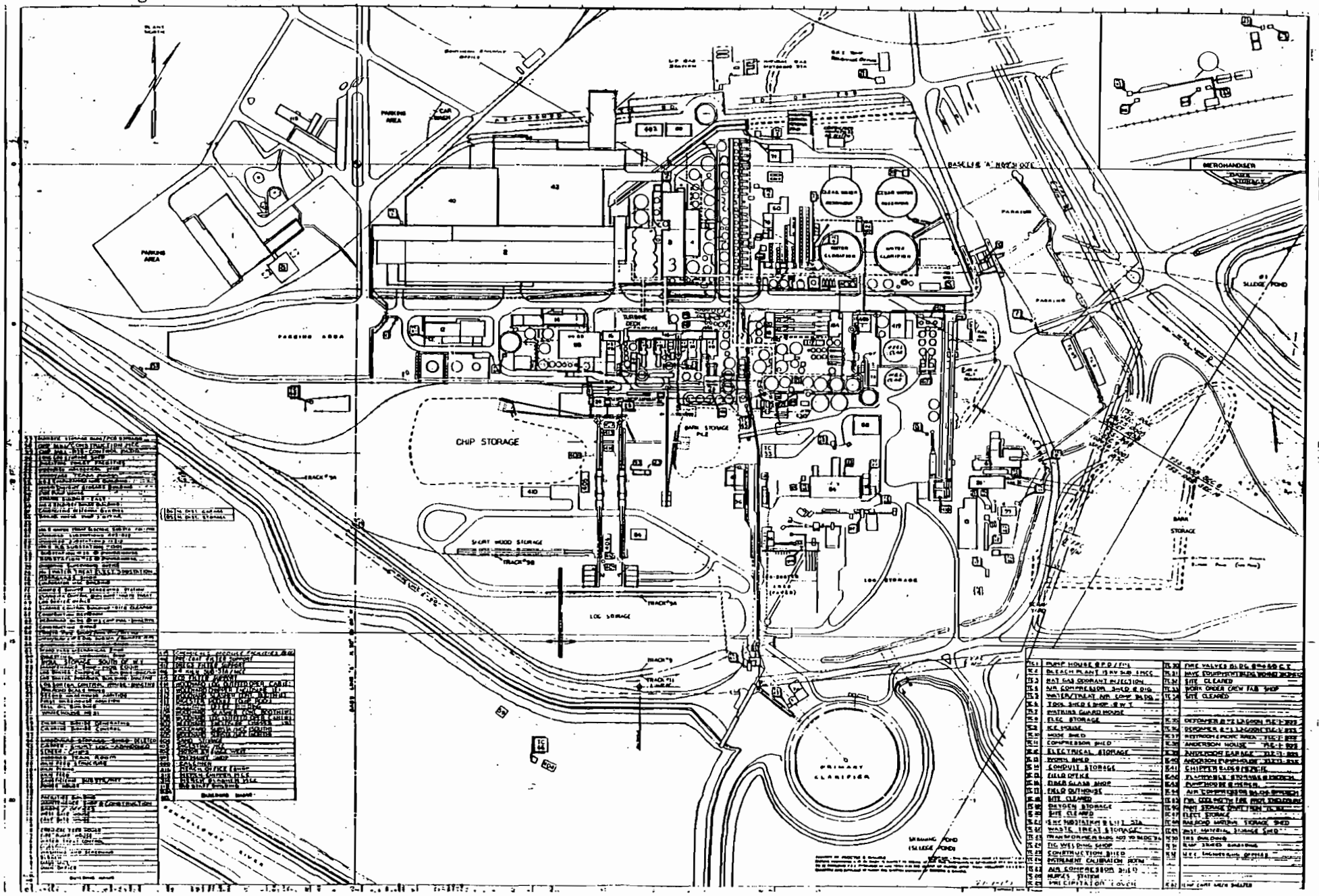


Figure 2

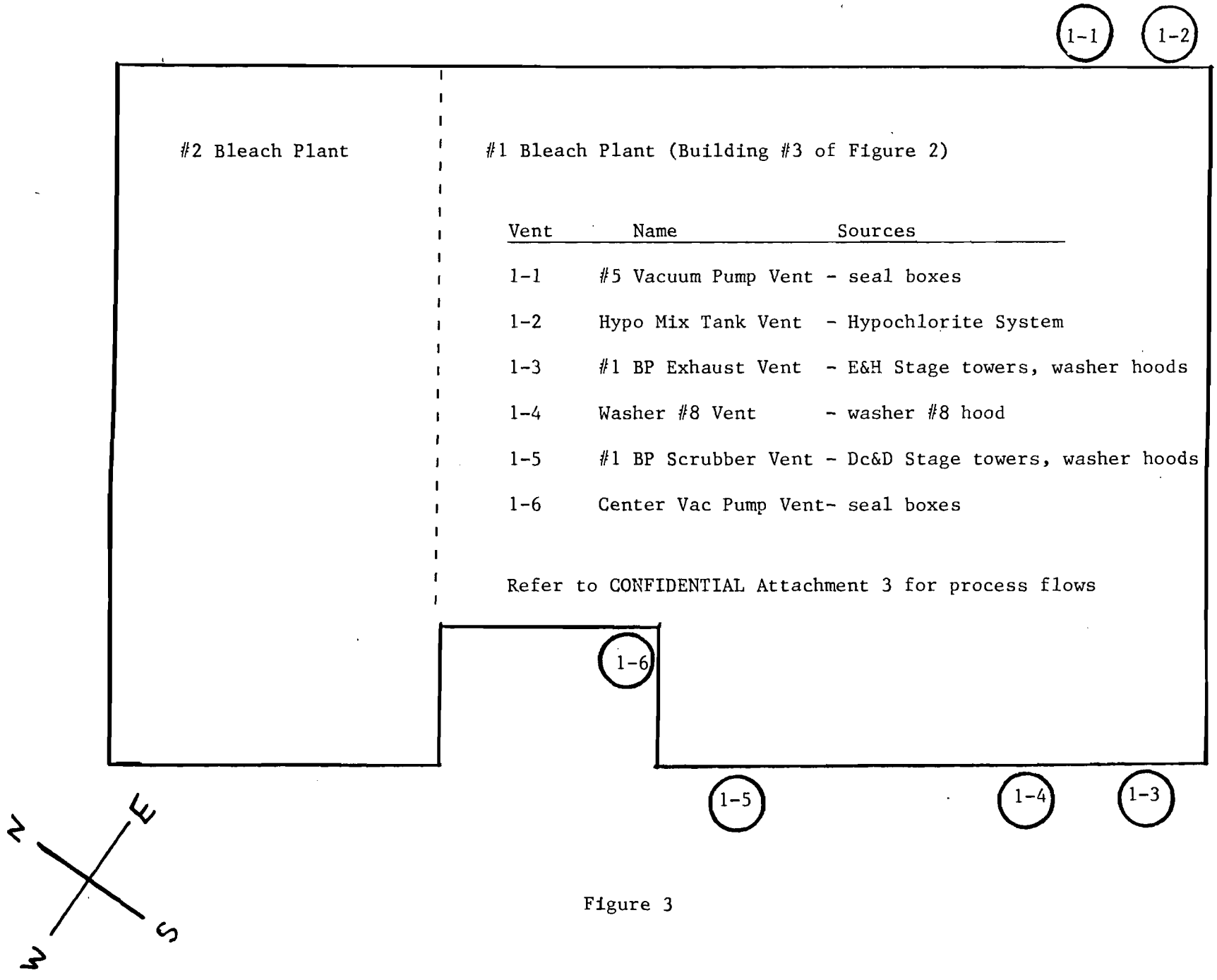

1-1
1-2
#2 Bleach Plant
#1 Bleach Plant (Building #3 of Figure 2)
Vent Name Sources
1-1 #5 Vacuum Pump Vent - seal boxes
1-2 Hypo Mix Tank Vent - Hypochlorite System
1-3 #1 BP Exhaust Vent - E&H Stage towers, washer hoods
1-4 Washer #8 Vent - washer #8 hood
1-5 #1 BP Scrubber Vent - Dc&D Stage towers, washer hoods
1-6 Center Vac Pump Vent- seal boxes
Refer to CONFIDENTIAL Attachment 3 for process flows
1-6
1-5
1-4
1-3
N
E
W
S

Figure 3

ATTACHMENT 1: PROJECT DESCRIPTION

ATTACHMENT 1

PROJECT DESCRIPTION

Background:

Buckeye Florida, Limited Partnership (Buckeye) operates a kraft pulp plant in Taylor County Florida. The plant has two separate mills that produce bleached market pulps and dissolving cellulose pulps. In the current #1 mill process, primarily chlorine is used in the first bleaching stage. Proposed regulations would require Buckeye to use a high level (up to 100%) of chlorine dioxide substitution in this chlorine stage, peroxide enhanced extraction, and hypochorite stage modifications in the #1 mill process. In light of these proposed regulations, Buckeye has been conducting laboratory scale experiments during the last year in order to determine the feasibility of operating the #1 mill process with these changes. The point has been reached where the laboratory scale findings must be tested in the production process. This project will allow Buckeye to run experimental process trials using these modifications in the #1 Bleach Plant. The normal operating mode of the #1 Bleach Plant will continue to be the current process. The production capacity of the #1 Bleach Plant will not increase as a result of this project.

