→ P 4/1

Check Sheet

Company Name: Champion International
Permit Number: AC17-111195, 113551, 113552, 113553
PSD Number:
County: ESCAMBIA
Permit Engineer:
Others involved:

Application:
- [x] Initial Application
- [x] Incompleteness Letters
- [x] Responses
- [ ] Final Application (if applicable)
- [ ] Waiver of Department Action
- [ ] Department Response

Intent:
- [x] Intent to Issue
- [x] Notice to Public
- [x] Technical Evaluation
- [ ] BACT Determination
- [x] Unsigned Permit

  Attachments:
  - [ ]
  - [ ]
  - [ ]

- [ ] Correspondence with:
  - [ ] EPA
  - [ ] Park Services
  - [ ] County
  - [ ] Other
- [x] Proof of Publication
- [ ] Petitions - (Related to extensions, hearings, etc.)

Final Determination:
- [x] Final Determination
- [x] Signed Permit
- [ ] BACT Determination

Post Permit Correspondence:
- [x] Extensions
- [x] Amendments/Modifications
- [ ] Response from EPA
- [ ] Response from County
- [ ] Response from Park Services

375 Muscogee Road
P.O. Box 87
Cantonment, Florida 32533-0087
904 968-2121

PM
Emery
Shipment #: 030548266-1

File Copy

Champion
Champion International Corporation

RECEIVED
FEB 29 1988
DER - BAQM

February 26, 1988

Mr. William Thomas
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

Dear Mr. Thomas:

Specific Condition No. 9 of Construction Permit AC 17-113551 specifies a maximum production throughput of 800 TPD for the A line system, and 600 TPD for the B line system. While the systems were designed for this throughput, actual production capacity is greater than anticipated capacity. In fact, compliance test was performed at a rate of 888 tons/day on A line and 792 tons/day on B line. These rates have defined the maximum daily capacity.

Champion requests that construction permit AC 17-113551 be modified to allow a <u>total</u> of 1400 tons per day annual average air dried bleached production rather than individaul limits on each line. This modification will not affect emissions or the basis of the original permit issuance. It will provide Champion flexibility in terms of operating the mill. It will have no effect on other processes in the mill, or on emissions from other permitted sources. It does not affect total facility production capacity or individual process production capacity.

If there are questions concerning this request, please call.

Sincerely,

David T. Arceneaux
Supervisor Environmental Control

DTA/ma

cc: Ed Middleswart
Northwest District, DER

Copied: CHF/BT
Mike Harley } 3-1-88

EMERY WORLDWIDE

Same Day ☐ Other ☐ Courier Express ☒
Next Morning ☒ Metro ☐ Air Cargo Service ☐
Second Morning ☐ Air Economy Service ☐

Date	Origin	Shipment Number	Check
2/26/88	PHL	030548266	1

To:
Mr. William Nicens
FHLB-Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida
3 2 3 0 1

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3.1.88

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– [illegible] parts, etc.

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– Measures 16" x 12" x 4" – 41 cm x 30 cm x 10 cm
– Accommodates computer tapes, binders, parts, etc.

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– Measures 38" x 3" x 3" – 97 cm x 8 cm x 8 cm
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375 Muscogee Road
P.O. Box 87
Cantonment, Florida 32533-0087
904 968-2121

Emery Shipment #: 030548216-1

Champion
Champion International Corporation

RECEIVED
FEB 29 1988
DER - BAQM

February 26, 1988

Mr. William Thomas
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

Dear Mr. Thomas:

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Champion requests that construction permit AC 17-113551 be modified to allow a total of 1400 tons per day annual average air dried bleached production rather than individaul limits on each line. This modification will not affect emissions or the basis of the original permit issuance. It will provide Champion flexibility in terms of operating the mill. It will have no effect on other processes in the mill, or on emissions from other permitted sources. It does not affect total facility production capacity or individual process production capacity.

If there are questions concerning this request, please call.

Sincerely,

David T. Arceneaux
Supervisor Environmental Control

DTA/ma

cc: Ed Middleswart
Northwest District, DER

Copied: CHF/BT
Mike Harley } 3-1-88

File Copy

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

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

TO: Clair Fancy

THROUGH: Ed Middleswart Edm 1/27

FROM: Jack Preece

DATE: January 27, 1988

DER
JAN 28
BAQM

SUBJECT: Champion International Corporation,
Toxic Evaluation of Bleach Plant

Ref: 1) AC17-113551
2) Final Air Stripper Review Procedures

During review of applications submitted for operation permits for sources constructed by Champion International Corporation under reference 1, a check of allowed emissions against the guidelines of reference 2 was carried out. The worst case comparison was 3.7 pounds of ClO_2 per hour allowed from the tail gas of the ClO_2 generation system. The conservative estimate of maximum ambient concentration, using equation in reference 2 is:

$$MAC = ACH^B$$
$$= 327.84.37(100)^{-2.264}$$
$$= 0.0360 \text{ mg/meter}^3$$

H is 100 feet as reported in the emissions test report (test date November 20, 1987) this contrasts to H = 60 feet stated in original application for construction permit.

The acceptable ambient concentration proposed in reference 2 for ClO_2 is:

$$AAC = 0.238 (TLV/A)$$
where $A = 100 (CAT_3A)$
$TLV = 0.3 \text{ mg/m}^3$
$= 0.238 (0.3/100) = 0.000714 \text{ mg/m}^3$

This appraisal revealed the allowed emissions failed the screening test for acceptable toxic emissions by a ratio of:

$$\frac{0.0360}{0.000714} = 50.4$$

If the reference 2 guidance or some other toxic screening procedure had been in effect at the time the AC was under review, I am sure a more sophisticated modelling would have been required and probably reduced allowed emissions would have been specified.

DEPARTMENT OF ENVIRONMENTAL REGULATION

ROUTING AND TRANSMITTAL SLIP

ACTION NO

ACTION DUE DATE

1. TO: (NAME, OFFICE, LOCATION) Clair Fancy BAQM T.T.	Initial	
	Date	
2.	Initial	
	Date	
3.	Initial	
	Date	
4.	Initial	
	Date	

REMARKS:

DER

JAN 28

BAQM

N-W

INFORMATION	
	Review & Return
	Review & File
	Initial & Forward

DISPOSITION	
	Review & Respond
	Prepare Response
	For My Signature
	For Your Signature
	Let's Discuss
	Set Up Meeting
	Investigate & Report
	Initial & Forward
	Distribute
	Concurrence
	For Processing
	Initial & Return

FROM: Jack Deuce Pensacola air Program

DATE 1/27/88

PHONE

I recommend that BAQM should take on the task of running more sophisticated modelling to determine what emissions will comply with the proposed AAC. The more sophisticated modelling should be less conservative than the reference 2 equation in the following:

1) Include plume rise due to exit velocity from the stack (ACFM 910, Stack diameter 10 inches)

2) Use 5 years of actual meterological data vs worst case meterological assumption of reference 2

3) Time average calculated ambient concentrations vs instantaneous maximum concentration assumption of reference 2. I recommend time averaging should equal 168 hours.

4) Receptors should be located at plant property lines vs maximum location assumed by reference 2.

Additionally, the impact of four other sources of Cl_2 and ClO_2 emissions combined with the one worst case source discussed above should be evaluated.

In the meantime, I plan to recommend issuance of operation permits with allowed emissions as specified in the AC, but with the condition that more stringent allowed emissions forthcoming from toxics rulemaking shall be applied. Further, the permit shall contain surrogate parameter limits to assure actual emissions measured by test (0.35 pounds per hour) are continued.

JP/jp1

cc: Steve Smallwood

Copied: Bruce Mitchell
Barry Andrews
CHF/BST
1-28-88

P 274 007 704

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. D.T. Arceneaux Champion International Corp.	
Street and No. P.O. Box 87	
P.O., State and ZIP Code Cantonment, FL 32533-0087	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date Mailed: 09-01-87 Permit: AC 17-113551 Expiration of Ext. Date	

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

PS Form 3811, July 1983 447-845

SENDER: Complete items 1, 2, 3 and 4.

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

1. ☒ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to: Mr. D.T. Arceneaux
Champion International Corporation
Post Office Box 87
Cantonment, FL 32533-0087

4. Type of Service:	Article Number
☐ Registered ☐ Insured ☒ Certified ☐ COD ☐ Express Mail	P 274 007 704

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X

7. Date of Delivery

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

DOMESTIC RETURN RECEIPT

Full Copy

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

August 27, 1987

Mr. David T. Arceneaux
Environmental Control Manager
Champion International Corporation
P. O. Box 87
Cantonment, Florida 32533-0087

Dear Mr. Arceneaux:

Re: Expiration Date Extension for Construction Permit
No. AC 17-113551

The Department is in receipt of your letter dated July 30, 1987, which requested an extension of the expiration date for the above referenced permit. The following shall be changed and added:

Expiration Date:

From: October 31, 1987
To: March 1, 1988

Attachment to be Incorporated:

8. Mr. David T. Arceneaux's letter dated July 30, 1987, and received August 3, 1987.

This letter must be attached to your construction permit, No. AC 17-113551, and shall become a part of the permit.

Sincerely,

Dale Twachtmann
Secretary

DT/ks

cc: E. Middleswart
B. Pittman, Esq.

ATTACHMENT 8

375 Muscogee Road
P.O. Box 87
Cantonment, Florida 32533-0087
904 968-2121

Champion
Champion International Corporation

DER
AUG 3 1987
BAQM

July 30, 1987

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

Dear Mr. Mitchell:

On March 24, 1987 Champion requested an extension of Construction Permit Nos.: AC17-111195, AC17-113551, AC17-113552 and AC17-113553. This request was granted on April 10, 1987 with the extension of these permits to October 31, 1987. These extensions were required to allow additional time for testing due to late start-up of the new facilities.

At this time we have completed testing on all sources. Operating permit applications have been submitted to the Northwest District Office for AC17-113553 (Woodyard addition) and for AC17-111195 (P-5 Paper Machine Conversion) on July 14, 1987. An application for operating permit for AC17-113552 (lime slaker) will be submitted on July 31, 1987.

The other Construction Permit, AC-113551 (Bleach Plant) is not ready for submittal at this time. Data from the Erco generator sources are all within permit limits. However, the bleach plant scrubbers and salt unloading are not within permit limits due to problems with vendor supplied equipment. The specific problems relate to the removal efficiencies for the bleach plant scrubbers and a pressure relief valve for the salt unloading tank. The bleach plant scrubber removal efficiency appears to be related to scrubber media.

At this time Champion is working with the vendors to correct these problems. We expect to have the problem corrected within the next two to four months. Champion is requesting, therefore, an extension of Construction Permit AC17-113551 from October 31, 1987 to March 1, 1988.

If you or your staff have any questions concerning this request, please don't hesitate to call.

Sincerely,

David T. Arceneaux
Supervisor, Environmental Control

DTA/ma

cc: Mr. Thomas W. Moody, FDER
Mr. Ed Middleswart, FDER

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

For Routing To Other Than The Addressee

To: _____ Location: _____
To: _____ Location: _____
To: _____ Location: _____
From: _____ Date: _____

AUG 28 1987

Office of the Secretary

TO: Dale Twachtmann

THRU: Howard Rhodes

FROM: Clair Fancy

DATE: August 27, 1987

SUBJ: Approval of Expiration Date Extension
Construction Permit No. AC 17-113551
Champion International Corporation

Attached for your approval and signature is an expiration date extension for the above referenced construction permit, issued February 11, 1986. There are no controversies regarding this request.

The Bureau recommends approval and signature.

CHF/BM/m

attachment

PM
Emery
7/31/87
Contonment, FL

file

375 Muscogee Road
P.O. Box 87
Cantonment, Florida 32533-0087
904 968-2121

Champion
Champion International Corporation

DER
AUG 3 1987
BAQM

July 30, 1987

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

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Copied: Bruce Mitchell } wmh
Bill Thomas } 8/4/87
Clair Fancy }

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If you or your staff have any questions concerning this request, please don't hesitate to call.