Project Scope:

The project involves the modification of the first bleaching stage of the #1 Bleach Plant to allow for the substitution of up to 100% chlorine dioxide for chlorine. This will be accomplished by adding a retention tube to the first bleaching tower, a high shear mixer, and ancillary equipment. The resulting chlorine dioxide and chlorine emissions will be controlled by modifying the existing scrubber. In addition to these modifications, piping and ancillary equipment will be added to allow the use of hydrogen peroxide in the extraction stages.

Emissions Impact:

The project is expected to reduce the total emissions of chlorine, chlorine dioxide, and chloroform from the #1 Bleach Plant relative to current levels. When the #1 Bleach Plant is operating in the normal mode, total emissions will be reduced by routing the final bleach stage emissions and related washer vent emissions to the modified scrubber. These final bleach stage emissions are currently controlled only by a chilled water scrubber. After modification they will be controlled by the chilled water scrubber and the modified scrubber. The washer vent has no existing control equipment. During the experimental process trials, chlorine and chloroform emissions are expected to decrease while chlorine dioxide emissions have the potential to increase due to the increased use in the process. However, the decrease in chlorine and chloroform emissions is considerably greater than the potential increase in chlorine dioxide emissions and total emissions are reduced.

ATTACHMENT 2: EXISTING PERMIT

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

ST. JOHNS RIVER SUBDISTRICT

January 25, 1980

Mr. John H. Millican
Environmental Control Manager
The Buckeye Cellulose Corporation
Rt. 3, Box 260
Perry, Florida 32347

Dear Mr. Millican:

Taylor County - AP
Buckeye Cellulose Corp.
A062-2381 for ClO_2
-2382 for Brownstock Washing
-2383 for Bleaching Vents

Based on the data in the application forms in our file, we have determined that renewal of the above permits will not be required.

However, a file will be maintained on these vents and you are required to submit for our review any proposed changes, prior to implementing them, over the signatures of the plant manager and professional engineer.

If there are any questions, please contact us.

Sincerely,

Frank Watkins Jr.

Frank Watkins, Jr., P.E.
Subdistrict Engineer

cc FW:jck

STATE OF FLORIDA

DEPARTMENT OF POLLUTION CONTROL

3426 BILLS ROAD
JACKSONVILLE, FLORIDA 32207

PETER P. BALJET
EXECUTIVE DIRECTOR

W.D. FREDERICK, JR.
CHAIRMAN

May 19, 1975

Taylor County - AP
Buckeye Cellulose Corp.
Bleaching Vents

Mr. F. P. Smith, Plant Manager
The Buckeye Cellulose Corporation
Perry, Florida 32347

Dear Mr. Smith:

Pursuant to your recent application, enclosed is Permit No. AO62-2383, dated May 19, 1975 to operate the subject pollution source.

This permit will expire on May 15, 1980 and will be subject to the conditions, requirements and restrictions checked or indicated otherwise on the attached sheet entitled "Permit Conditions".

This permit is issued under the authority of Florida Statutes 403.061(16). The time limits imposed herein are a condition to this permit and are enforceable under Florida Statute 403.161. You are hereby placed on Notice that the Department will review this permit before the scheduled date of expiry and will seek court action for any violation of the conditions and requirements of this permit.

You have ten days from the date of receipt hereof within which to seek a review of the conditions and requirements contained in this permit.

In future communication please refer to your permit number and source I.D. Your continued cooperation is appreciated.

Very truly yours,

Frank Watkins, Jr., P.E.
Regional Engineer

FWjr:JRG:vk

cc: Central Files, Tallahassee
William F. Karns, P.E.

STATE OF FLORIDA
DEPARTMENT OF
POLLUTION CONTROL

OPERATION PERMIT

FOR The Buckeye Cellulose Corporation
Perry, Florida 32347

PERMIT NO. A062-2383 DATE May 19, 1975

PURSUANT TO THE PROVISIONS OF SECTION 403.061 (16) OF CHAPTER 403 FLORIDA STATUTES AND CHAPTER 17-4 FLORIDA ADMINISTRATIVE CODE, THIS PERMIT IS ISSUED TO:

Mr. C. P. Smith, Plant Manager

FOR THE OPERATION OF THE FOLLOWING:

Bleaching Vents with Chilled Water Scrubbers on ClO2 Tower Vents, Caustic Scrubber on ClO2 Tower and Washer and Seal Box Vents

LOCATED AT: 5 to 6 miles southeast of Perry, Taylor County, Florida

UTM: E-256740 N-3328700

IN ACCORDANCE WITH THE APPLICATION DATED April 2A, 1975

AND IN CONFORMITORY WITH THE STATEMENTS AND SUPPORTING DATA ENTERED THEREIN, ALL OF WHICH ARE FILED WITH THE DEPARTMENT AND ARE CONSIDERED A PART OF THIS PERMIT.

THIS PERMIT SHALL BE EFFECTIVE FROM THE DATE OF ITS ISSUANCE UNTIL 5/15/80 OR UNTIL REVOKED OR SURRENDERED AND SHALL BE SUBJECT TO ALL LAWS OF THE STATE AND THE RULES AND REGULATIONS OF THE DEPARTMENT.

Peter P. Baljet

PETER P. BALJET
EXECUTIVE DIRECTOR

Frank Watkins Jr.

REGIONAL ENGINEER
Frank Watkins, Jr.

FORM FS-11
5-75

ATTACHMENT 3: CONFIDENTIAL PROCESS FLOW DIAGRAMS (SEPARATE)

APPENDIX: TEST DATA AND EMISSIONS CALCULATIONS

WESTON TEST DATA MAY 1993

SUMMARY OF EMISSIONS

MEAN EMISSIONS RATES POUNDS/HOUR

ID	Chlorine	Chlorine Dioxide	Chloroform	Methanol	VENT[3]
#1 BP Exhaust Vent	<0.287	<0.327	4.63	<0.130	1-3
#1 BP Scrubber[1] Vent	<0.223	<2.90	0.826	0.686	1-5
#5 Vacuum Pump Vent	<0.006	<0.004	0.123	<0.005	1-1
Center Vacuum Pump Vent	<0.027	<0.017	0.513	0.392	1-6
Washer #8 Vent	<0.027	<0.068	0.004	<0.017	1-4
Hypo Mix Tank[2] Vent	<0.668	<0.002	0.007	0.007	1-2

Average unbleached pulp input rate to #1 Bleach Plant during the testing was 48,000 lbs/hr.
Maximum unbleached pulp input rate to #1 Bleach Plant 58,333 lbs/hr.

Footnotes:

< - indicates that some detection limits (non-detect) were used in calculating the mean

1 - Scrubber to be modified by changing the scrubber medium to white liquor and adding the vent gases from Washer 11 and Tower 10 Scrubber. The emissions calculations for this source and all assumptions are on a separate page.

2 - Sodium Hypochlorite is made from chlorine and caustic, no chlorine dioxide is expected. No data on Methanol, basis #1 BP Scrubber at 1/100th of the volumetric flow.

3 - Refer to Figure 3

POTENTIAL EMISSIONS[1]

MAXIMUM EMISSIONS RATES POUNDS/HOUR

ID	Chlorine	Chlorine Dioxide	Chloroform	Methanol	VENT[4]
#1 BP Exhaust Vent	<0.349	<0.397	5.63	<0.158	1-3
#1 BP Scrubber[2] Vent	<0.271	<3.52	1.00	0.833	1-5
#5 Vacuum Pump Vent	<0.007	<0.005	0.149	<0.006	1-1
Center Vacuum Pump Vent	<0.033	<0.021	0.623	0.476	1-6
Washer #8 Vent	<0.033	<0.083	0.005	<0.021	1-4
Hypo Mix Tank[3] Vent	<0.811	<0.003	0.009	0.009	1-2

Footnotes:

< - indicates that some detection limits (non-detect) were used in calculating the Mean.

1 - Basis: Mean emissions rate from Weston Data projected to the maximum pulp input rate; Potential Emissions Rate = Mean Emissions Rate x (58,333 lbs/hr)/(48,000 lbs/hr)

2 - Scrubber to be modified by changing the scrubber medium to white liquor and adding the vent gases from Washer 11 and Tower 10 Scrubber. The emissions calculations for this source and all assumptions are on a separate page.

3 - Sodium Hypochlorite is made from chlorine and caustic, no chlorine dioxide is expected. No data on Methanol, basis #1 BP Scrubber at 1/100th of the volumetric flow.

4 - Refer to Figure 3

PROJECTED[1] EMISSION LEVELS FROM #1 BLEACH PLANT

EMISSION POINT	CURRENT	NON-OP[2] FUTURE	OPERAT.[3] FUTURE	COMMENT
CHLORINE	lbs/hour	lbs/hour	lbs/hour	
#1 BP Exhaust	<0.287	<0.287	<0.287	
Hypo Mix	<0.668	<0.668	<0.668	
#5 Vac pump	<0.006	<0.006	<0.006	
Cen. Vac pump	<0.027	<0.027	<0.027	
Washer 8	<0.027	<0.027	<0.027	
#1 BP Scrubber	<0.091	<0.223	<0.223	60% reduction in scr.
Tower 10	0.126	**	**	
Washer 11	<0.011	**	**	
Total	<1.243	<1.238	<1.238	
CHLORINE DIOXIDE				
#1 BP Exhaust	<0.327	<0.327	<0.327	
Hypo Mix	<0.002	<0.002	<0.002	
#5 Vac pump	<0.004	<0.004	<0.004	
Cen. Vac pump	<0.017	<0.017	<0.017	
Washer 8	<0.068	<0.068	<0.068	
#1 BP Scrubber	<0.058	<0.265	<2.896	60% reduction in scr.
Tower 10	0.336	**	**	40% increase in vol.
Washer 11	<0.049	**	**	
Total	<0.861	<0.683	<3.314	
CHLOROFORM				
#1 BP Exhaust	4.63	4.63	0.463	90% reduction
Hypo Mix	0.007	0.007	0.007	from process changes
#5 Vac pump	0.123	0.123	0.012	
Cen. Vac pump	0.513	0.513	0.051	
Washer 8	0.004	0.004	0.004	
#1 BP Scrubber	0.808	0.811	0.019	
Tower 10	<0.001	**	**	
Washer 11	0.002	**	**	
Total	<6.088	<6.088	<0.556	
METHANOL	No Change expected			
#1 BP Exhaust	<0.130	<0.130	<0.130	
Hypo Mix	0.007	0.007	0.007	
#5 Vac pump	<0.005	<0.005	<0.005	
Cen. Vac pump	0.392	0.392	0.392	
Washer 8	<0.017	<0.017	<0.017	
#1 BP Scrubber	<0.676	<0.686	<0.686	
Tower 10	<0.001	**	**	
Washer 11	<0.009	**	**	
Total	<1.237	<1.237	<1.237	
TOTAL (ALL FOUR)	lbs/hour	lbs/hour	lbs/hour	
	9.43	9.25	6.35	

Footnotes:
1 - Maximum potential emissions = projected emissions x 1.215
2 - Normal Operation after modification (5% ClO2 substitution)
3 - 100% ClO2 Substitution after modification
** included in the #1 BP Scrubber emissions after modification

Emissions Calculation for Modified Scrubber (#1BP Scrubber)

1) Influent load made up from the following sources

   a) Tower 10 Scrubber Effluent
   b) Washer 11 Effluent
   c) Dc Stage Tower Effluent

2) Assumptions using Weston data of May 1993 as basis

   a) *Tower 10 ClO2 emissions from the chilled water scrubber will increase by 40% due to increased volume of air flow caused by connecting it to the modified scrubber*

      0.336 lbs/hour + 40% = 0.470 lbs/hour ClO2

   b) *Dc Stage Tower will have emissions similar to Tower 10*

      calculate influent to chilled water scrubber for Tower 10 using the effluent data and 95% efficiency for the scrubber removal of chlorine dioxide {NCASI TB 616}

      0.336 lbs/hour = (0.05) x (influent lbs/hour)

      influent = 6.72 lbs/hour ClO2

      calculate influent to chilled water scrubber for Tower 10 using the effluent data and 70% efficiency for the scrubber removal of chlorine {NCASI TB 616}

      0.126 lbs/hour = (0.30) x (influent lbs/hour)

      influent = 0.42 lbs/hour Cl2

3) Effluent Calculation

   a) *total influent load at 60% removal for ClO2 and Cl2: basis vendor estimate for modified scrubber*

      Tower 10 Scrubber Effluent = 0.470 lbs ClO2/hour
      0.126 lbs Cl2/hour

      Washer 11 Effluent = 0.049 lbs ClO2/hour
      0.011 lbs Cl2/hour

      Dc Stage Tower Effluent = 6.72 lbs ClO2/hour
      0.42 lbs Cl2/hour

      7.239 lbs ClO2/hour x 0.40 = 2.90 lbs/hour

      0.557 lbs Cl2/hour x 0.40 = 0.223 lbs/hour

   b) *Assume potential emissions at 1.215 times these levels based on actual test rate versus maximum rate*

      2.90 lbs/hour x 1.215 = 3.52 lbs/hour ClO2

      0.223 lbs/hour x 1.215 = 0.271 lbs/hour Cl2

PACKED TOWER SCRUBBER EFFICIENCY CALCULATIONS

$Z = Hoy \times Noy$
$Hoy = G/K_{ga}P$
$Noy = \ln [\text{conc in/conc out}]$

Z = height of packing in tower.
Hoy = height of transfer unit.
Noy = number of transfer units.
G = gas flow in lb moles/hr ft^2.
K_{ga} = mass transfer coeff. for gas.
P = pressure in atm.
conc. in = scrubber inlet gas concentration.
conc. out = scrubber outlet gas concentration.

$Z = (G/K_{ga}P)(\ln[\text{conc in/conc out}])$

For the Foley #1 mill chlorine scrubber, the packed height is 4 ft. = Z.
The Foley #1 mill chlorine scrubber is 7 ft in diameter, which is 38.48 ft^2
The concentration of chlorine out of the scrubber = .091 lbs/hr (per Weston data of 1993).
The gas flow through #1 mill chlorine scrubber is 12400cfm.
The P used is 1 atm.
Per NCASI, K_{ga} for chlorine dioxide scrubbed with white liquor = 14 to 50.
Per NCASI, K_{ga} for chlorine scrubbed with white liquor = 15 to 35 (see Tech. Bull. 616).
Per Caldwell/MacKay, K_{ga} for chlorine and chlorine dioxide scrubbed with white liquor is approximately 8.0.
Per NCASI Technical Bulletin 616, Hoy = 1.7 to 3.2 for chlorine dioxide scrubbed with white liquor.
Per NCASI Technical Bulletin 616, Noy = 2.7 to 4.1 for chlorine scrubbed with white liquor.

$G = (12400\ ft^3/min)(.0686\ lbs/ft^3)(60\ min/hr) = 51038$ lbs/hr.
G = (51038 lbs/hr)(1 lb mole/29 lbs)(1 area/38.48 ft^2) = 45.7 lb moles/hr ft^2.