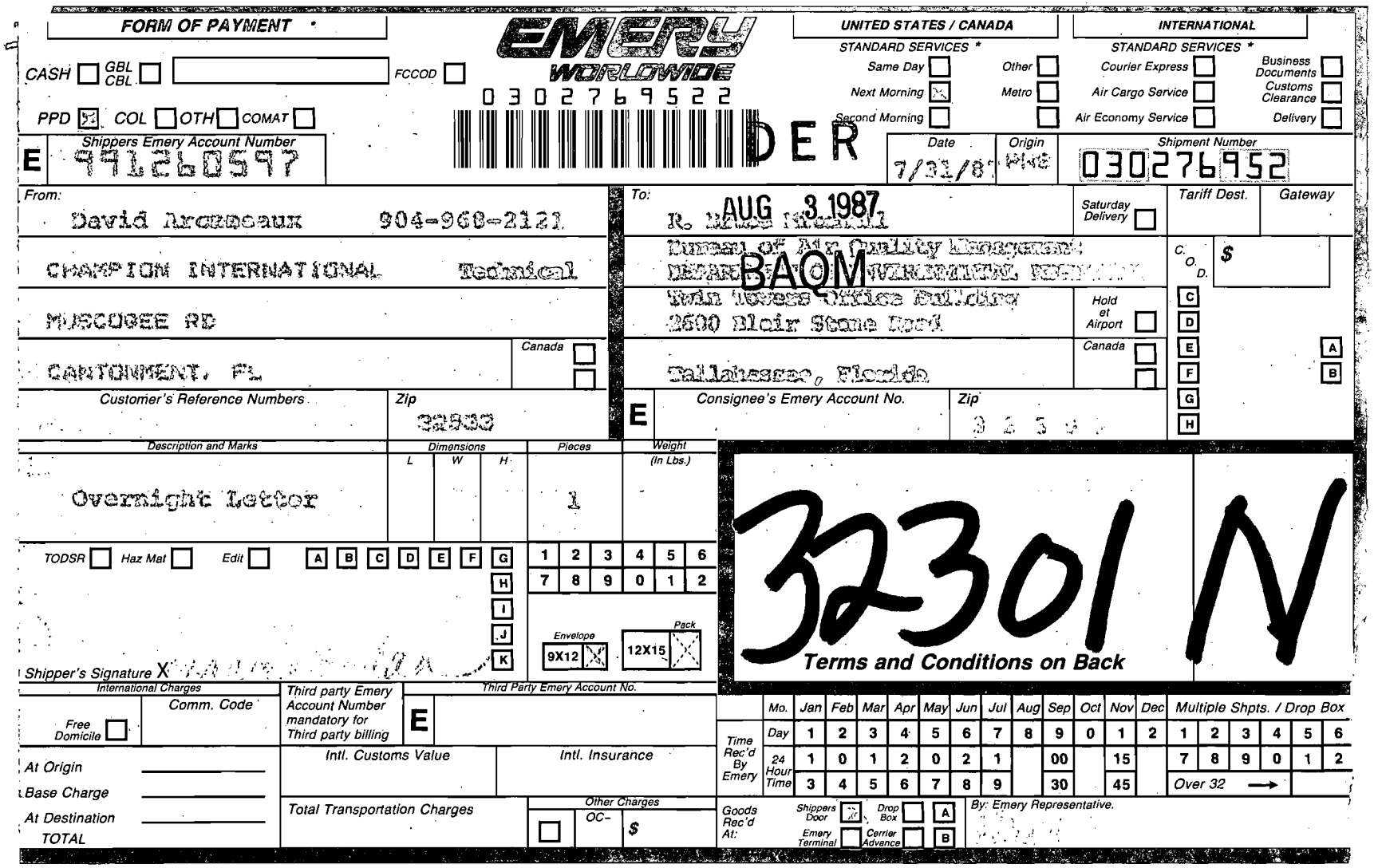
Sincerely,

David T. Arceneaux
Supervisor, Environmental Control

DTA/ma

cc: Mr. Thomas W. Moody, FDER
Mr. Ed Middleswart, FDER

Best Available Copy



FORM OF PAYMENT *

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PPD ☒ COL ☐ OTH ☐ COMAT ☐

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STANDARD SERVICES *
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Next Morning ☒ Metro ☐
Second Morning ☐

INTERNATIONAL
STANDARD SERVICES *
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Air Cargo Service ☐ Customs Clearance ☐
Air Economy Service ☐ Delivery ☐

E Shippers Emery Account Number 99126059?

DER

Date 7/31/87 | Origin PNS | Shipment Number 030276952

From:
David Arceneaux 904-968-2121
CHAMPION INTERNATIONAL Technical
MUSCOGEE RD
CANTONMENT, FL
Canada ☐ ☐
Customer's Reference Numbers
Zip 32533

To:
R. [illegible] Harrell
Bureau of Air Quality Management
DEPARTMENT OF ENVIRONMENTAL REGULATION
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida
Saturday Delivery ☐
Hold at Airport ☐
Canada ☐ ☐
E Consignee's Emery Account No.
Zip 3 2 3 0 1

AUG 3 1987
BAQM

Tariff Dest. | Gateway

C.O.D. $

C ☐ D ☐ E ☐ F ☐ G ☐ H ☐ A ☐ B ☐

Description and Marks	Dimensions L	W	H	Pieces	Weight (In Lbs.)
Overnight Letter				1	

TODSR ☐ Haz Mat ☐ Edit ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H ☐ I ☐ J ☐ K ☐

1	2	3	4	5	6
7	8	9	0	1	2

Envelope 9X12 ☒ Pack 12X15 ☒

Shipper's Signature X

32301 N

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Third party Emery Account Number mandatory for Third party billing

E Third Party Emery Account No.

At Origin
Base Charge
At Destination
TOTAL

Intl. Customs Value | Intl. Insurance

Total Transportation Charges

Other Charges ☐ OC- $

Time Rec'd By Emery	Mo.	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Day	1	2	3	4	5	6	7	8	9	0	1	2
	24 Hour Time	1	0	1	2	0	2	1		00		15	
		3	4	5	6	7	8	9		30		45	

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By: Emery Representative.

P 408 531 222

RECEIPT FOR CERTIFIED MAIL

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Sent to David T. Arceneaux Champion International Corp.	
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Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 4/14/87 AC 17-111195, -113551, -113552, -113553	

PS Form 3800, Feb. 1982

PS Form 3811, July 1983

SENDER: Complete items 1, 2, 3 and 4.

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

1. ☒ Show to whom, [redacted] delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:
David T. Arceneaux
Champion International Corporation
P.O. Box 87
Contonment, FL 32533-0087

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

Article Number
P 408 531 222

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X Willie S Lustledge

7. Date of Delivery
4-15-87

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

DOMESTIC RETURN RECEIPT

File Copy

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

April 10, 1987

Mr. David T. Arceneaux
Environmental Control Supervisor
Champion International Corporation
P.O. Box 87
Cantonment, Florida 32533-0087

Dear Mr. Arceneaux:

Re: Construction Permits Nos. AC 17-111195, -113551, -113552 and -113553

The department is in receipt of your letter with attachments dated March 24, 1987, which requested an extension of the expiration date for the above referenced permits. Also requested was acceptability of an alternate test method for chlorine and chlorine dioxide specified in AC 17-113551. Based on a review of these requests, the following shall be changed and added:

A. Expiration Date:

From: July 1, 1987
To: October 31, 1987

B. AC 17-113551

The proposal to use the alternate test method described in your submittal to test for chlorine and chlorine dioxide to show compliance with the emission limits is acceptable.

Attachment to be Incorporated:

Affected Permits: AC 17-111195, -113551 and -113553
7. Mr. David Arceneaux's letter and attachments dated 3/24/87.

Affected Permit: AC 17-113552
8. Mr. David Arceneaux's letter and attachments dated 3/24/87.

This letter must be attached to your construction permits Nos. AC 17-111195, -113551, -113552 and -113553, and shall become a part of those permits.

Sincerely,

Dale Twachtmann
Secretary

DT/ks

cc: E. Middleswart
J. Costas, Esq.

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

RECEIVED
APR 10 1987
Office of the Secretary

FOR ROUTING TO OTHER THAN THE ADDRESSEE

To: _____ LOCTN: _____
To: _____ LOCTN: _____
To: _____ LOCTN: _____
FROM: _____ DATE: _____

TO: Dale Twachtmann

THRU: Howard L. Rhodes

FROM: C. H. Fancy

8-1344 when signed

DATE: April 10, 1987

SUBJ: Approval and Signature of an Amendment(s) to Construction Permits Nos. AC 17-111195, -113551, -113552 and -113553 for Champion International Corporation, issued February 11, 1986.

Enclosed is an amendment(s) to the referenced construction permits and the bureau recommends approval.

CHF/BM/s

375 Muscogee Road
P.O. Box 87
Cantonment, Florida 32533-0087
904 968-2121

PM
3-27-87
Cantonment, FL

File Copy

DER
MAR 30 1987
BAQM

Champion
Champion International Corporation

March 24, 1987

Mr. C. H. Fancy, P.E.
Bureau of Air Quality Management
State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Dear Mr. Fancy:

On February 11, 1986, Champion was granted air quality construction permits NOS: AC 17-111195, AC 17-113551, AC 17-113552, and AC 17-113553 as part of the Pensacola Conversion Project. At the time of application, Champion expected to have all construction complete by December, 1986, and to be in full operation by January, 1987. This schedule would then allow adequate time for compliance testing at the required full production rates.

Longer than expected construction and start-up problems with the paper machine have resulted in a delay in completing the required compliance testing. It has only been during the past few days that the bleach plants have operated at consistent production levels. Champion, therefore, requests an extension of the construction permits to October 1, 1987. This will allow three additional months to complete compliance testing and submit applications for operating permits.

In addition, Champion would like to request the approval to use an alternate test for chlorine and chlorine dioxide testing for compliance. The test method specified in Specific Condition 8 and 9 of Permit AC 17-113551 is the CPPA Standard Testing Method J.14P. This test is directly applicable only to very high concentration gas streams and is primarily used as a process control method. The test method we would like to use is one developed by NCASI, and is very similar to the CPPA method, differing in the sample volume and the addition of a buffer to the potassium iodide. A paper describing the NCASI method will be published in an upcoming issue to TAPPI JOURNAL, and will also be the subject of a NCASI technical bulletin. A copy of the TAPPI JOURNAL article is attached along with a copy of CPPA Method J.14P.

If you or your staff have any questions concerning these requests, please contact me at the Pensacola Mill.

Sincerely,

David T. Arceneaux
Environmental Control Supervisor

DTA/dj
Attachment

cc: Mr. Thomas W. Moody, FDER, Pensacola

BRUCE, 4/2/87

IT WOULD BE BETTER IF CHAMPION WOULD USE NCASI's INSTRUMENTAL METHOD FOR "CONTINUOUS COMPLIANCE", AND TRACK Cl^- & ClO_2 constantly. I think the NCASI paper tries to minimize the health effects. I HAVE NO PROBLEM WITH THEIR PROPOSAL.

DOUG SEES EPA HAS NO TEST METHODS YET!

CHLORINE DIOXIDE PLANT ANALYSES

SCOPE

Chlorine dioxide is widely used in the pulp and paper industry as a bleaching agent. It is manufactured as a gas on site from sodium chlorate in a strongly acidic solution by reduction with sulphur dioxide, methanol, hydrochloric acid or alkali metal chloride. The chlorine dioxide gas is stripped from the solution with air and dissolved in water for storage and use.

The following methods cover all the necessary tests for a chlorine dioxide plant regardless of the manufacturing process used.

1. Generator Feed Solution Concentrations

a) Chlorate
b) Chloride

2. Generator Liquor Concentrations

a) Chlorate
b) Acid and chloride
c) Chlorine dioxide and chlorine
d) Catalysts

3. Generator Gas Volume and Chlorine Dioxide Concentrations

4. Chlorine Dioxide Solution Concentrations

a) Chlorine dioxide and chlorine
b) Hydrochloric and sulphuric acid

REAGENTS

1. **Sodium Hydroxide,** 10 %. Dissolve 100 g of reagent grade NaOH pellets in 1000 mL of distilled water.

2. **Sodium Hydroxide,** 0.50 M. Dissolve 20.0 ± 0.1 g of reagent grade NaOH pellets in 1000 mL of distilled water. Standardize against reagent grade potassium biphthalate ($C_6 H_4 (COOH) COOK$) to the nearest 0.01 M.

3. **Sodium Hydroxide,** 0.10 M. Dissolve 4.0 ± 0.1 g of reagent grade NaOH pellets in 1000 mL of distilled water. Standardize against reagent grade potassium biphthalate to the nearest 0.01 M.

4. **Sodium Bromide,** 10 %. Dissolve 100 g reagent grade NaBr in 1000 mL of distilled water.

5. **Potassium Dichromate,** 0.0167 M. Dissolve 4.903 g of dry reagent grade $K_2Cr_2O_7$ in 1000 mL of distilled water.

6. **Sodium Thiosulphate,** 0.10 M. Dissolve 25.0 ± 0.1 g of reagent grade $Na_2S_2O_3 \cdot 5H_2O$ in freshly boiled and cooled distilled water, add 0.1 g of sodium bicarbonate and make up to 1000 mL. Standardize against 25.0 mL of standard 0.0167 M potassium dichromate solution, to which has been added 10 mL of 10 % potassium iodide and 10 mL of 1 M sulphuric acid, using starch indicator.

7. **Silver Nitrate,** 0.02 M. Dissolve 3.398 g of dry reagent grade $AgNO_3$ crystals in 1000 mL of distilled water.

8. **Sulphuric Acid,** 1 M. Pour 55 mL of reagent grade 96 % H_2SO_4 carefully into 500 mL of distilled water and make up to one litre. (**Caution**: do not pour water into acid).

9. **Sodium Arsenite,** 0.0025 M. Dissolve 0.2473 g of dry reagent grade arsenious oxide, As_2O_3, in 20 mL of 1 M sodium hydroxide solution. Add 1 M sulphuric or hydrochloric acid to the solution until neutral or slightly acidic. Transfer to a 500 mL volumetric flask and make up to the mark with distilled water.

10. **Sodium Bicarbonate,** dry reagent grade $NaHCO_3$.

11. **Hydrochloric Acid,** conc. HCl.

12. **Acetic Acid,** 3 %. Pour 30 mL glacial CH_3COOH into 500 mL of distilled water and make up to 1000 mL.

13. **Phenolphthalein,** 0.1 %. Dissolve 0.1 g of phenolphthalein into 60 mL of ethanol and make up to 100 mL with distilled water.

14. **Starch Indicator,** 0.5 %. Make 5 g of soluble reagent grade starch into a smooth paste with water. Pour it into a litre of boiling water. Make up fresh each time since it deteriorates on standing.

15. **Potassium Chromate,** 5 %. Dissolve 5 g of reagent grade K_2CrO_4 in 100 mL of distilled water.

16. **Potassium Iodide,** 10 %. Dissolve 100 g of reagent grade KI in 100 mL of distilled water and make up to 1000 mL.

APPARATUS

Each procedure is accompanied by a diagram of the apparatus set-up necessary to perform the test. The apparatus can be assembled from standard lab glassware.

1. GENERATOR FEED SOLUTION

SAMPLING

Pipette 10 mL of feed solution into a 500 mL volumetric flask and dilute to volume with distilled water. Mix thoroughly.

Revised by the Testing Methods Committee and Approved by the Physical and Chemical Standards Committee, Technical Section, Canadian Pulp and Paper Association

PROCEDURE

a) Chlorate Concentration

Pipette a 5 mL aliquot of the diluted sample into the 1000 mL Erlenmeyer flask of the chlorate analysis apparatus (Fig. 1). Add 15 mL of 10 % KI solution to the trap to absorb any oxidizing components in the gases leaving the flask (Note 1).

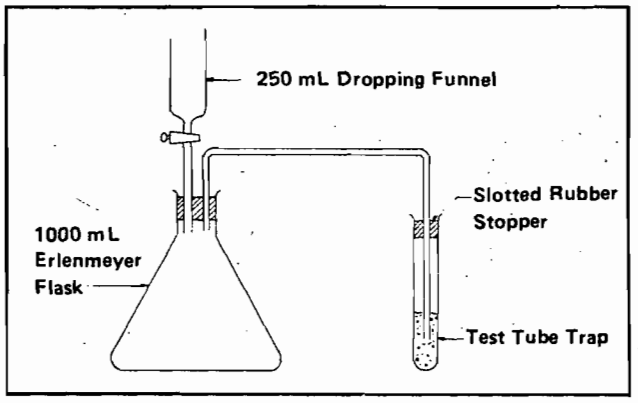

Figure 1. Chlorate Analysis Apparatus

Add 20 mL of 10 % NaBr solution to the flask through the dropping funnel (Note 2). Then add 100 mL of conc. HCl to the flask through the dropping funnel, shake gently and set aside for 5 min (Note 3).

At the end of 5 min add 200 mL of distilled water through the dropping funnel and then add 20 mL of 10 % KI. Place the trap contents into the dropping funnel and refill the trap with water. Add the contents of the dropping funnel to the flask.

Remove the stopper from the flask, washing any droplets adhering to the stopper into the flask and transfer the contents of the trap quantitatively into the flask.

Titrate the contents of the flask with 0.10 M $Na_2S_2O_3$, using starch indicator near the end point.

b) Chloride Concentration

Pipette a 5 mL aliquot of the diluted sample into a 500 mL flask. Add 2 mL of 5 % K_2CrO_4 and 25 mL of distilled water. Titrate to the first appearance of a permanent reddish tinge with 0.020 M $AgNO_3$.

CALCULATIONS

Chlorate, Molarity = $Na_2S_2O_3$, mL x M $Na_2S_2O_3$ x 1.667

Chloride, Molarity = $AgNO_3$, mL x M $AgNO_3$ x 10

2. GENERATOR LIQUOR

SAMPLING

Fill a 100 mL volumetric flask to the mark with distilled water and remove 25 mL with a pipette.

A respirator and safety goggles should be worn when collecting the sample. Allow the sample tube to run for a minute or two to flush thoroughly. Fill the volumetric flask to the mark directly from the sampling tube. Stopper immediately and mix well (Note 4).

PROCEDURE

a) Chlorate Concentration

Pipette an aliquot of the diluted sample into an Erlenmeyer flask containing 20 mL of 10 % KI solution and 80 mL of distilled water (Note 5). Titrate the liberated iodine with 0.10 M $Na_2S_2O_3$. Call this titration "T_2" (Note 6).

Pipette a second aliquot of the diluted sample (volume to be the same as above) into the 1000 mL Erlenmeyer flask of the chlorate analysis apparatus (Fig. 1). Add 15 mL of 10 % KI solution to the trap to absorb any oxidizing components in the gases leaving the flask.

Add 20 mL of 10 % NaBr solution to the flask through the dropping funnel. Then add 100 mL of conc. HCl through the dropping funnel, shake gently and set aside for 5 min (Note 3).

At the end of 5 min add 200 mL of distilled water through the dropping funnel and then add 20 mL of 10 % KI solution. Place the trap conrents into the dropping funnel and refill with distilled water. Add the contents of the dropping funnel to the flask. Remove the stopper, washing any droplets adhering to it into the flask and transfer the contents of the trap quantitatively into the flask.

Titrate the iodine liberated with 0.10 M $Na_2S_2O_3$, using starch indicator near the end point. Call this titration "T_1".

b) Acid and Chloride Concentration

Pipette a 10 mL aliquot of the diluted sample carefully onto the fritted glass disk of the stripping apparatus (Fig. 2) while the vacuum is full on. Replace the glass stopper and allow air to bubble through the sample until all traces of colour have disappeared. The vacuum should

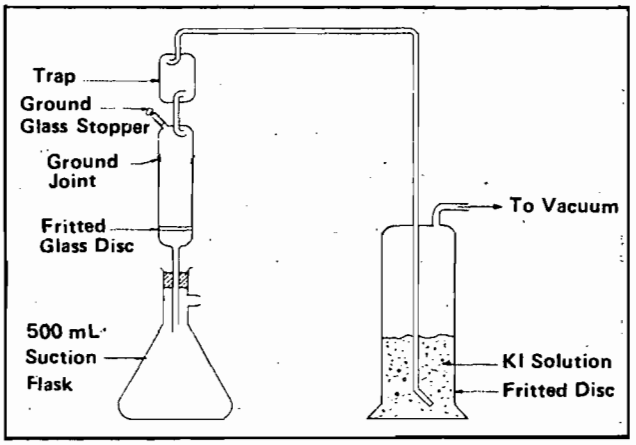

Figure 2. Special Stripping Apparatus

be adjusted to prevent excessive bubbling of the sample into the top sections of the apparatus. Any liberated gases are absorbed in 200 mL of 10 % KI.

When all of the colour has disappeared from the sample, transfer the vacuum line from the stripper to the suction flask and draw the sample into the flask. Wash down the walls of the stripper thoroughly, passing at least 100 mL of distilled water through the fritted disc.

Titrate the sample with 0.5 M NaOH using phenolphthalein indicator. Call this titration "Na".

Add a drop or two of 3 % acetic acid to decolourize the solution and then add 2 mL of 5 % potassium chromate. Titrate with 0.020 M $AgNO_3$ to the first appearance of a permanent reddish tinge. Call this titration "Ag".

c) Chlorine Dioxide and Chlorine Concentration

Transfer the contents of the KI trap quantitatively to a 1000 mL flask and titrate the solution to a colourless end point with 0.10 M $Na_2S_2O_3$. DO NOT USE STARCH and do not refill the burette. Call this titration "N".

Add 10 mL of I M H_2SO_4 and continue the titration with 0.10 M $Na_2S_2O_3$ using starch indicator near the end point. Call this titration "T". Let "A" = T-N (Note 7, 8, 9, 10).

CALCULATIONS

$$\text{Chlorate, Molarity, } = \frac{T_1 - T_2}{15 \times \text{Aliquot, mL}}$$

$$\text{Chlorate, as } NaClO_3\text{, g/L} = 106.5 \times \text{Molarity}$$

$$\text{Acid, as HCl Molarity} = \frac{Na}{5}$$

$$\text{Chloride, Molarity} = \frac{Ag}{125}$$

$$\text{Chloride, as NaCl g/L} = 58.5 \times \text{Molarity}$$

$$\text{Chlorine Dioxide, g/L} = 0.675 \times A$$

$$\text{Chlorine, g/L} = 1.42 \times (T - 1.25\ A)$$

d) Catalyst Levels

Certain chlorine dioxide manufacturing processes require the use of catalysts in order to reach peak efficiency. Because of the variety of catalysts in use it is recommended that the manufacturers' instructions for the selection of proper testing conditions be carefully followed.

3. GENERATOR GAS VOLUME AND CHLORINE DIOXIDE

SAMPLING

The sample is obtained by drawing gas from the line between the generator and absorption tower into the gas pipette shown in Fig. 3.

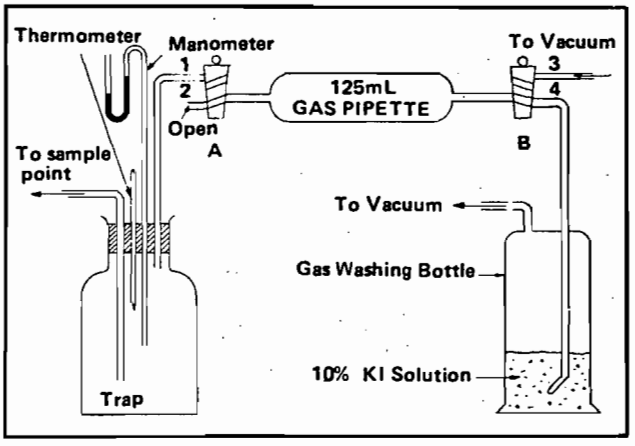

Figure 3. Gas Sempling Apparatus

The gas pipette shall be calibrated by weighing to the nearest 10 mg when completely filled with water at a known temperature. Drain the pipette and rinse well with acetone. Draw air through the pipette by attaching it to a source of vacuum to dry, and reweigh. The volume is then calculated as follows:

$$\text{Volume, mL} = \frac{W_w - W_d}{d_t}$$

Where:

W_w = Weight when filled with water, g

W_d = Weight when dry, g

d_t = Density of water at the temperature used, g/mL

PROCEDURE

Add enough 10 % KI solution to the gas washing bottle to cover the bubbler to a depth of about 4 cm. Open stopcocks A and B so that gas is drawn from the sample line through the pipette leaving via line 3, and allow to run for about 5 min. Close stopcock B, record temperature and pressure, then close stopcock A.

Open stopcock B so that vaccum is applied to the pipette via the gas washing bottle, then open stopcock A so that air is drawn in through line 2. Do not allow the bubbling to become too violent in the gas washing bottle. Allow about 5 min for the sample to be thoroughly drawn out of the pipette.

Remove the gas washing bottle and transfer its contents quantitatively into a 1000 mL flask. Titrate the iodine released with 0.1 M $Na_2S_2O_3$ to a colourless end point. Do not use starch and do not refill the burette. Call this titration "N".

Add 10 mL of 1 M H_2SO_4 and continue the titration using starch indicator near the end point. Call this titration "T". Let "A" = T - N (Notes 10, 11).

CALCULATIONS

$$V_S = \frac{V_O (P_O - 0.0736\, P_1)}{760} \times \frac{273}{(t + 273)} \qquad \text{(Note 12)}$$

$$\text{Volume \% } ClO_2 = 56 \times \frac{A}{V_S}$$

Where:

V_O = Volume of gas pipette, mL

V_S = Sample volume in mL at standard conditions, (760 mm Hg, 0°C).

P_O = Barometric pressure, mm Hg

P_1 = Manometer reading, mm H_2O

t = Temperature, °C

A = Thiosulphate titration (T - N), mL

4. CHLORINE DIOXIDE SOLUTION

SAMPLING

Flush sample line thoroughly before collecting specimen. Fill the sample bottle completely, and stopper. A respirator and safety goggles should be worn when sampling.

PROCEDURE

A. Chlorine Dioxide and Chlorine Concentrations

(1) Thiosulphate Titration

Pipette 10 mL of the sample into a 500 mL flask containing 25 mL of 10 % KI solution, 10 mL 1 M H_2SO_4 and about 100 mL distilled water. Titrate the liberated iodine with 0.1 M $Na_2S_2O_3$ using starch indicator near the end point. Record the titration as "C".

(2) Arsenite Titration

Pipette 10 mL of the sample into a 250 mL flask containing 25 mL of 10 % NaOH solution and set aside for at least 10 min until it turns colourless. Add 25 g. of solid $NaHCO_3$, swirl to dissolve, and set aside for an additional 5 min. Additional bicarbonate must be added to saturate the solution if it all dissolves. Add 10 mL of 10 % KI solution and titrate the liberated iodine with 0.0025 M $NaAsO_2$ using starch indicator (Notes 13,14).

CALCULATIONS

Chlorine Dioxide, g/L = 0.135 (C - E)

Chlorine, g/L = 0.355 E

$$\text{Chlorine Dioxide, GA \%} = \frac{C - E}{C + 4E} \times 100$$

Where:

Thiosulphate equivalent of arsenite = E

$$\text{Titration} = \frac{NaAsO_2, \text{mL}}{10}$$

B. Hydrochloric and Sulphuric Acid Concentrations

Place 120 mL of the chlorine dioxide solution into a gas washing bottle and draw air slowly through the sample until it is completely decolourized. Pipette 100 mL of the stripped sample into a 500 mL flask and titrate with 0.1 M NaOH using phenolphthalein indicator. Record the titration as "Na".

Add a drop or two of 3 % acetic acid to decolourize the solution and 2 mL of 5 % K_2CrO_4 indicator.

Titrate with 0.020 M $AgNO_3$ to the first appearance of a permanent reddish tinge. Record this titration as "Ag".

CALCULATIONS

Total Acid Molarity as HCl = 0.001 Na

Hydrochloric Acid, Molarity = 0.0002 Ag

Sulphuric Acid, Molarity = 0.0001 (5 Na - Ag)

Hydrochloric Acid, g/L = 36.5 x Molarity HCl

Sulphuric Acid, g/L = 98 x Molarity H_2SO_4

NOTES

1. Sodium chlorate is fed to the chlorine dioxide generator as a concentrated solution and in some cases may contain sodium chloride. It is necessary to know the concentration of the feed solution to properly adjust feed rates and to assess the efficiency of the operation.

Chlorate reacts with chloride in a strongly acid solution in the presence of bromide as follows:

1) $ClO_3^- + 5Cl^- + 6H^+ \rightarrow 3Cl_2 + 3H_2O$

2) $3Cl_2 + 6Br^- \rightarrow 3Br_2 + 6Cl^-$

After the chlorate has been reduced KI is added and the following reaction occurs:

3) $3Br_2 + 6I^- \rightarrow 3I_2 + 6Br^-$

Bromide is used as an intermediate in this procedure because of the tendency of the iodine to be oxidized to iodate in strongly acid solution. The iodine released is then titrated with thiosulphate to determine the chlorate concentration.

2. For routine testing the dropping funnel and trap may be eliminated in the chlorate determination and the 1000 mL flask merely fitted with a solid rubber stopper.

The quantities of reagents and sequence of addition remain exactly as above. The calculation is also unchanged.

3. Care must be taken that a vacuum does not develop, otherwise the contents of the trap may be sucked back into the flask. This can be prevented by opening the dropping funnel stopcock briefly, taking care to avoid any loss of gases.