Using the Caldwell/MacKay K_{ga} of 8.0:

$Z = (G/K_{ga}P)(\ln [in/.091])$
$4 = (45.7/8)(\ln [in/.091])$
$\ln [in/.091] = .70$
$in/.091 = \text{anti log of } .70 = 2.01$
$in = (2.010)(.091) = .183$ lbs/hr of chlorine

The inlet concentration is thus .183 lbs/hr with an outlet concentration of .091 lbs/hr.
The **scrubber removal efficiency is:**
[(.183 - .091)/.183] x 100 = **50.4 %**

Using NCASI midrange K_{ga} of 25:

$Z = (G/K_{ga}P)(\ln [\text{in conc/out conc}])$
$4 = (45.7/25)(\ln [in/.091])$
$\ln [in/.091] = 2.19$
$in/.091 = \text{anti log of } 2.19 = 8.92$
$in = (8.92)(.091) = .812$ lbs/hr of chlorine.

The inlet concentration is thus .812 lbs/hr with an outlet concentration of .091 lbs/hr.
The **scrubber removal efficiency is**:
[(.812 - .091)/.812] x 100 = **89 %**

John Edgar 6-1-94

1. Based on the design equation for a packed scrubber, and using the K_{ga}'s defined above, the scrubber vent emissions of chlorine ranged from **50 to 89 %**.

2. Per correspondence with Caldwell/MacKay (Mr. Rick MacKay), using some of their scrubber field data, and the scrubber design of the current #1 mill chlorine scrubber, it is predicted the chlorine removal efficiency would be 60 to 80 % and chlorine dioxide removal would be **40 to 60 %**

3. Per discussion with Willard Hughes of Sirrine Engineering, following his discussion with Ceilcote, they believe our present #1 mill scrubber will remove **50 to 70 %** of chlorine and chlorine dioxide using white liquor as scrubbing liquid.

4. All the above data **averages** out to **60 % removal efficiency.**

The available data makes me believe we can achieve 60 % removal of chlorine dioxide emissions across our existing #1 mill chlorine scrubber with the system in good operating condition and a properly sized white liquor delivery system.

scrub1

John C. Edgar 6-1-94

Bleach Plant Production Rate Calculations

Definitions:
EADMTPD = Equivalent Air Dried Metric Tons Per Day
ADMTPD = Air Dried Metric Tons Per Day
BDSTPD = Bone Dry Short Tons Per Day
5M1BLRTE - TDC Point for #1 Bleach Plant
5M2BLRTE - TDC Point for #2 Bleach Plant

TDC Calculation:
5M1BLRTE = EADMTPD from #1 Pulp Drying Machine
5M2BLRTE = EADMTPD from #2 Pulp Drying Machine

Pulp Shrinkage from 1989 study:
#1 Mill Stock Type V-5 = 12.1%
#2 Mill Stock Type NMC (P-1) = 9.0%

Calculate Bleach Plant Feed Rates from TDC Data and shrinkage data:

#1 Bleach Feed = 5M1BLRTE/0.879 = ADMTPD unbleached feed
#2 Bleach Feed = 5M2BLRTE/0.91 = ADMTPD unbleached feed

	#1 Bleach	
	5M1BLRTE	Feed
Date	EADMTPD	ADMTPD
5/11	550	626
5/12	487	554
5/13	489	556

	#2 Bleach	
	5M2BLRTE	Feed
Date	EADMTPD	ADMTPD
5/11	843	926
5/12	841	924
5/13	854	938

Convert to Bone Dry Short Tons:

Assume 10% moisture for Air Dried pulp
1 metric ton = 1.1023 short ton

	#1 Bleach	
	Feed	Feed
Date	ADMTPD	BDSTPD
5/11	626	621
5/12	554	550
5/13	556	552
avg		574
		23.9 TPH

	#2 Bleach	
	Feed	Feed
Date	ADMTPD	BDSTPD
5/11	926	919
5/12	924	917
5/13	938	931
avg		922
		38.4 TPH

References: Ned Kruis letter on TDC Calculations & Tonnage

TABLE 2.3. Cl2, ClO2, AND CHCl3 EMISSION DATA - NO. 1 MILL EXHAUST VENT (#1)

(No. 1 BP Exhaust Vent)

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	MEAN
Date	5/11/93	5/11/93	5/12/93	5/12/93	5/13/93	5/13/93	----
Time Began	1255	1715	0745	1145	0950	1400	----
Time Ended	1325	1745	0815	1215	1020	1430	----
Stack Gas							
Temperature, °F	88	87	83	84	84	87	86
Velocity, ft/sec	32.4	31.8	31.0	31.3	31.1	31.3	31.5
Moisture, %	4.4	4.3	3.8	3.9	4.0	4.3	4.1
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	20500	20100	19600	19800	19700	19800	19900
at Standard Conditions*	19000	18700	18400	18600	18300	18200	18600
Chlorine							
Concentration, ppm	4.50	< 0.768	< 0.743	< 0.773	< 0.761	< 0.778	< 1.39
Emission Rate, lb/hr	0.945	< 0.159	< 0.151	< 0.159	< 0.154	< 0.156	< 0.287
Chlorine Dioxide							
Concentration, ppm	7.37	< 0.512	< 0.495	< 0.515	< 0.508	< 0.519	< 1.65
Emission Rate, lb/hr	1.47	< 0.101	< 0.096	< 0.101	< 0.098	< 0.099	< 0.327
Chloroform							
Concentration, ppm	10.6	9.13	8.69	8.22	9.73	34.7	13.5
Emission Rate, lb/hr	3.74	3.17	2.97	2.84	3.31	11.8	4.63

* 68 °F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at level indicated

TABLE 2.2. ACETONE, METHANOL, AND MEK EMISSION DATA - NO. 1 MILL EXHAUST VENT (#1)

(No.1 BP Exhaust Vent)

	RUN 1	RUN 2	RUN 3	MEAN
Date	5/11/93	5/11/93	5/12/93	----
Time Began	1240	1700	0730	----
Time Ended	1340	1800	0830	----
Stack Gas				
Temperature, °F	88	87	83	86
Velocity, ft/sec	32.4	31.8	31.0	31.7
Moisture, %	4.4	4.3	3.8	4.2
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	20500	20100	19600	20100
at Standard Conditions*	19000	18700	18400	18700
Acetone				
Concentration, ppm	< 0.846	< 0.846	< 0.820	< 0.837
Emission Rate, lb/hr	< 0.145	< 0.143	< 0.136	< 0.142
Methanol				
Concentration, ppm	< 1.41	< 1.41	< 1.36	< 1.39
Emission Rate, lb/hr	< 0.133	< 0.131	< 0.125	< 0.130
Methyl Ethyl Ketone				
Concentration, ppm	< 0.625	< 0.625	< 0.605	< 0.618
Emission Rate, lb/hr	< 0.133	< 0.131	< 0.125	< 0.130

* 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at level indicated

TABLE 2.4. Cl2, ClO2, AND CHCl3 EMISSION DATA - NO. 1 MILL Cl2 SCRUBBER VENT (#2)

(No. 1 BP Scrubber Vent)

	RUN 1	RUN 2	RUN 3*	RUN 5**	RUN 6	RUN 7***	MEAN
Date	5/11/93	5/11/93	5/12/93	5/13/93	5/13/93	5/13/93	----
Time Began	1304	1700	1300	0740	1140	1540	----
Time Ended	1334	1730	1325	0810	1210	1610	----
Stack Gas							
Temperature, °F	112	112	111	112	112	112	112
Velocity, ft/sec	22.1	22.2	20.7	22.2	22.2	22.2	21.9
Moisture, %	9.1	9.1	8.8	9.2	9.2	9.2	9.1
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	12500	12500	11700	12500	12500	12500	12400
at Standard Conditions****	10500	10600	9890	10400	10400	10400	10400
Chlorine							
Concentration, ppm	< 0.772	< 0.780	< 0.937	< 0.760	< 0.765	< 0.776	< 0.798
Emission Rate, lb/hr	< 0.089	< 0.091	< 0.102	< 0.087	< 0.088	< 0.089	< 0.091
Chlorine Dioxide							
Concentration, ppm	< 0.515	< 0.520	< 0.625	< 0.507	< 0.510	< 0.517	< 0.532
Emission Rate, lb/hr	< 0.057	< 0.058	< 0.065	< 0.055	< 0.056	< 0.056	< 0.058
Chloroform							
Concentration, ppm	4.66	3.87	2.14	5.26	4.85	4.30	4.18
Emission Rate, lb/hr	0.908	0.762	0.392	1.02	0.938	0.831	0.808

*Average of two velocity runs shown.