4. Since the reaction:

4) $4H^+ + 2\,ClO_3^- + 2\,Cl^- \rightarrow Cl_2 + 2\,ClO_2 + 2\,H_2O$

will proceed after the sample is removed from the reactor, it is essential that the sample be diluted promptly.

5. Use 5.0 mL where the chlorate concentration is expected to be above 0.10 Molar, and 10 mL where the concentration is expected to be below 0.10 Molar.

6. The chlorate concentration is determined in the same manner as for the chlorate feed. However, since the generator liquor contains dissolved chlorine dioxide and chlorine, this must be determined separately and a correction made.

7. The analysis of chlorine dioxide in mixtures containing chlorine is based on the observation that in neutral solutions the reduction of ClO_2 by iodide proceeds as follows:

5) $ClO_2 + I^- \rightarrow ClO_2^- + I$

then on acidification the reduction is completed:

6) $ClO_2^- + 4H^+ + 4I^- \rightarrow Cl^- + 2H_2O + 2I_2$

Chlorine in either neutral or acid solution is rapidly reduced by iodide:

7) $Cl_2 + 2I^- \rightarrow 2Cl^- + I_2$

Therefore, by absorbing the mixture in neutral KI solution, reactions (5) and (7) occur and the titration with thiosulphate represents all of the chlorine plus 1/5 of the oxidizing power of chlorine dioxide. On acidification of the mixture, reaction (6) occurs and the subsequent titration represents 4/5 of the oxidizing power of the chlorine dioxide present.

8. As with the feed solution, the use of the dropping funnel and trap assembly may be eliminated from the chlorate determination for routine testing with only slight sacrifice of accuracy. A solid rubber stopper is substituted. Reagent quantities, sequences of addition and calculations remain the same.

9. The acidity and chloride determinations may be simplified for routine testing by substituting the stripping apparatus shown in Fig. 4. The sample is introduced into the flask and stripped to complete disappearance of the yellow colour by drawing air through the capillary tube. Subsequent dilution, titrations and calculations remain the same. Care must be taken to ensure that the capillary tube is close to the bottom of the flask and that the bottom of the stopper and the capillary are rinsed with water into the flask.

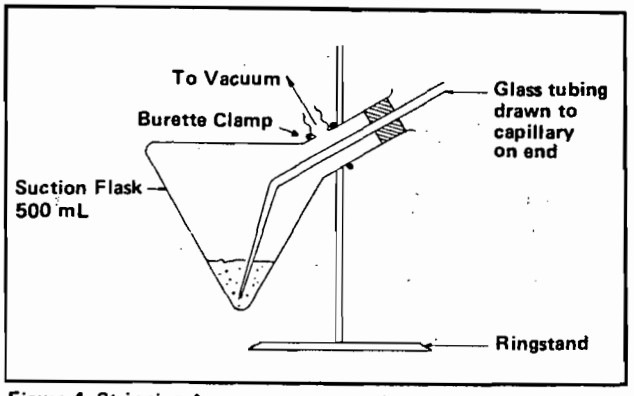

Figure 4. Stripping Apparatus

10. The total gas ($ClO_2 + Cl_2$) in the generator liquor may be calculated from the $Na_2S_2O_3$ titration T_2 obtained in the chlorate analysis as follows:

Total gas (as ClO_2) g/L = 0.54 T_2

11. This test is necessary for the processes using chloride or methanol as the reducing agent.

12. For purposes of routine control the manometer and the thermometer are often eliminated from the apparatus. It is then assumed in the calculation that $V_S = V_O$.

13. When working with neutral solutions, ClO_2 and Cl_2 can be determined using a neutral and acid titration as described under the determination of these constituents in Generator Liquor. Chlorine dioxide solution produced in the plant invariably contains some acidity which interferes with the neutral titration. For this reason the Cl_2 content is determined accurately and independently using sodium arsenite with the system buffered to a pH at which only the chlorine is titrated.

14. For convenience, the chlorine dioxide content in mixtures with chlorine is usually expressed as Gram Atom percent chlorine dioxide, defined as:

$$GA\,\% = \left[\frac{ClO_2}{ClO_2 + Cl_2}\right] \times 100$$

where ClO_2 represents moles of ClO_2 in the mixture and Cl represents atoms of chlorine in the mixture. (This is not to imply that the chlorine is present as atomic chlorine).

REFERENCES

1. Electric Reduction Company of Canada, Limited, Technical Service Bulletin, T-6-1, October 1961.

2. Allied Chemical Corporation, Solvay Process Division, Technical Service Report No. 9, 55 R, January 1958.

STUDIES OF MEASUREMENT METHODS FOR CHLORINE AND CHLORINE DIOXIDE EMISSIONS FROM PULP BLEACH PLANT OPERATIONS

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ABSTRACT

Methods for determining chlorine and chlorine dioxide emissions from pulp bleaching facilities are employed in control device efficiency studies and in determining compliance with non-criteria pollutant regulations. The dual pH potassium iodide impinger capture method was investigated in laboratory and field studies, and an optimized method was developed and tested.

An instrumental method for continually measuring total oxidants or chlorine and chlorine dioxide was developed via modification of a commercial electrochemical chlorine monitor. Comparison testing with the dual pH potassium iodide method demonstrated the utility of the instrumental method for survey purposes.

INTRODUCTION

Non-criteria pollutant regulations are being established by state regulatory agencies for the purpose of regulating ambient concentrations of substances released to the atmosphere by industrial operations. These substances are typically chemicals which are recognized as having adverse health effects at higher concentrations, and are usually limited in workplace atmospheres by regulation (Occupational Safety and Health Act Permissible Exposure Levels - PELs) or by recommendation (American Conference of Governmental Industrial Hygienists Threshold Limit Values - TLVs). The emerging state regulations generally specify a maximum ambient concentration of a regulated substance as a fraction of a workplace limit (e.g., 1/50 of the TLV), and mathematical source emission modelling is employed to calculate the maximum allowable quantity of that substance which may be emitted.

Because of their ability to produce respiratory tract and eye irritation (1), chlorine (Cl_2) and chlorine dioxide (ClO_2) are assigned 8-hour TLVs of 1 and 0.1 ppm, respectively. They are included in many state non-criteria pollutant regulations, and because of their use in the bleaching of pulp, their atmospheric emissions are of concern to the pulp and paper industry.

The various pulp bleaching sequences involve several stages of bleaching and extraction of solubilized organic material. Each stage typically includes reaction with bleaching chemical or caustic extraction solution in a retention tower, washing of the product pulp on a rotary vacuum drum washer prior to subsequent operations, and removal of the filtrate via a seal tank. The vents to the atmosphere from the towers, washer hoods, and seal tanks, may or may not be fan driven, ducted together to common vents, or ducted to gas-liquid scrubbers for emission control. Because chlorine dioxide is always generated on-site, there is a ClO_2 generator vent which may be a source of emissions of Cl_2 and ClO_2, and which may or may not be ducted to a gas-liquid scrubbing device for emission control.

The pulp and paper industry in the United States is in various stages of reducing chlorine and chlorine dioxide atmospheric emissions. In those circumstances where non-criteria pollutant regulations do not impose restrictions on Cl_2 and ClO_2 release, emission control may be undertaken primarily for workplace considerations, if necessary. This control may take the form of reduction in vat residuals of aqueous Cl_2 and ClO_2 (where this is possible), it may involve the use of tall vent stacks, or it may include gas-liquid scrubbing. Scrubbers may utilize sodium hydroxide, cold water, extraction-stage filtrate, weak wash, or aqueous sulfur dioxide solutions. (2,3)

NCASI is conducting a study of bleach plant emissions of Cl_2 and ClO_2, in order to (a) document uncontrolled emission levels, (b) examine the relationship of process operation variables to emission levels, and (c) determine the effectiveness of in place control devices. This activity has required the examination of methods for measuring chlorine and chlorine dioxide emissions.

ANALYSIS METHODS DEVELOPMENT

Grab Sampling Method

Background. Gas phase chlorine and chlorine dioxide may be captured in neutral potassium iodide solution in impingers in an extractive sampling system. Because of the dependence of the reactivity of chlorine dioxide with iodide upon solution pH, the post-sampling determination of iodine formed at neutral and acidic pH permits the quantitative measurement of both chlorine and chlorine dioxide:

Neutral pH: $Cl_2 + 2I^- \rightarrow I_2 + 2Cl^-$ (1)

$ClO_2 + I^- \rightarrow 1/2\ I_2 + ClO_2^-$ (2)

Acid pH: $ClO_2^- + 4H_3O^+ + 4I^- \rightarrow$

$2I_2 + 6H_2O + Cl^-$ (3).

Standard practice within the industry has been to use two impingers in series, each containing 2 percent potassium iodide, to sample at a rate of from 1 to 5 L/min, and to collect a sample over a period of from 5 to 30 minutes (using shorter sampling times if the color in the second impinger turns from straw yellow to orange). After sampling, the contents of the impingers are combined and titrated with 0.1 N sodium thiosulfate solution. After the first endpoint, the solution is acidified with sulfuric acid solution, and the titration is continued to the second endpoint. Algebraic manipulation of equations (1) through (3) permits the calculation of gas phase concentrations of Cl_2 and ClO_2 on the basis of the neutral and total acid titration equivalents.

Method Testing and Modification. The evaluation of this method included study of the following: the effect of capture solution pH, and the necessity for capture solution pH buffering; the precision of the optimized method; the effect of potassium iodide concentrations; and the effect of capture solution temperature.

Capture Solution pH. Although reaction (2) above is for calculation purposes regarded as the full extent of the reaction of ClO_2 with iodide at other than acidic pH values, there is a dependence of the rate of reaction of chlorite with iodide on solution pH, such that at slightly acidic pH values the reaction can proceed to an extent appreciable enough to cause (1) deviation from the 5:1 (total acid:neutral) ratio of equivalents of iodine expected upon titration of a capture solution obtained from ClO_2 only, and (2) an erroneously high calculated concentration of chlorine. Because drawing a bleach plant vent sample through an unbuffered potassium iodide solution may lower the pH of the solution, this phenomenon was investigated.

The sampling equipment described in the appendix was employed to sample gaseous emissions from a chlorine dioxide bleaching tower vent. A manifold was constructed from FEP and PFA Teflon® which permitted the collection of six gas samples simultaneously. Twenty mL of 2 percent unbuffered potassium iodide (KI) solution were placed in each first impinger, and a gas sample was drawn at ca. 500 mL/min through each impinger. The pH of the solutions was measured electrometrically. Twelve samples (two sets) were taken, representing a sampling time of from 5 seconds to 4 minutes. The solution pH dropped from an initial value of 6.7 to 6.1, at 30 seconds, then returned to ca. 6.6 at 4 minutes. This was taken as evidence that the pH of unbuffered KI solution could drop during sampling to a level low enough to permit the reaction of chlorite with iodide. This was confirmed in subsequent testing.

A sample was withdrawn from a chlorine dioxide bleaching tower vent into a 30 L Tedlar® gas bag (Pollution Measurement Corporation, Oak Park, IL). To determine that the chlorine and chlorine dioxide were stable with time, analyses of the bag contents by the method of the appendix were carried out. Over a period of

one hour, the measured chlorine and chlorine dioxide varied randomly with an average of 66 and 148 ppm, with standard deviations of 12 and 40 ppm, respectively, for five measurements. Another sample was placed in a Tedlar bag, and using the method of the appendix with 1 minute sampling and potassium iodide solutions buffered with borate and phosphate buffers, the data of Figure 1 were obtained. (The ClO_2 concentration remained constant as a function of pH, averaging 1490 ppm with a standard deviation of 43 ppm, except for pH 4.3 and 5.3 tests, where the ClO_2 concentration decreased.)

Insert Fig. 1 here >

Two experiments were conducted to test the hypothesis that the concentration of chlorine formed by conversion of captured chlorite depends upon the initial concentration of ClO_2, as well as upon the pH of the capture solution. In the laboratory, dynamic ClO_2 test gases containing very low concentrations of chlorine were prepared by passing air through a room temperature solution of aqueous ClO_2 (from a pulp bleach plant), then passing this gas through an impinger containing aqueous 0.1% sulfamic acid to remove chlorine, then blending this gas with humidified air to produced the desired concentration of ClO_2 (determined by analysis using the method of the appendix). The results of tests at 500 ppm and at 4000 ppm ClO_2, shown in Figure 2, clearly illustrate the effect of pH and of ClO_2 concentration upon artifact chlorine formation.

Insert Fig. 2 here >

Experiments were also conducted at a pulp bleach plant in which a sampling manifold, fabricated from FEP and PFA Teflon, was employed, which permitted collection of four samples simultaneously, employing trains as described in the appendix. Each impinger pair contained two percent KI solution, buffered essentially as per the appendix formula, but buffered at pH values of 6.4, 7.5, 8.5, and 9.5. Samples were withdrawn from a chlorine dioxide bleaching tower vent over a period of time such that normal variations in bleaching conditions produced variations in chlorine and chlorine dioxide gaseous emission concentrations. The data of Figure 3 were collected, and these data support the hypothesis.

Insert Fig. 3 here >

In order to demonstrate the combined effect on recovery and precision of buffered versus unbuffered sampling, an experiment was performed in which a Tedlar bag containing a gas sample drawn from a chlorine dioxide bleaching tower vent was sampled via the method of the appendix, using a manifold which permitted collection of six simultaneous samples. The experiment was conducted with three sets of impingers containing unbuffered 2 percent KI, and three sets containing pH 7.5 buffered 2 percent KI, and was repeated once to obtain 12 tests. Results are indicated in Figure 4. The average concentrations of chlorine and chlorine dioxide obtained using the unbuffered system were 354 and 1400 ppm, with standard deviations of 63 and 71 ppm, respectively. The average Cl_2 and ClO_2 concentrations obtained employing buffered sampling were 228 and 1440 ppm, with standard deviations of 25 and 22 ppm, respectively.