** Run 4 was voided due to process problem.

***Average of two morning velocity runs shown.

**** 68 F, 29.92 in. Hg.

Note: this source to pick up Tower 10 and Washer 11 upon modification

less than sign indicates that emissions were non-detect at level indicated

TABLE 2.4. ACETONE, METHANOL, AND MEK EMISSION DATA - NO. 1 MILL Cl2 SCRUBBER VENT (#2)
(No. 1 BP Scrubber Vent)

	RUN 1	RUN 2	RUN 3*	MEAN
Date	5/13/93	5/13/93	5/13/93	----
Time Began	0730	1020	1130	----
Time Ended	0830	1120	1230	----
Stack Gas				
Temperature, °F	112	112	112	112
Velocity, ft/sec	22.2	22.2	22.2	22.2
Moisture, %	9.2	9.2	9.2	9.2
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	12500	12500	12500	12500
at Standard Conditions**	10400	10400	10400	10400
Acetone				
Concentration, ppm	< 0.837	< 0.843	< 0.843	< 0.841
Emission Rate, lb/hr	< 0.079	< 0.079	< 0.079	< 0.079
Methanol				
Concentration, ppm	12.2	12.8	14.1	13.0
Emission Rate, lb/hr	0.633	0.664	0.730	0.676
Methyl Ethyl Ketone				
Concentration, ppm	< 0.618	< 0.623	< 0.623	< 0.621
Emission Rate, lb/hr	< 0.072	< 0.073	< 0.073	< 0.073

*Run 2 velocity data repeated for Run 3.

** 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

TABLE 2.5. Cl2, ClO2, AND CHCl3 EMISSION DATA - NO. 5 VACUUM PUMP VENT (#3)

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	MEAN
Date	5/11/93	5/11/93	5/12/93	5/12/93	5/13/93	5/13/93	----
Time Began	1313	1751	0734	1525	0753	1258	----
Time Ended	1343	1821	0804	1555	0823	1328	----
Stack Gas							
Temperature, °F	98	98	98	98	95	97	97
Velocity, ft/sec	38.9	38.3	38.3	39.2	36.4	36.9	38.0
Moisture, %	6.0	6.0	6.1	6.1	5.6	6.0	6.0
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	790	778	779	796	744	758	774
at Standard Conditions*	706	696	696	711	664	671	691
Chlorine							
Concentration, ppm	< 0.768	< 0.783	< 0.744	< 0.777	< 0.756	< 0.767	< 0.766
Emission Rate, lb/hr	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006	< 0.006
Chlorine Dioxide							
Concentration, ppm	< 0.512	< 0.522	< 0.496	< 0.518	< 0.504	< 0.511	< 0.510
Emission Rate, lb/hr	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Chloroform							
Concentration, ppm	10.6	6.54	8.07	9.17	13.4	9.86	9.61
Emission Rate, lb/hr	0.139	0.085	0.104	0.121	0.166	0.123	0.123

* 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

TABLE 2.6. ACETONE, METHANOL, AND MEK EMISSION DATA - NO. 5 VACUUM PUMP VENT (#3)

	RUN 1	RUN 2*	RUN 3*	MEAN
Date	5/11/93	5/11/93	5/11/93	----
Time Began	1329	1452	1628	----
Time Ended	1429	1552	1728	----
Stack Gas				
Temperature, °F	98	98	98	98
Velocity, ft/sec	38.9	38.6	38.6	38.7
Moisture, %	6.0	6.0	6.0	6.0
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	790	784	784	786
at Standard Conditions**	706	701	701	703
Acetone				
Concentration, ppm	< 0.850	0.921	< 0.876	< 0.882
Emission Rate, lb/hr	< 0.005	0.006	< 0.006	< 0.006
Methanol				
Concentration, ppm	< 1.41	< 1.41	< 1.46	< 1.43
Emission Rate, lb/hr	< 0.005	< 0.005	< 0.005	< 0.005
Methyl Ethyl Ketone				
Concentration, ppm	< 0.627	< 0.628	< 0.647	< 0.634
Emission Rate, lb/hr	< 0.005	< 0.005	< 0.005	< 0.005

*Average of two velocity runs shown.

** 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

TABLE 2.6. Cl2, ClO2, AND CHCl3 EMISSION DATA - CENTER VACUUM PUMP VENT (#4)

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	MEAN
Date	5/11/93	5/11/93	5/12/93	5/12/93	5/13/93	5/13/93	----
Time Began	1010	1420	0745	1440	0945	1345	----
Time Ended	1040	1450	0815	1510	1015	1415	----
Stack Gas							
Temperature, °F	92	92	112	112	112	112	105
Velocity, ft/sec	69.3	71.1	69.5	74.2	72.3	77.0	72.2
Moisture, %	5.0	5.0	9.1	9.1	9.2	9.2	7.8
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	3540	3630	3560	3800	3700	3940	3690
at Standard Conditions*	3250	3330	3010	3210	3090	3290	3190
Chlorine							
Concentration, ppm	< 0.772	< 0.777	< 0.746	< 0.781	< 0.767	< 0.774	< 0.770
Emission Rate, lb/hr	< 0.028	< 0.029	< 0.025	< 0.028	< 0.026	< 0.028	< 0.027
Chlorine Dioxide							
Concentration, ppm	< 0.515	< 0.518	< 0.498	< 0.521	< 0.511	< 0.516	< 0.513
Emission Rate, lb/hr	< 0.018	< 0.018	< 0.016	< 0.018	< 0.017	< 0.018	< 0.017
Chloroform							
Concentration, ppm	5.79	3.58	3.73	5.65	4.59	27.7	8.52
Emission Rate, lb/hr	0.350	0.221	0.209	0.337	0.264	1.70	0.513

* 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

TABLE 2.8. ACETONE, METHANOL, AND MEK EMISSION DATA - CENTER VACUUM PUMP VENT (#4)

	RUN 1	RUN 2	RUN 3	MEAN
Date	5/11/93	5/11/93	5/12/93	----
Time Began	0955	1415	0735	----
Time Ended	1055	1515	0835	----
Stack Gas				
Temperature, °F	92	92	112	99
Velocity, ft/sec	69.3	71.1	69.5	70.0
Moisture, %	5.0	5.0	9.1	6.4
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	3540	3630	3560	3580
at Standard Conditions*	3250	3330	3010	3200
Acetone				
Concentration, ppm	0.921	< 0.857	< 0.822	< 0.867
Emission Rate, lb/hr	0.027	< 0.026	< 0.022	< 0.025
Methanol				
Concentration, ppm	13.7	28.9	31.5	24.7
Emission Rate, lb/hr	0.223	0.480	0.473	0.392
Methyl Ethyl Ketone				
Concentration, ppm	< 0.628	< 0.633	< 0.607	< 0.623
Emission Rate, lb/hr	< 0.023	< 0.024	< 0.021	< 0.022

* 68°F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

TABLE 2.7. Cl2, ClO2, AND CHCl3 EMISSION DATA - WASHER 11 VENT (#5)

	RUN 1	RUN 2	RUN 3	RUN 5*	RUN 6	RUN 7**	MEAN
Date	5/11/93	5/11/93	5/12/93	5/13/93	5/13/93	5/13/93	----
Time Began	1130	1538	0900	0845	1245	1645	----
Time Ended	1200	1608	0930	0915	1315	1715	----
Stack Gas							
Temperature, °F	91	91	87	90	90	90	90
Velocity, ft/sec	42.3	42.2	36.6	37.2	39.9	38.6	39.5
Moisture, %	4.9	4.9	4.3	4.8	4.8	4.8	4.8
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	1530	1520	1320	1340	1440	1390	1420
at Standard Conditions***	1400	1400	1230	1220	1310	1260	1300
Chlorine							
Concentration, ppm	< 0.772	< 0.780	< 0.754	< 0.760	< 0.769	< 0.776	< 0.768
Emission Rate, lb/hr	< 0.012	< 0.012	< 0.010	< 0.010	< 0.011	< 0.011	< 0.011
Chlorine Dioxide							
Concentration, ppm	< 0.515	< 0.520	7.84	4.66	3.59	5.38	< 3.75
Emission Rate, lb/hr	< 0.008	< 0.008	0.101	0.060	0.049	0.071	< 0.049
Chloroform							
Concentration, ppm	0.132	0.038	0.113	0.047	0.048	0.025	0.067
Emission Rate, lb/hr	0.003	0.001	0.003	0.001	0.001	0.001	0.002

* Run 4 was voided due to process problem.