Insert Fig. 4 here >

On the basis of the information obtained in these experiments, it was concluded that use of an iodide solution buffered between pH 7.0 and 7.5 would minimize the formation of "phantom" chlorine due apparently to the reaction of chlorite with iodide at low pH values, but would not cause losses in apparently valid finite chlorine concentrations. Such losses appear at high pH values (e.g., greater than pH 8), and may be due to the reaction of iodine with base to form hypoiodite. The selection of pH 7.0 as the buffer pH of choice was based upon the apparent equivalence of recoveries at pH 7.0 and at 7.5, plus the knowledge that the buffering capacity of a given concentration of a dihydrogen phosphate buffer is greater at pH 7.0 than at pH 7.5.

Precision. Laboratory generated mixtures of chlorine and chlorine dioxide at three different analyte concentrations were analyzed by testing six simultaneously withdrawn samples from each mixture by the method of the appendix. Results are indicated in Figure 5. For the range of concentrations examined, relative standard deviation values were all less than 6 percent.

Insert Fig. 5 here >

Effect of Potassium Iodide Concentration. Although the concentration of potassium iodide (KI) to be employed in impinger sampling of gaseous oxidants is generally specified as 2%, sampling of high concentrations of gaseous Cl_2 and ClO_2 with midget impingers can deplete 2% KI with as little as 15 minutes of sampling at 200 mL/min. Because of this, higher concentrations of KI have been proposed for use in bleach plant vent sampling. Two sets of six simultaneous samples were taken at a pulp bleach plant from a combined EHD seal tank vent. In each set, three of the samples were taken in 10% KI and three were taken in 2% KI. Both capture solutions were buffered at a pH of 7.0. In set one the average measured Cl_2 was 3.4% higher, and the average measured ClO_2 was 7.7% lower in the 10% KI than in the 2% KI. In set two the average Cl_2 was 4.0% higher, and the average ClO_2 was 7.9% lower in the 10% KI capture solution. A laboratory experiment was designed to elucidate this effect.

A chlorine dioxide test gas at ca. 210 ppm was generated and scrubbed of chlorine in the manner described above. Two sets of six simultaneous samples were taken, with each set consisting of a 2%, 5%, 7%, 10%, 12%, and a 15% solution of buffered KI. Figure 6 illustrates the results of that experiment, and indicates that chlorine and chlorine dioxide should be sampled with KI capture solutions of less than 5% strength.

Insert Fig. 6 here >

Effect of Temperature. Because some field use of potassium iodide impinger sampling has been conducted with the impingers immersed in a water ice bath, an experiment was conducted to identify any advantage to reduced temperature sampling. In the laboratory, two sets of six simultaneous samples were taken from a Tedlar bag containing roughly equal concentrations of chlorine and chlorine dioxide. In each set, three impinger pairs were immersed in ice and three pairs were used at ambient temperature (approximately 24°C). Analyses were performed by the method of

On the basis of the information obtained in these experiments, it was concluded that use of an iodide solution buffered between pH 7.0 and 7.5 would minimize the formation of "phantom" chlorine due apparently to the reaction of chlorite with iodide at low pH values, but would not cause losses in apparently valid finite chlorine concentrations. Such losses appear at high pH values (e.g., greater than pH 8), and may be due to the reaction of iodine with base to form hypoiodite. The selection of pH 7.0 as the buffer pH of choice was based upon the apparent equivalence of recoveries at pH 7.0 and at 7.5, plus the knowledge that the buffering capacity of a given concentration of a dihydrogen phosphate buffer is greater at pH 7.0 than at pH 7.5.

Precision. Laboratory generated mixtures of chlorine and chlorine dioxide at three different analyte concentrations were analyzed by testing six simultaneously withdrawn samples from each mixture by the method of the appendix. Results are indicated in Figure 5. For the range of concentrations examined, relative standard deviation values were all less than 6 percent.

Insert Fig. 5 here

Effect of Potassium Iodide Concentration. Although the concentration of potassium iodide (KI) to be employed in impinger sampling of gaseous oxidants is generally specified as 2%, sampling of high concentrations of gaseous Cl_2 and ClO_2 with midget impingers can deplete 2% KI with as little as 15 minutes of sampling at 200 mL/min. Because of this, higher concentrations of KI have been proposed for use in bleach plant vent sampling. Two sets of six simultaneous samples were taken at a pulp bleach plant from a combined EHD seal tank vent. In each set, three of the samples were taken in 10% KI and three were taken in 2% KI. Both capture solutions were buffered at a pH of 7.0. In set one the average measured Cl_2 was 3.4% higher, and the average measured ClO_2 was 7.7% lower in the 10% KI than in the 2% KI. In set two the average Cl_2 was 4.0% higher, and the average ClO_2 was 7.9% lower in the 10% KI capture solution. A laboratory experiment was designed to elucidate this effect.

A chlorine dioxide test gas at ca. 210 ppm was generated and scrubbed of chlorine in the manner described above. Two sets of six simultaneous samples were taken, with each set consisting of a 2%, 5%, 7%, 10%, 12%, and a 15% solution of buffered KI. Figure 6 illustrates the results of that experiment, and indicates that chlorine and chlorine dioxide should be sampled with KI capture solutions of less than 5% strength.

Insert Fig. 6 here

Effect of Temperature. Because some field use of potassium iodide impinger sampling has been conducted with the impingers immersed in a water ice bath, an experiment was conducted to identify any advantage to reduced temperature sampling. In the laboratory, two sets of six simultaneous samples were taken from a Tedlar bag containing roughly equal concentrations of chlorine and chlorine dioxide. In each set, three impinger pairs were immersed in ice and three pairs were used at ambient temperature (approximately 24°C). Analyses were performed by the method of

the appendix. The results, indicated in Table 1, show that iced 2% buffered KI is little, if any, more effective at capturing chlorine and chlorine dioxide than is 2% buffered KI maintained at 24°C.

Insert Table 1 here >

Instrumental Analysis Method

Background. Field testing employing the method of the appendix indicated that several bleach plant sources were at some mills highly variable in the concentrations of chlorine and chlorine dioxide emitted. This prompted consideration of the use of continuous monitoring devices for high concentrations (as opposed to workplace level concentrations) of chlorine and chlorine dioxide. Of the several devices available commercially, two were chosen for study. An Anacon (Anacon, Marlborough, MA) electrochemical diffusion based workplace chlorine monitor was fitted by the manufacturer with a Teflon barrier around the sensing electrode, which caused the response to chlorine to be reduced such that high concentrations of chlorine could be measured. (This was designated a 0 to 500 ppm probe by Anacon.) Laboratory testing of this instrument with gases analyzed by the method of the appendix showed a linear response to chlorine from 0 to 500 ppm, but very low response to chlorine dioxide.

A Delta Model 964 (Delta/Xertex Corporation, Hauppauge, NY) diffusion based electrochemical high concentration chlorine monitor with a Delta-supplied nominal 0.25 mm (0.010 in) thickness Silastic (Dow Chemical, Midland, Michigan) membrane separating the electrochemical sensor from the test gas was tested in the laboratory for response to chlorine and chlorine dioxide. The data of Figure 7 indicate that the response to Cl_2 was linear to ca. 400 ppm, and the response to ClO_2 was linear to ca. 250 ppm. Below 250 ppm, the response ratio of Cl_2:ClO_2 was near 1:1.

Insert Fig. 7 here >

The Delta Model 964 was tested for time of response to changes in chlorine concentrations. The time response of the system to a pulse of 250 ppm chlorine of a duration of two minutes was satisfactory, as indicated in Figure 8. However, a pulse of 250 ppm chlorine of 14 minute duration produced an unusably long fall time, as indicated in Figure 9.

Insert Figs. 8+9 here >

A modification was made to the Model 964, as diagrammed in Figure 10. Teflon solenoids were configured so that source gas and potassium iodide-scrubbed ambient air could be alternately provided to the Teflon chamber in which the sensor was mounted. A cycle time of 2 minutes on source gas and 4 minutes on air proved satisfactory, as indicated in Figure 11.

Insert Figs. 10+11 here >

In earlier studies of measurement methods for workplace atmosphere chlorine and chlorine dioxide (4,5), NCASI determined that aqueous solutions of sulfamic acid in midget impingers would trap chlorine, but would quantitatively pass chlorine dioxide, at concentrations in the 0.05 to 2 ppm range. This prompted further modification of the Delta Model 964 system, as indicated in

Table 1 Comparison of results of iced and uniced impinger sampling of gas monitors of chlorine and chlorine dioxide

Set 1 (n = 3)		Set 2 (n = 3)	
Iced	Uniced	Iced	Uniced
$\bar{x}$ ClO_2 = 600 ppm	$\bar{x}$ ClO_2 = 594 ppm	$\bar{x}$ ClO_2 = 598 ppm	$\bar{x}$ ClO_2 = 596 ppm
RSD = 2.1%	RSD = 0.74%	RSD = 1.5%	RSD = 2.3%
$\bar{x}$ Cl_2 = 720 ppm	$\bar{x}$ Cl_2 = 726 ppm	$\bar{x}$ Cl_2 = 755 ppm	$\bar{x}$ Cl_2 = 755 ppm
RSD = 1.0%	RSD = 1.0%	RSD = 1.7%	RSD = 1.7%

Figure 12. By providing to the sensor timed sequential pulses of source gas (Cl_2 + ClO_2), air, source gas passed through sulfamic acid (ClO_2 only), and air, the output indicated in general form in Figure 13 was obtained. Testing with mixtures of gaseous Cl_2 and ClO_2 produced the recovery results indicated in Table 2.

Insert Figs 12 & 13 here

Table 2 Gas phase Cl_2 and ClO_2 measurements, laboratory mixture analysis results, modified Delta 964

True Concentration, ppm		Recovery, Percent	
Cl_2	ClO_2	Cl_2	ClO_2
106	300	78	100
100	298	80	101
107	58	106	132
65	320	86	141

Upon testing with mixtures of chlorine and chlorine dioxide, neither of the configurations of the modified Delta Model 964 systems yields data which are accurate enough for non-criteria pollutant analysis reporting purposes. The equipment has proven very useful, however, in continuous monitoring during field studies of factors influencing Cl_2 and ClO_2 emission rates.

CONCLUSIONS

The buffered dual pH potassium iodide impinger capture method yields good precision upon analysis of gaseous chlorine and chlorine dioxide mixtures, and buffering at pH 7.0 appears to reduce the chance of obtaining falsely high chlorine concentrations in the presence of high concentrations of chlorine dioxide.

Instrumental methods for continuously measuring gaseous chlorine and chlorine dioxide in bleach plant vents were studied, and modifications made to one commercially available system permitted the observation of short term concentration fluctuations in total Cl_2 and ClO_2. A further modification to provide separate continual quantitation of Cl_2 and ClO_2 proved sufficiently accurate for survey purposes.

APPENDIX - METHOD FOR MEASURING CHLORINE AND CHLORINE DIOXIDE GASEOUS EMISSIONS

This method is based upon extractive sampling using midget impingers, sampling at a low sampling rate, ca. 200 mL/min. Greater sampling rates may be used with larger impingers.

The sampling train includes a sample probe and withdrawal line which is an appropriate length, e.g., 3 m of 0.64 cm (0.25 in) od FEP Teflon tubing. This is connected at one end via either Galtek (Chaska, MN) 0.64 cm unions or short pieces of silicone tubing to a tapered stem 30 mL capacity midget impinger with 0.64 cm od inlet and outlet tubulatures (Southern Scientific, Micanopy, FL). Two identical impingers are connected in series behind the first. The third impinger contains silica gel as a dessicant, and its outlet tubulature is connected to the flow control/prime mover equipment.

Two methods may be employed for low flow rate sampling flow control. One method utilizes a dessicant column and a critical orifice downstream of the second impinger, followed by a vacuum pump capable of providing ca. 64 cm (25 in) of mercury vacuum. The orifice is calibrated prior to use, the vacuum at which critical flow is achieved is noted, and in use the high vacuum side of the orifice is always maintained at at least 13 cm (5 in) of mercury vacuum greater than this value. The flow rate at the probe tip is measured before and after sampling with a bubble tube flow meter, as impingers or other restrictive devices upstream of the critical orifice will cause the system flow rate to change from the value obtained during calibration with atmospheric pressure at the orifice inlet.

A second means of controlling flow during low flow rate sampling is to utilize EPA Method 25 evacuated sampling tanks to draw the sample and, via pre- and post-sampling pressure measurements, to measure its volume.

The first two impingers each contain 20 mL of potassium iodide (KI) solution, buffered with potassium dihydrogen phosphate (KH_2PO_4) and sodium hydroxide (NaOH), as follows:

Dissolve 20 g KI in ca. 900 mL deionized water
Add 50 mL of 1 M KH_2PO_4
Add 30 mL of 1 M NaOH

Measure pH of solution electrometrically and add 1 M NaOH to bring pH to between 6.95 and 7.05.

When sampling, measure the temperature and pressure in the vent being sampled. Assuming critical orifice flow controls, activate the sample draw equipment and measure the sampling flow rate at the probe tip with a bubble tube flow meter. Insert the probe into the sample port and start a stopwatch. End the sampling (stop the watch) after 30 minutes, or after the color in the

second impinger turns from pale yellow to a deeper straw color. After sampling, remove the probe from the vent, and with the probe tip elevated above the impingers, add ca. 5 mL deionized water to the probe so that this drains into the first impinger. Combine the contents of the impingers in a 100 mL beaker, and titrate with sodium thiosulfate solution (0.100 N or less concentrated, depending upon the quantity of iodine being titrated). Record the volume of titrant to the first endpoint (T_N, mL). Add 5 mL of 10 percent sulfuric acid solution, and continue the titration to the second endpoint. Record the total volume of titrant required to go through the first and to the second endpoint (T_A, mL).

To calculate moles of chlorine and moles of chlorine dioxide captured employ the formulas:

$$EqI_2N = (T_N)(10^{-3})(\bar{N})$$

$$EqI_2A = (T_A)(10^{-3})(\bar{N})$$

$$ClO_2 \text{ moles} = 1/4\ EqI_2A - 1/4\ EqI_2N$$

$$Cl_2 \text{ moles} = 1/8\ (5\ EqI_2N - EqI_2A),$$

where EqI_2N and EqI_2A are equivalents of iodine determined in the neutral and (total) acid titrations, respectively, and $\bar{N}$ is the normality of the sodium thiosulfate solution. Calculate gas phase concentrations of ClO_2 and Cl_2 employing standard EPA calculations. Assume gas phase water saturation in most vents.

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3. N. Manley, "Control of Chlorine and Chlorine Dioxide Emissions," Proceedings of the 1985 NCASI Northeast Regional Meeting, Special Report No. 86-01, NCASI, New York, pp. 124-34 (1986).

4. "A Laboratory Investigation of Techniques for Instrumentally Measuring Chlorine and Chlorine Dioxide in the Pulp Bleaching Area Workplace," Technical Bulletin No. 412, NCASI, New York (1983).

5. "A Laboratory Evaluation of the Sulfamic Acid-Iodometric Method for Determining Chlorine in Pulp Bleaching Area Workplace Atmospheres," Special Report No. 82-02, NCASI, New York (1982).

FIGURE CAPTIONS

Figure

1 Effect of capture solution pH on observed chlorine concentration.

2 Effect of chlorine dioxide concentration and pH on observed chlorine concentration - laboratory testing.

3 Effect of chlorine dioxide concentration and pH on observed chlorine concentration - field testing.

4 Effect of buffered vs. unbuffered pH capture solutions on calculated chlorine and chlorine dioxide concentrations.

5 Precision of chlorine and chlorine dioxide mixture analyses.

6 Effect of potassium iodide concentration on apparent oxidant concentration.

7 Response of Delta model 964 chlorine monitor to chlorine and chlorine dioxide.

8 Response of unmodified Delta 964 to a chlorine pulse of short duration.

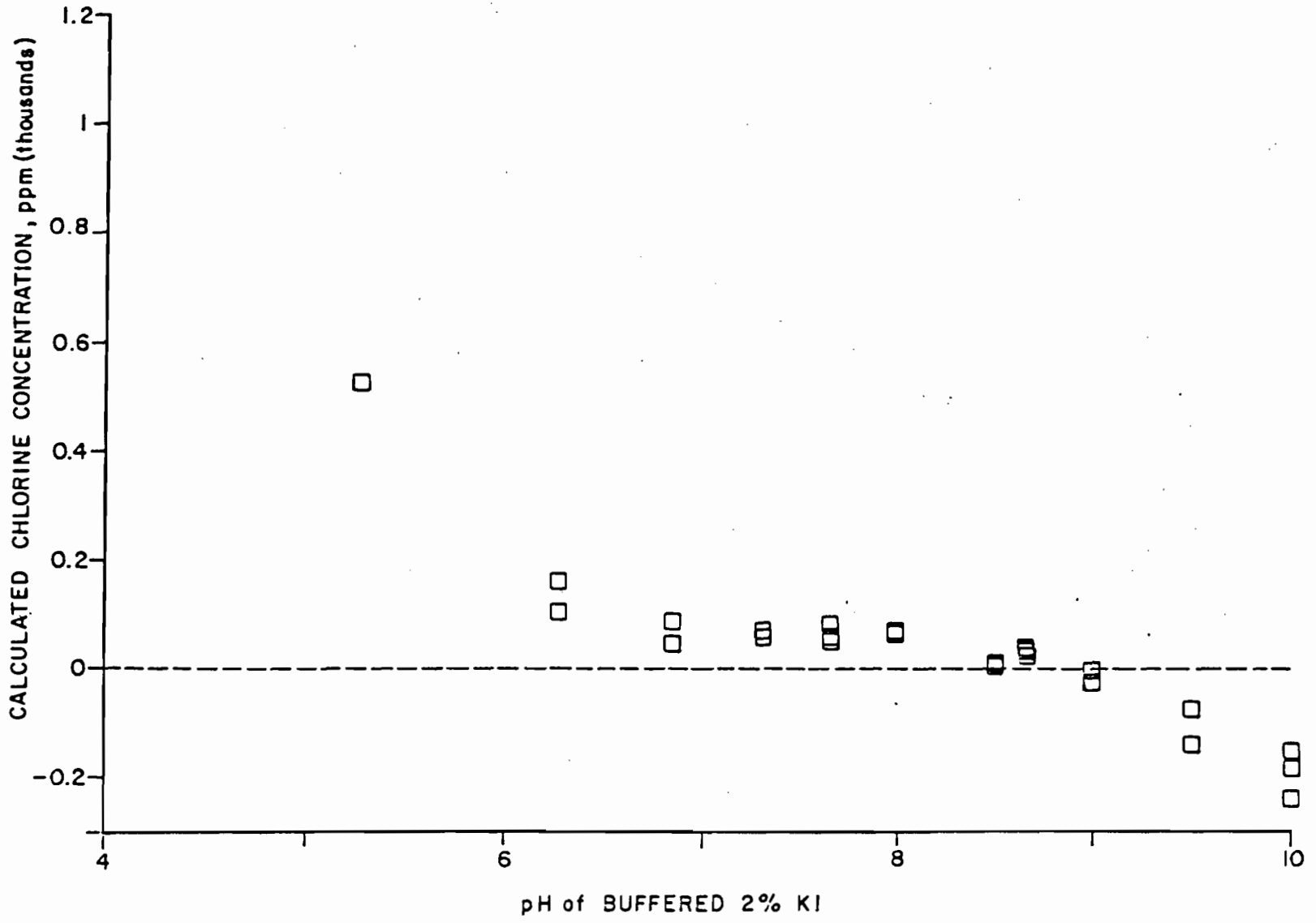
9 Response of unmodified Delta 964 to a chlorine pulse of long duration.