** Average of two earlier velocity runs shown.

*** 68 F, 29.92 in. Hg.

Note: this source to be routed to No. 1 BP Scrubber after modification

less than sign indicates that emissions were non-detect at levels indicated

TABLE 2.10. ACETONE, METHANOL, AND MEK EMISSION DATA - WASHER 11 VENT (#5)

	RUN 1	RUN 2	RUN 3	MEAN
Date	5/11/93	5/11/93	5/12/93	----
Time Began	1115	1515	0900	----
Time Ended	1215	1615	1000	----
Stack Gas				
Temperature, °F	91	91	87	90
Velocity, ft/sec	42.3	42.2	36.6	40.4
Moisture, %	4.9	4.9	4.3	4.7
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	1530	1520	1320	1460
at Standard Conditions*	1400	1400	1230	1340
Acetone				
Concentration, ppm	0.886	< 0.860	< 0.830	< 0.859
Emission Rate, lb/hr	0.011	< 0.011	< 0.009	< 0.010
Methanol				
Concentration, ppm	< 1.41	< 1.43	< 1.38	< 1.41
Emission Rate, lb/hr	< 0.010	< 0.010	< 0.008	< 0.009
Methyl Ethyl Ketone				
Concentration, ppm	< 0.628	< 0.635	< 0.613	< 0.625
Emission Rate, lb/hr	< 0.010	< 0.010	< 0.008	< 0.009

* 68°F, 29.92 in. Hg.

Note: this source to be routed to No. 1 BP Scrubber after modification

less than sign indicates that emissions were non-detect at levels indicated

TABLE 2.8. Cl2, ClO2, AND CHCl3 EMISSION DATA - WASHER 8 VENT (#6)

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	MEAN
Date	5/11/93	5/11/93	5/12/93	5/12/93	5/13/93	5/13/93	----
Time Began	1135	1600	0900	1310	0855	1300	----
Time Ended	1205	1630	0930	1340	0925	1330	----
Stack Gas							
Temperature, °F	86	86	82	84	81	84	84
Velocity, ft/sec	37.8	44.0	43.9	43.6	41.5	42.1	42.1
Moisture, %	4.2	4.2	3.7	3.9	3.6	4.0	3.9
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	2360	2720	2710	2700	2570	2610	2610
at Standard Conditions*	2200	2540	2560	2530	2400	2420	2440
Chlorine							
Concentration, ppm	2.46	< 0.768	< 0.753	< 0.773	< 0.756	< 0.774	< 1.05
Emission Rate, lb/hr	0.060	< 0.022	< 0.021	< 0.022	< 0.020	< 0.021	< 0.027
Chlorine Dioxide							
Concentration, ppm	14.7	< 0.512	< 0.502	< 0.515	< 0.504	< 0.516	< 2.88
Emission Rate, lb/hr	0.341	< 0.014	< 0.013	< 0.014	< 0.013	< 0.013	< 0.068
Chloroform							
Concentration, ppm	0.232	0.030	0.162	0.028	0.055	0.055	0.094
Emission Rate, lb/hr	0.009	0.001	0.008	0.001	0.002	0.002	0.004

* 68° F, 29.92 in. Hg.

less than sign indicates that emissions were non-detect at levels indicated

TABLE 2.12. ACETONE, METHANOL, AND MEK EMISSION DATA - WASHER 8 VENT (#6)

	RUN 1	RUN 2	RUN 3	MEAN
Date	5/11/93	5/11/93	5/12/93	----
Time Began	1120	1545	0845	----
Time Ended	1220	1645	0945	----
Stack Gas				
Temperature, °F	86	86	82	85
Velocity, ft/sec	37.8	44.0	43.9	41.9
Moisture, %	4.2	4.2	3.7	4.0
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	2360	2720	2710	2600
at Standard Conditions*	2200	2540	2560	2430
Acetone				
Concentration, ppm	< 0.846	**	< 0.829	< 0.838
Emission Rate, lb/hr	< 0.017	**	< 0.019	< 0.018
Methanol				
Concentration, ppm	< 1.41	**	< 1.38	< 1.39
Emission Rate, lb/hr	< 0.015	**	< 0.018	< 0.017
Methyl Ethyl Ketone				
Concentration, ppm	< 0.625	**	< 0.612	< 0.618
Emission Rate, lb/hr	< 0.015	**	< 0.018	< 0.017

* 68°F, 29.92 in. Hg.

**Run 2 sample vial broken.

less than sign indicates that emissions were non-detect at levels indicated

TABLE 2.9. Cl2, ClO2, AND CHCl3 EMISSION DATA - TOWER 10 SCRUBBER VENT (#7)

	RUN 1	RUN 2	RUN 3	RUN 4	RUN 5	RUN 6	MEAN
Date	5/11/93	5/11/93	5/12/93	5/12/93	5/13/93	5/13/93	----
Time Began	1005	1430	1015	1415	0745	1145	----
Time Ended	1035	1500	1045	1445	0815	1215	----
Stack Gas							
Temperature, °F	94	94	71	82	70	82	82
Velocity, ft/sec	1.2	1.1	1.3	1.2	1.1	1.2	1.2
Moisture, %	5.4	5.4	2.5	3.7	2.5	3.7	3.9
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	58	54	58	58	52	56	56
at Standard Conditions*	52	49	56	55	50	52	52
Chlorine							
Concentration, ppm	333	163	255	240	170	135	216
Emission Rate, lb/hr	0.191	0.088	0.158	0.146	0.094	0.078	0.126
Chlorine Dioxide							
Concentration, ppm	451	514	459	235	1850 **	228	623
Emission Rate, lb/hr	0.246	0.264	0.270	0.136	0.973	0.124	0.336
Chloroform							
Concentration, ppm	0.388	0.298	0.047	0.155	0.229	0.231	0.225
Emission Rate, lb/hr	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

* 68 F, 29.92 in. Hg.

**Duplicate shown in Table 3.1 confirms the high result.

Note: this source to be routed to the No.1 BP Scrubber after modification

less than sign indicates that emissions were non-detect at level indicated

TABLE 2.14. ACETONE, METHANOL, AND MEK EMISSION DATA - TOWER 10 SCRUBBER VENT (#7)

	RUN 1	RUN 2	RUN 3	MEAN
Date	5/11/93	5/11/93	5/12/93	----
Time Began	0950	1415	1000	----
Time Ended	1050	1515	1100	----
Stack Gas				
Temperature, °F	94	94	71	86
Velocity, ft/sec	1.2	1.1	1.3	1.2
Moisture, %	5.4	5.4	2.5	4.4
CO2 Concentration , %	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min				
at Stack Conditions	58	54	58	57
at Standard Conditions*	52	49	56	52
Acetone				
Concentration, ppm	< 0.846	< 0.846	< 0.849	< 0.847
Emission Rate, lb/hr	< 0.001	< 0.001	< 0.001	< 0.001
Methanol				
Concentration, ppm	< 1.41	< 1.41	< 1.41	< 1.41
Emission Rate, lb/hr	< 0.001	< 0.001	< 0.001	< 0.001
Methyl Ethyl Ketone				
Concentration, ppm	< 0.625	< 0.625	< 0.627	< 0.625
Emission Rate, lb/hr	< 0.001	< 0.001	< 0.001	< 0.001

* 68°F, 29.92 in. Hg.

Note: this source to be routed to the No. 1 BP Scrubber after modification

less than sign indicates that the emission were non-detect at level indicated

TABLE 2.10. Cl2, ClO2, AND CHCl3 EMISSION DATA - HYPO MIX VENT (#8)

	RUN 2*	RUN 3	RUN 4	RUN 5	RUN 6	RUN 7	MEAN
Date	5/11/93	5/12/93	5/13/93	5/13/93	5/13/93	5/13/93	----
Time Began	1637	1430	0720	1121	1522	1922	----
Time Ended	1646	1500	0750	1151	1552	1952	----
Stack Gas							
Temperature, °F	105	104	93	93	97	98	98
Velocity, ft/sec	0.5	0.6	0.6	0.6	0.6	0.6	0.6
Moisture, %	7.4	7.3	5.3	5.3	5.9	6.1	6.2
CO2 Concentration , %	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O2 Concentration , %	20.8	20.8	20.8	20.8	20.8	20.8	20.8
Volumetric Flow Rates, ft3/min							
at Stack Conditions	69	72	73	73	76	79	74
at Standard Conditions**	60	63	66	66	67	70	65
Chlorine							
Concentration, ppm	6040	9.89	< 0.754	< 0.778	1.44	1.38	< 1010
Emission Rate, lb/hr	4.00	0.007	< 0.001	< 0.001	0.001	0.001	< 0.668
Chlorine Dioxide							
Concentration, ppm	17.1	< 0.529	< 0.503	< 0.519	< 0.535	< 0.513	< 3.28
Emission Rate, lb/hr	0.011	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002
Chloroform							
Concentration, ppm	5.16	1.78	4.65	3.13	18.3	3.04	6.01
Emission Rate, lb/hr	0.006	0.002	0.006	0.004	0.023	0.004	0.007

*Run 1 was voided due to process problem.