10 Modified Delta model 964 sample system.

11 Response of modified Delta model 964 to a chlorine pulse of long duration.

12 Delta model 964 modified for chlorine dioxide speciation.

13 Response of the modified Delta model 964 to a mixture of chlorine and chlorine dioxide.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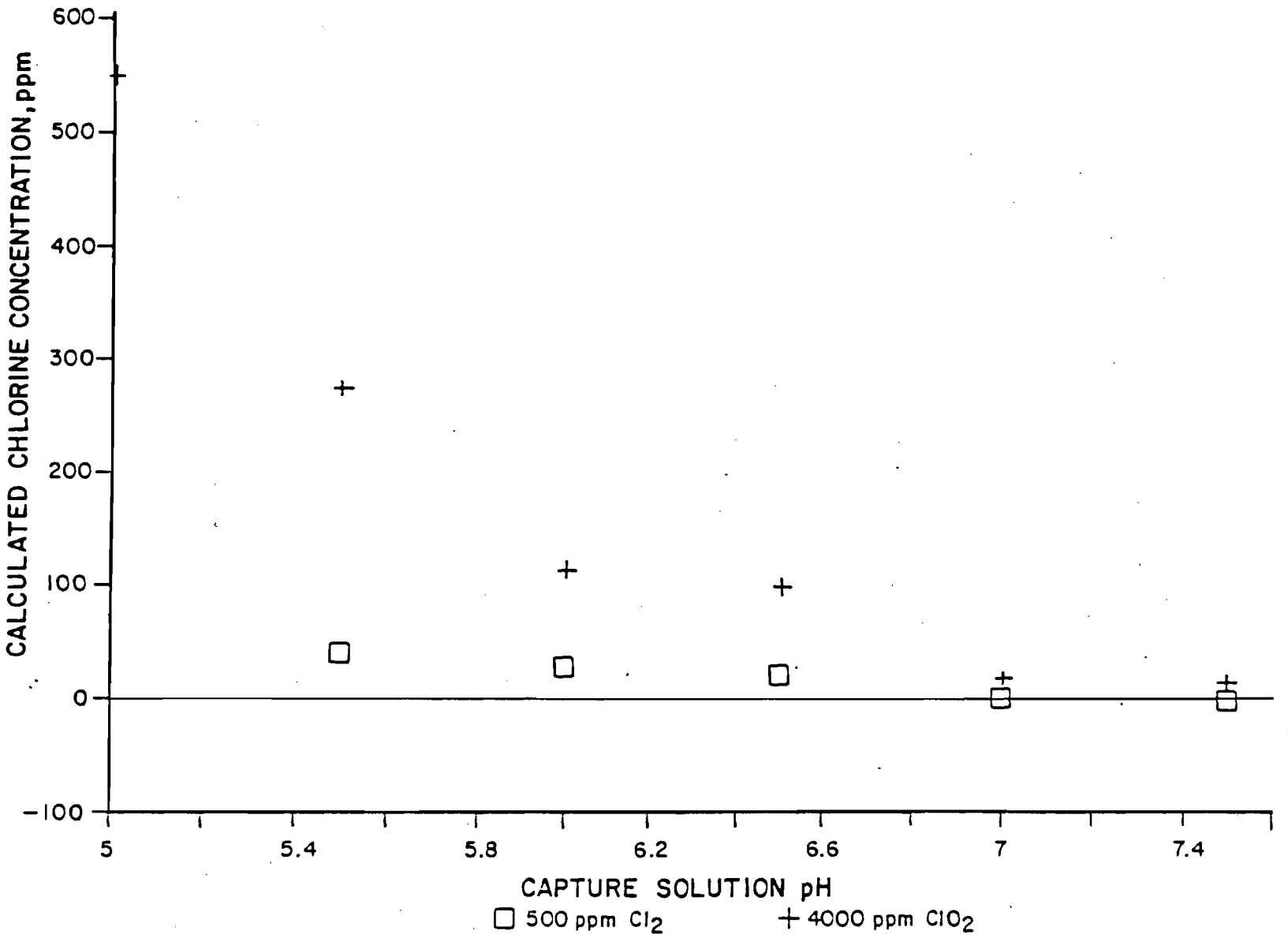
4
6
8
10
pH of BUFFERED 2% KI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300
200
100
0
-100
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6.6
7
7.4
CAPTURE SOLUTION pH
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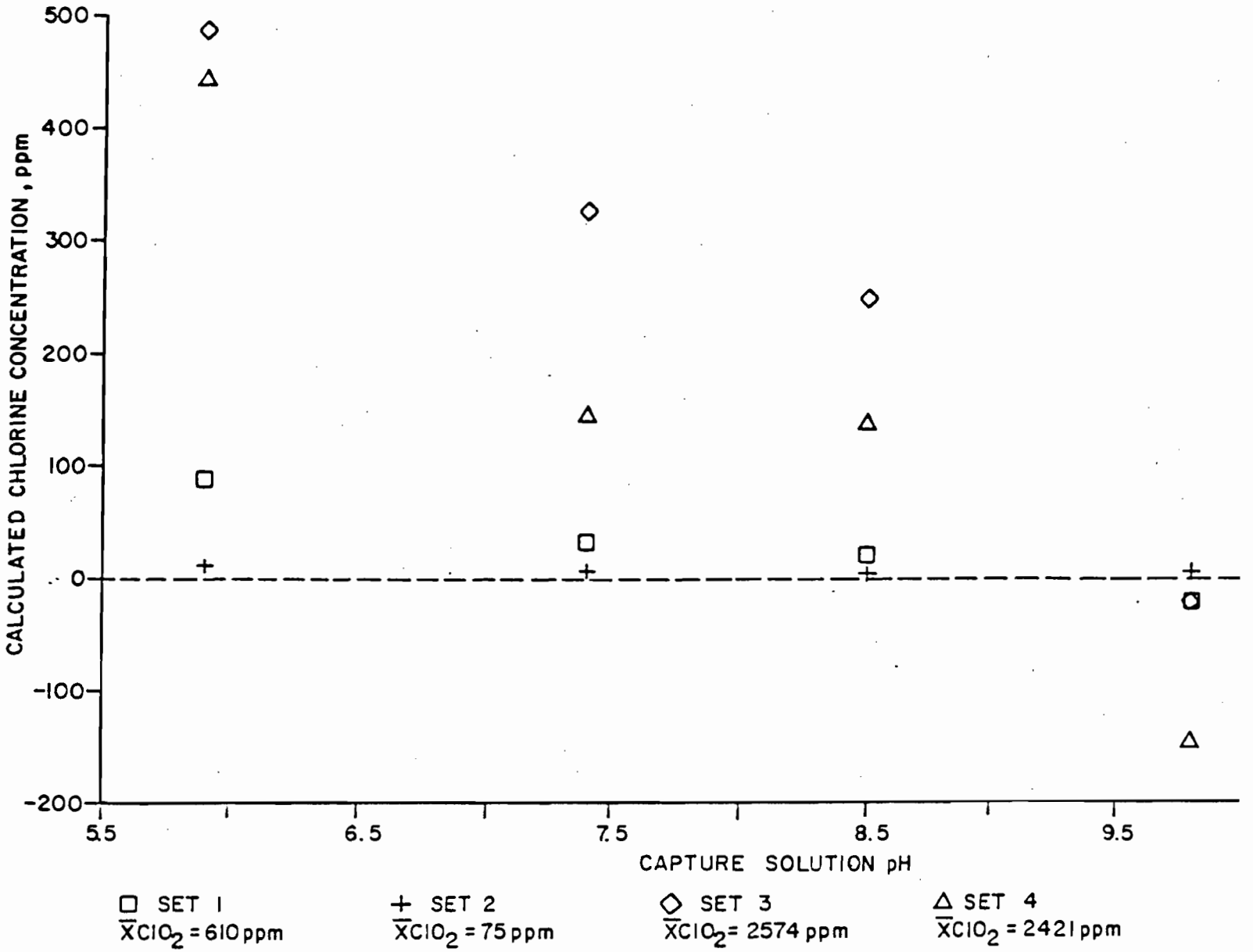
4000 ppm ClO_2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100
0
-100
-200
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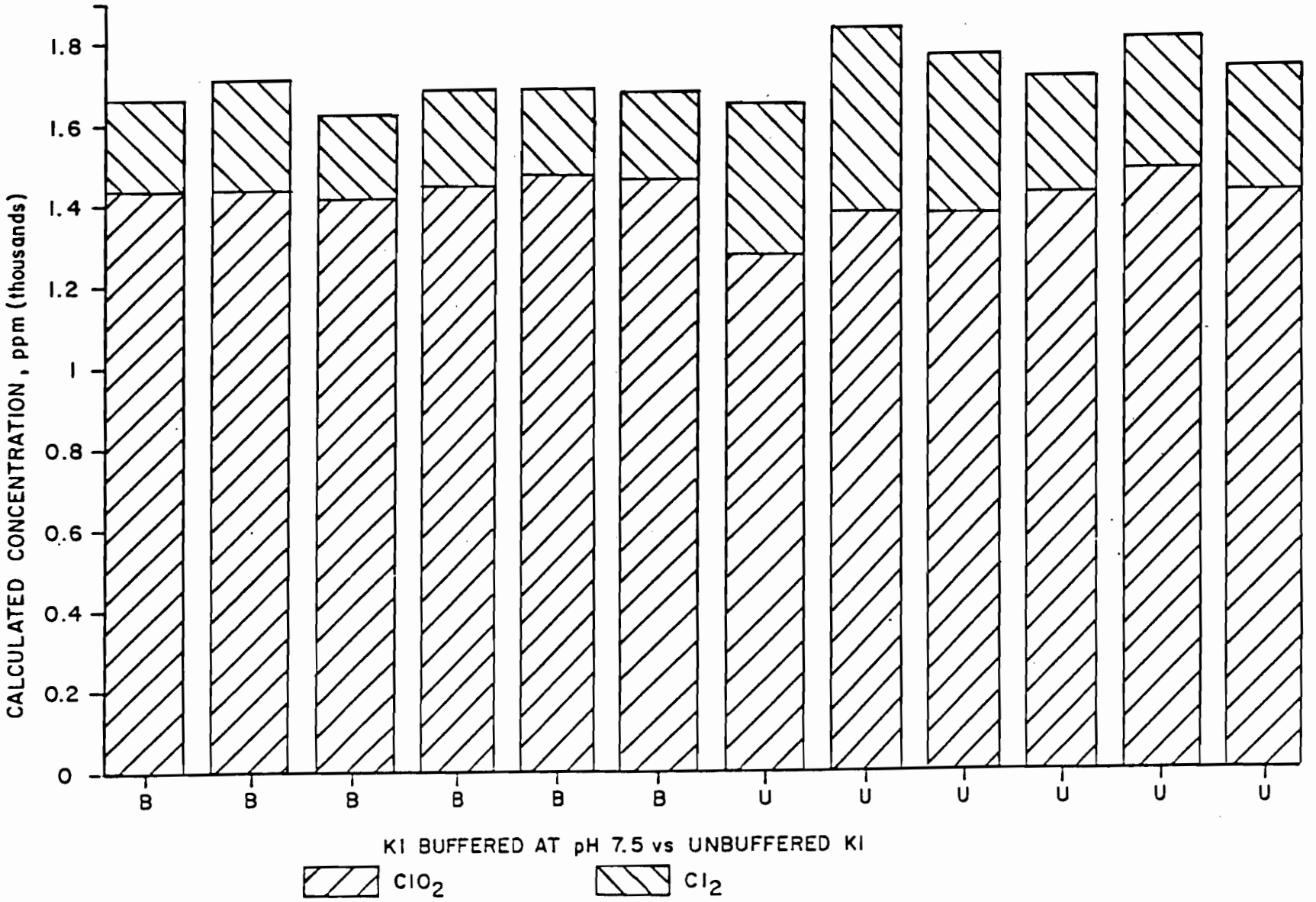
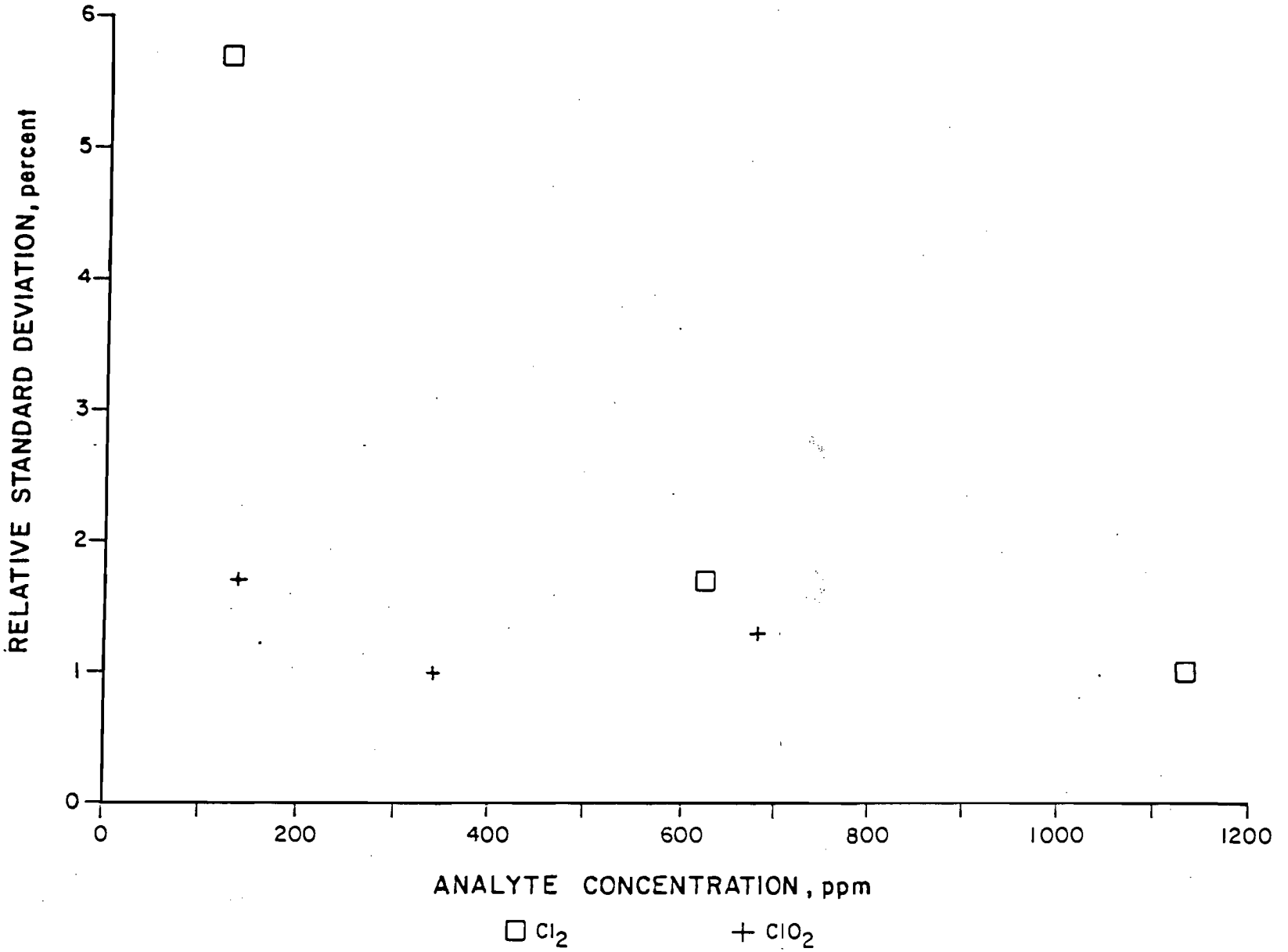
5.5
6.5
7.5
8.5
9.5
CAPTURE SOLUTION pH
□ SET 1
$\overline{X}ClO_2$ = 610 ppm
+ SET 2
$\overline{X}ClO_2$ = 75 ppm
◇ SET 3
$\overline{X}ClO_2$ = 2574 ppm
△ SET 4
$\overline{X}ClO_2$ = 2421 ppm