** 68°F, 29.92 in. Hg.

Note: no chlorine dioxide is used in this process

less than sign indicates that emissions were non-detect at level indicated

TEST METHODOLOGY

SECTION 3. SOURCE TESTING METHODOLOGY

3.1. AIR EMISSION SAMPLING AND ANALYSIS

3.1.1. Procedures

Testing was performed using the reference methods identified below.

Parameter	Reference Method
Volumetric Flow	EPA 1, 2
Chlorine, Chlorine Dioxide, Chloroform	NCASI* Procedures

*National Council of the Paper Industry for Air and Stream Improvement, Inc.

The most current revision of each method was used. The following paragraphs summarize the protocol.

Volumetric Flow

The sampling points for some sources were selected in accordance with EPA Reference Method 1 so that a representative sample of stack gas was taken. The traverse points were located in the centers of equal area zones. The number of zones was determined by the stack dimensions and the number of stack diameters upstream and downstream from the sampling points to the nearest disturbance.

The velocity of the gas stream of some sources was measured in accordance with EPA Reference Method 2 by reading the instantaneous velocity head with an inclined manometer at each sampling point using a standard pitot tube. The stack pressure was measured with the static side of the pitot tube. A calibrated pyrometer was used to measure stack temperature.

The velocity of the gas stream of some sources was measured by reading the instantaneous velocity with an anemometer at each sampling point. A calibrated pyrometer was used to measure stack temperature.

Gas Composition

Carbon dioxide and oxygen concentrations were assumed to be the same as ambient air. The molecular weight of the gas was calculated using the moisture, oxygen, and carbon dioxide contents.

Moisture Content

The moisture content was calculated using the wet bulb/dry bulb approximation technique.

Chlorine, Chlorine Dioxide, and Chloroform

Samples were withdrawn from the source at a flow rate of approximately 200 mL/min or 1 L/min through a probe and Teflon line to three midget impingers in series. The first and second impingers each contained 20 mL of potassium iodide (KI) solution, buffered with potassium dihydrogen phosphate (KH_2PO_4) and sodium hydroxide (NaOH). The third impinger was empty. The sample flow rate was measured at the probe inlet with a calibrated rotameter before and after each 200 mL/min run. A calibrated dry gas meter was used to measure the sample volume for 1 L/min runs.

The outlet of the third impinger was connected to an activated charcoal adsorbent tube to collect any chloroform present. The outlet of the charcoal tube was connected to the sample pump inlet. The sampling train is illustrated in Figure 3.1.

After sampling, the probe was removed from the source and washed with 2 mL of deionized water which was collected in the first impinger. The sample train was then purged for 15 minutes with ambient air filtered through a charcoal tube.

The contents of the impingers were combined in a flask and titrated with sodium thiosulfate solution to the first endpoint (Tn). Five mL of ten percent sulfuric acid solution was then added, and the titration was continued to the second endpoint (Ta).

Concentrations of chlorine and chlorine dioxide were calculated by using the number of moles of each detected during the titration and the gas volume collected. For reporting purposes, when no color was seen or Ta was much greater than Tn, detection limits of Tn = 0.05 mL and Ta = Tn + 0.05 mL were used in the calculations.

The charcoal tubes were sealed and placed on ice to preserve them until they were returned to the laboratory. The charcoal tubes were desorbed in hexane to prepare them for analysis. Standards were prepared and used to record the instrument response. The concentrations of chloroform were measured by gas chromatography using an electron capture detector (GC/ECD).

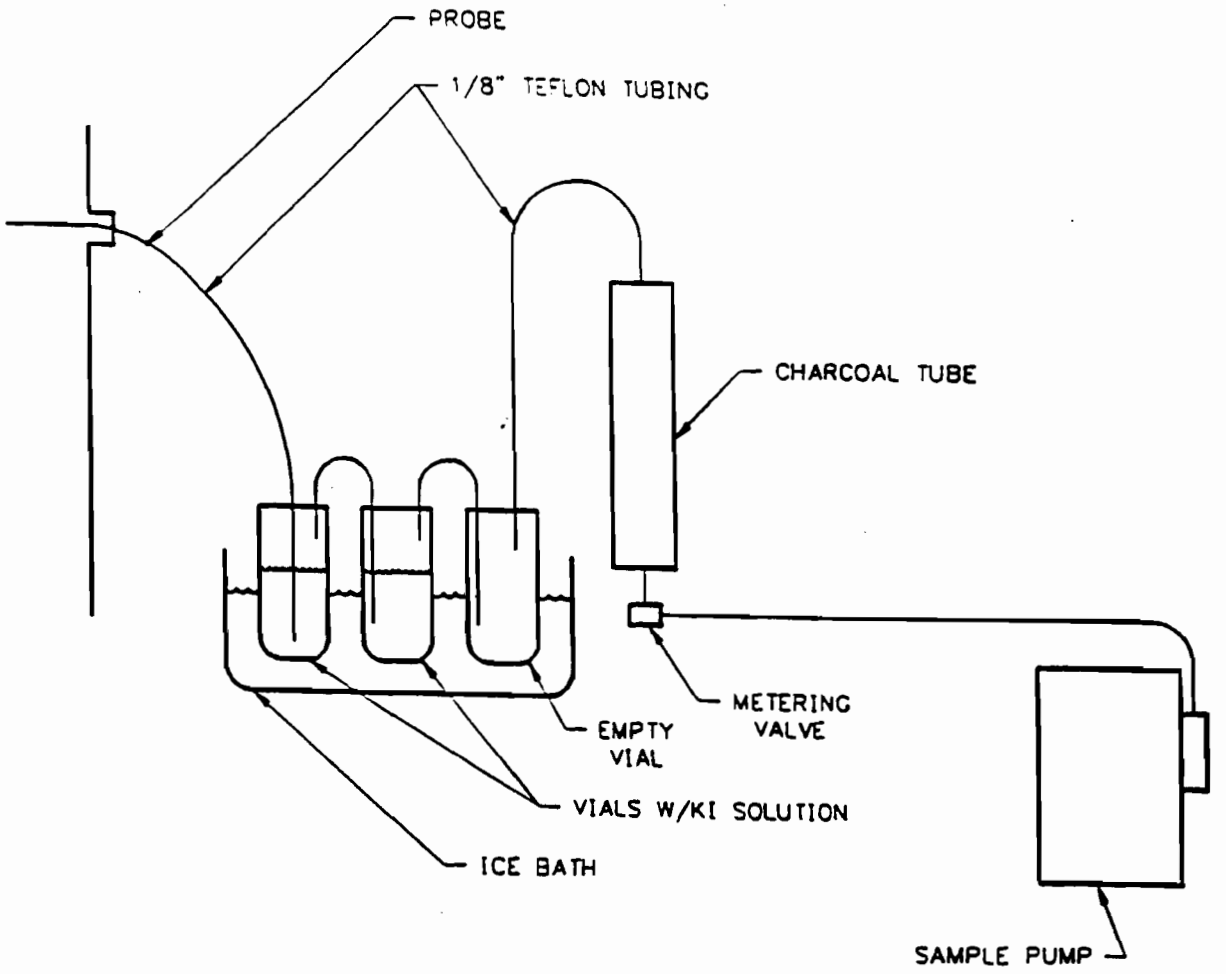


FIGURE 3.1. CHLORINE, CHLORINE DIOXIDE, AND CHLOROFORM SAMPLING TRAIN

124

Acetone, Methanol, and Methyl Ethyl Ketone

Samples were withdrawn from the source at a flow rate of approximately 200 mL/min for a period of one hour through a Teflon probe and a single midget impinger containing 20 mL of deionized water submersed in an ice bath. The outlet of the impinger was connected to a silica gel sampling tube. The outlet of the silica gel tube was connected to the sample pump inlet. A calibrated rotameter was used to measure the sample flow rate before and after each run. The sampling train is illustrated in Figure 3.2.

After sampling, the sampling probe was rinsed with deionized water which was collected in the impinger. The liquid in the impinger was transferred to a 40 mL volatile organic analysis (VOA) vial and made up to volume.

The VOA vials and silica gel tubes were sealed and placed on ice to preserve them until they were returned to the laboratory for analysis. The silica gel tubes were desorbed in n-propanol in water to prepare them for analysis. Standards were prepared and used to record the instrument response. Concentrations were measured by gas chromatography using a flame ionization detector (GC/FID).

3.1.2. Quality Control

Throughout the entire project, a high level of quality control was maintained. The test personnel were experienced in the use of the instrumentation, the procedures, and the quality control requirements. Professional profiles of the personnel involved in the project are included in Appendix A. The following paragraphs briefly summarize the quality control associated with the project.

General

Data were recorded at the time of collection on preprinted data sheets. Data transfers were minimized. Samples were prepared for shipment, and chain-of-custody was maintained from the sampling technician to the analyst. Calculations were verified by a second person. The report was reviewed and approved by the Project Manager prior to transmittal. In general, the quality control standards and practices recommended by the reference methods were followed.

Volumetric Flow

The stack was measured to the nearest 0.25 inch with a steel tape measure. The velocity and sampling traverse points were marked on the probe with heat resistant glass fiber tape.

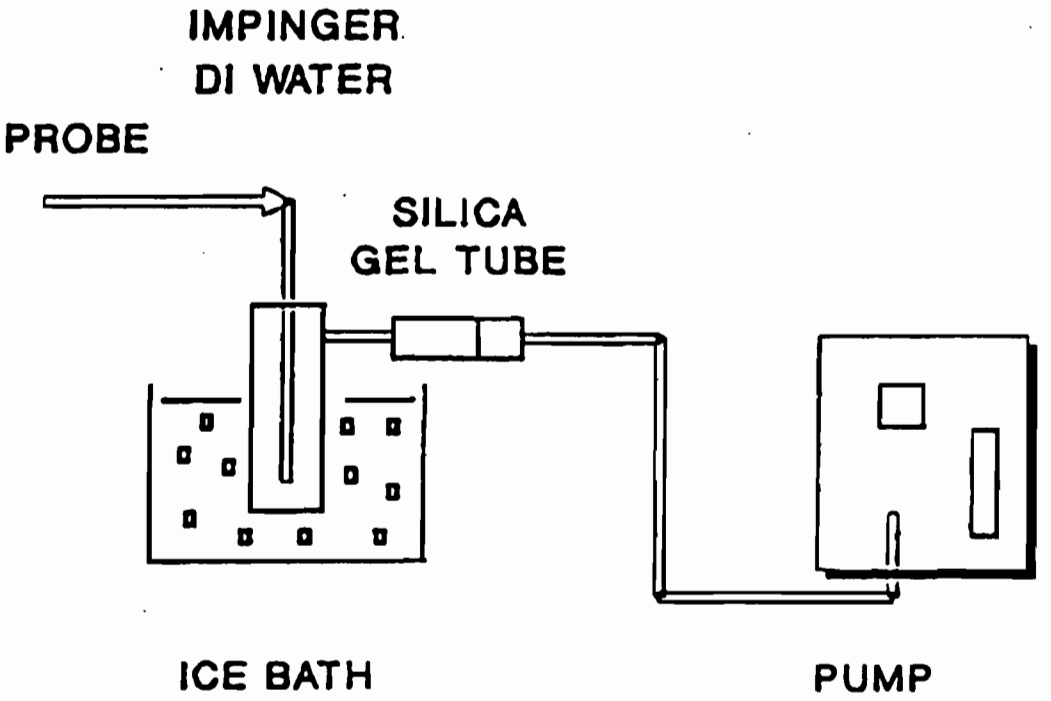


FIGURE 3.2. ACETONE, METHANOL, AND METHYL ETHYL KETONE SAMPLING TRAIN

3.1.2. Quality Control

Throughout the entire project, a high level of quality control was maintained. The test personnel were experienced in the use of the instrumentation, the procedures, and the quality control requirements. Professional profiles of the personnel involved in the project are included in Appendix A. The following paragraphs briefly summarize the quality control associated with the project.

General

Data were recorded at the time of collection on preprinted data sheets. Data transfers were minimized. Samples were prepared for shipment, and chain-of-custody was maintained from the sampling technician to the analyst. Calculations were verified by a second person. The report was reviewed and approved by the Project Manager prior to transmittal. In general, the quality control standards and practices recommended by the reference methods were followed.

Volumetric Flow

The stack was measured to the nearest 0.25 inch with a steel tape measure. The velocity and sampling traverse points were marked on the probe with heat resistant glass fiber tape.

The anemometer used to measure the velocity was calibrated by the manufacturer. The pyrometer used to measure the stack gas temperature and the thermocouples for intermediate temperature measurements were calibrated routinely with respect to standard thermometers. At the completion of the test, the equipment was visually inspected and no damage was found.

Chlorine, Chlorine Dioxide, and Chloroform

The integrity of the sample collection was verified through routine leak checks before and after each run. The flow rates or volumes were measured with a calibrated rotameter or dry gas meter. Calibration data are presented in Appendix P. Sample volumes were corrected to standard temperature and pressure.

The charcoal tubes used in sample collection were factory sealed until immediately prior to their use for sample collection. Afterwards, the tubes were sealed with the caps provided by the manufacturer and refrigerated until analyses were performed. A charcoal tube blank was analyzed at the same time as the samples. Data were corrected for the mass of chloroform in the blank tube. The GC/ECD calibration curves were obtained using dilutions of chemicals that met American Chemical Society specifications in the appropriate solvent solutions.

Duplicate samples were collected on three sources to establish the precision of the sampling and analytical techniques. Table 3.1 shows the duplicate sample analytical results.

TABLE 3.1. DUPLICATE SAMPLE ANALYTICAL RESULTS - Cl_2, ClO_2, AND $CHCl_3$

	CONCENTRATION (PPM)			% DIFFERENCE
	SAMPLE A	SAMPLE B	MEAN	FROM MEAN
CHLORINE				
No. 1 Mill Exhaust Vent - Run 5	<0.761	<0.761	----	----
Washer 8 Vent - Run 5	<0.756	<0.756	----	----
Tower 10 Scrubber Vent - Run 5	170	167	169	1
CHLORINE DIOXIDE				
No. 1 Mill Exhaust Vent - Run 5	<0.508	<0.508	----	----
Washer 8 Vent - Run 5	<0.504	<0.504	----	----
Tower 10 Scrubber Vent - Run 5	1850	1860	1855	0.3
CHLOROFORM				
No. 1 Mill Exhaust Vent - Run 5	9.73	11.9	10.8	10
Washer 8 Vent - Run 5	0.055	0.032	0.044	26
Tower 10 Scrubber Vent - Run 5	0.229	0.246	0.238	4

In addition, chlorine and chloroform quality control samples were analyzed in house as required by the NCASI method. Results of these quality control samples are presented in Table 3.2. The chloroform recoveries ranged from 88 to 106 percent, while the chlorine recoveries were between 99 and 101 percent. Supporting data are presented in Appendix O.

TABLE 3.2. IN-HOUSE Cl_2 AND $CHCl_3$ QUALITY CONTROL SAMPLE RESULTS

ACTUAL CONCENTRATION	ANALYTICAL RESULTS	STANDARD DEVIATION (%)	RECOVERY (%)
Chlorine[a]			
5.60×10^{-5} equiv.	5.59×10^{-5} equiv.	----	100
1.40×10^{-4} equiv.	1.41×10^{-4} equiv.	----	101
5.60×10^{-4} equiv.	5.57×10^{-4} equiv.	----	99
Chloroform[b]			
0.500 ppm	0.53 ppm	22	106
48.1 ppm	42 ppm	7.4	88
300 ppm	294 ppm	7.3	98

[a]Average of three replicate samples.
[b]Average of six replicate samples.