CALCULATED CONCENTRATION, ppm (thousands)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
B B B B B B U U U U U U
KI BUFFERED AT pH 7.5 vs UNBUFFERED KI
ClO2
Cl2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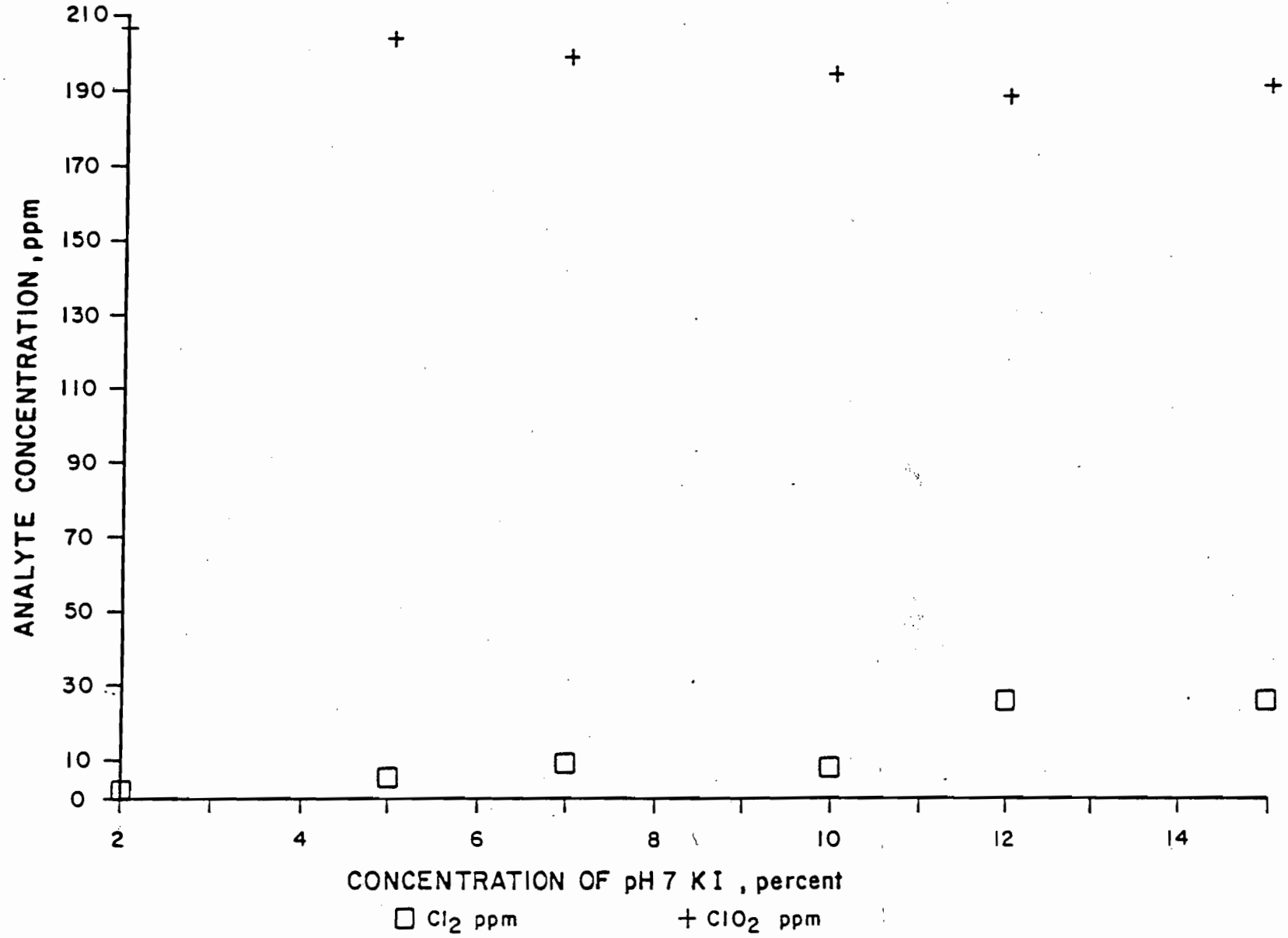
1
2
3
4
5
6
0
200
400
600
800
1000
1200
ANALYTE CONCENTRATION, ppm
Cl2
ClO2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170
150
130
110
90
70
50
30
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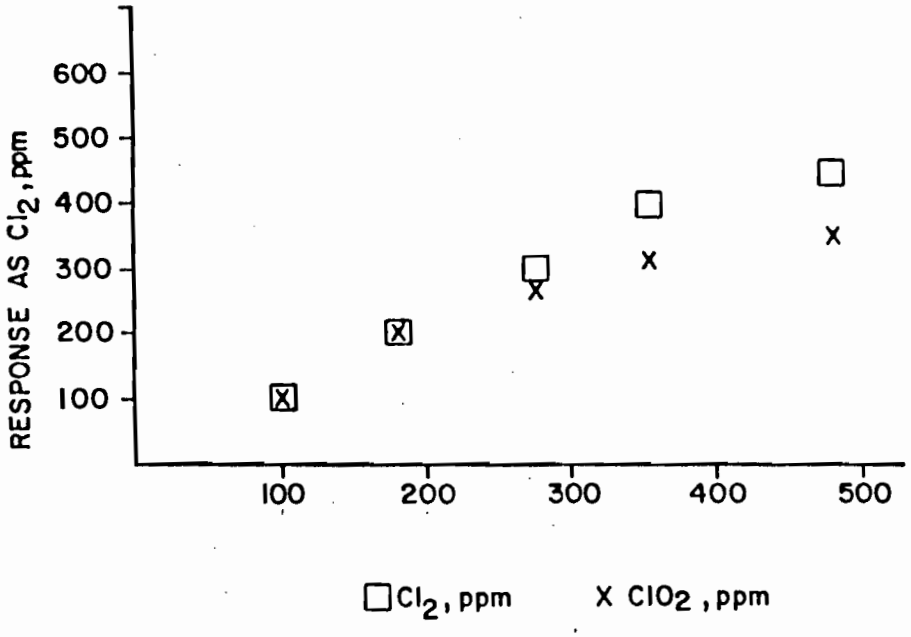
10
12
14
CONCENTRATION OF pH 7 KI, percent
□ Cl_2 ppm
+ ClO_2 ppm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200
100
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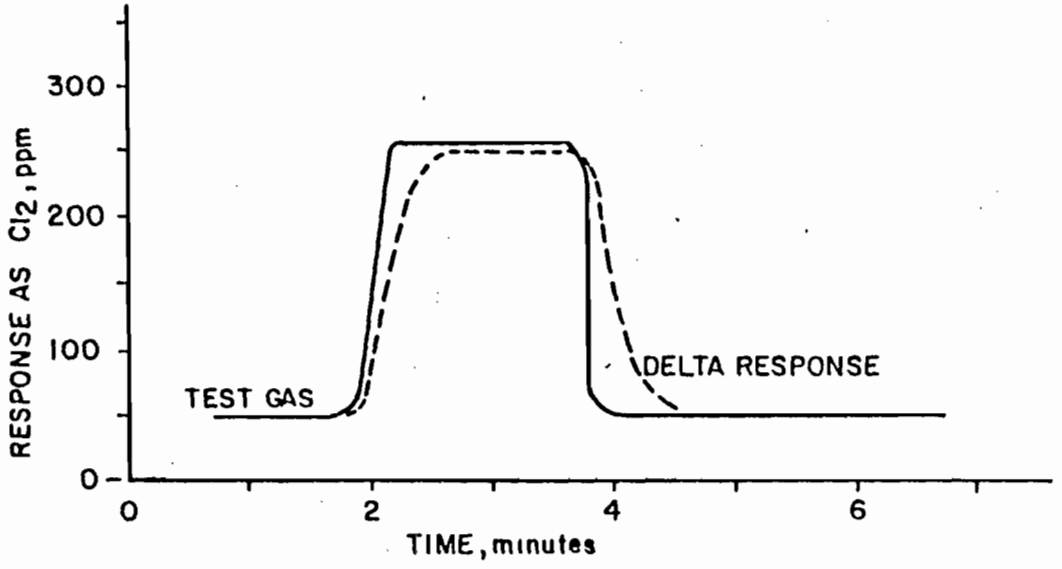
200
300
400
500
$\square Cl_2$, ppm
X ClO_2, ppm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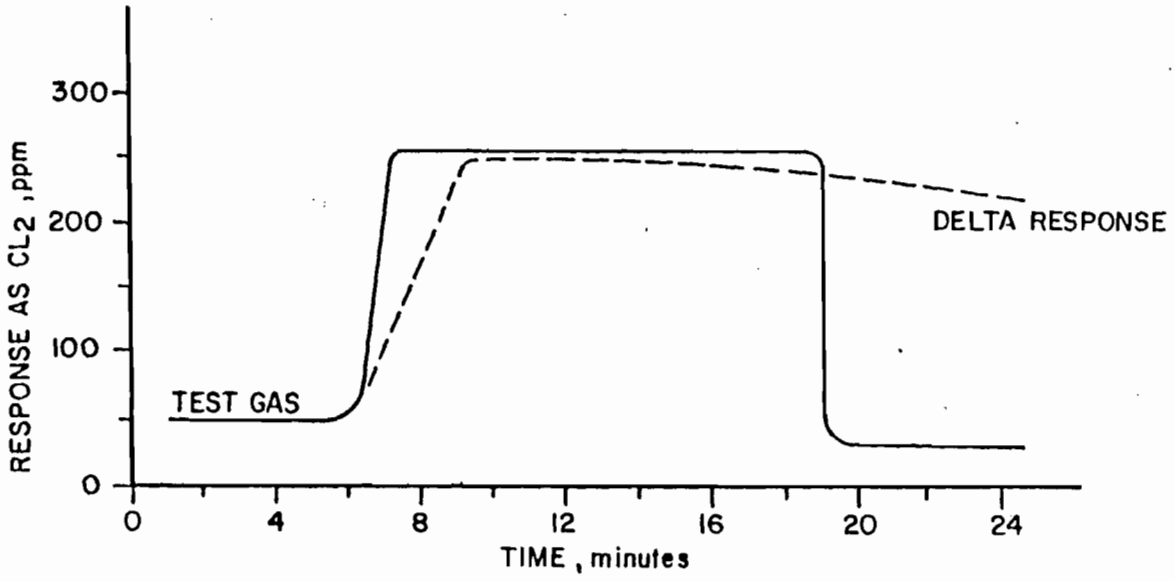
4
6
TIME, minutes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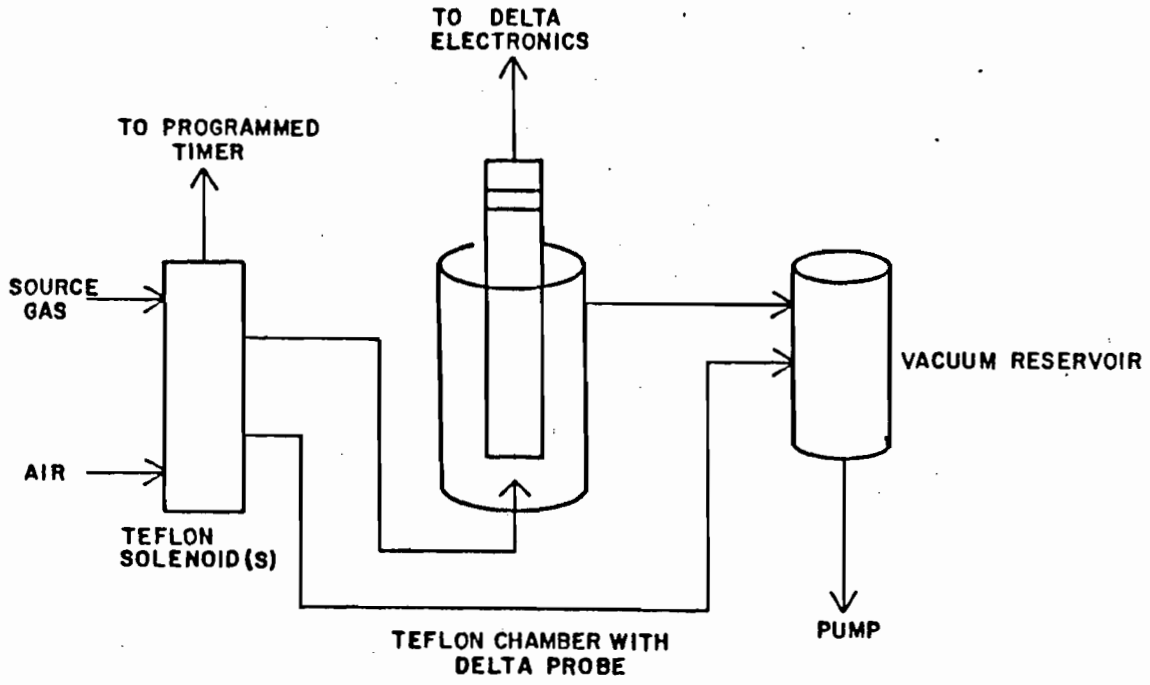
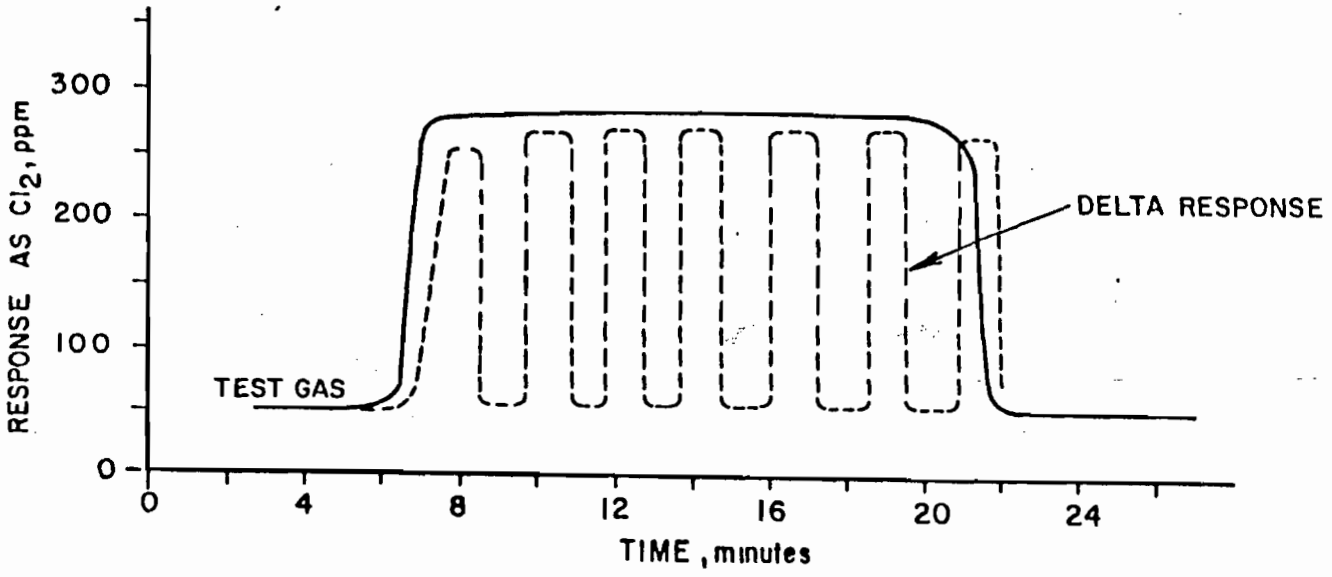
4
8
12
16
20
24
TIME , minutes


TO DELTA ELECTRONICS
TO PROGRAMMED TIMER
SOURCE GAS
AIR
TEFLON SOLENOID(S)
VACUUM RESERVOIR
PUMP
TEFLON CHAMBER WITH DELTA PROBE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TEST GAS
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4
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16
20
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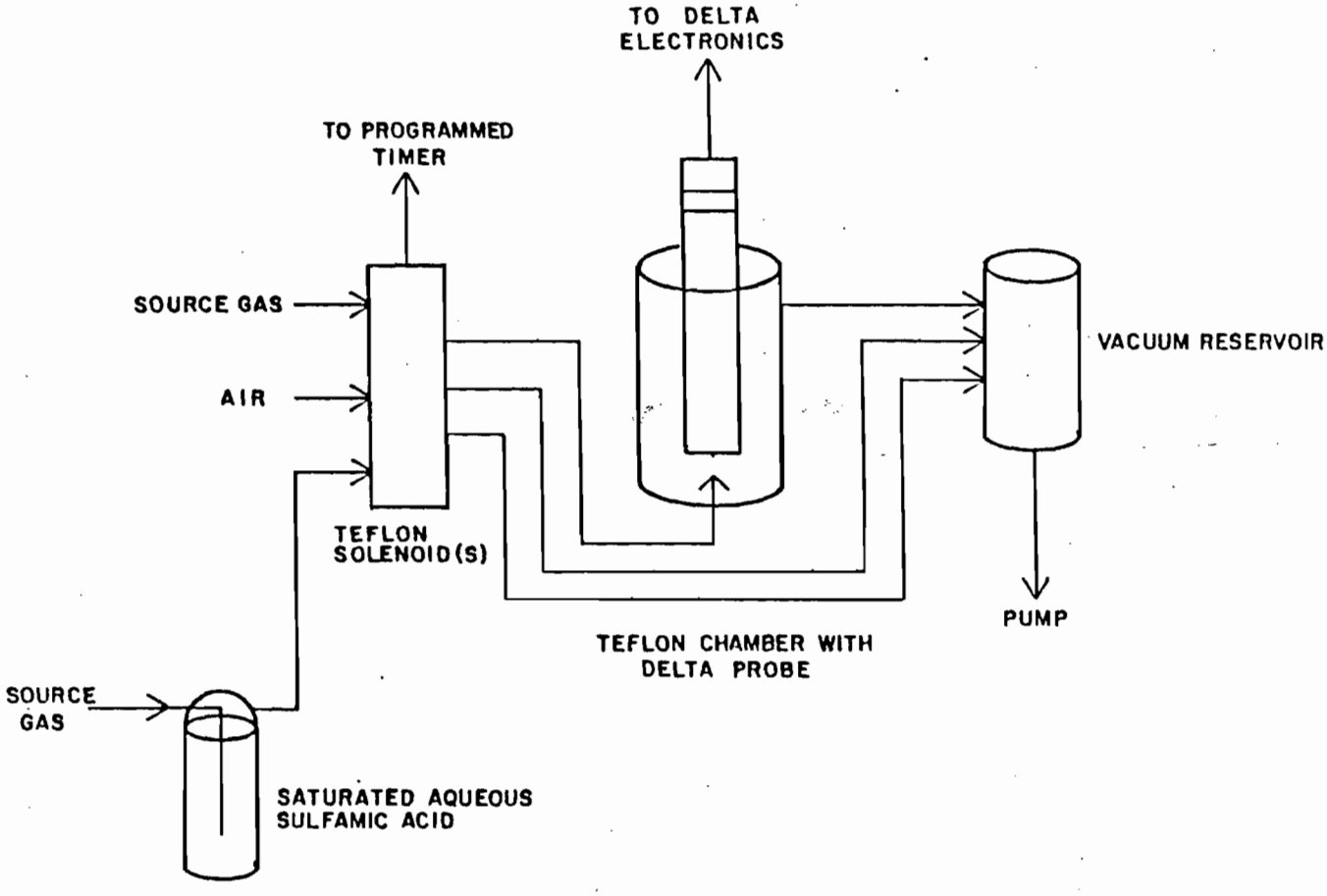
TIME, minutes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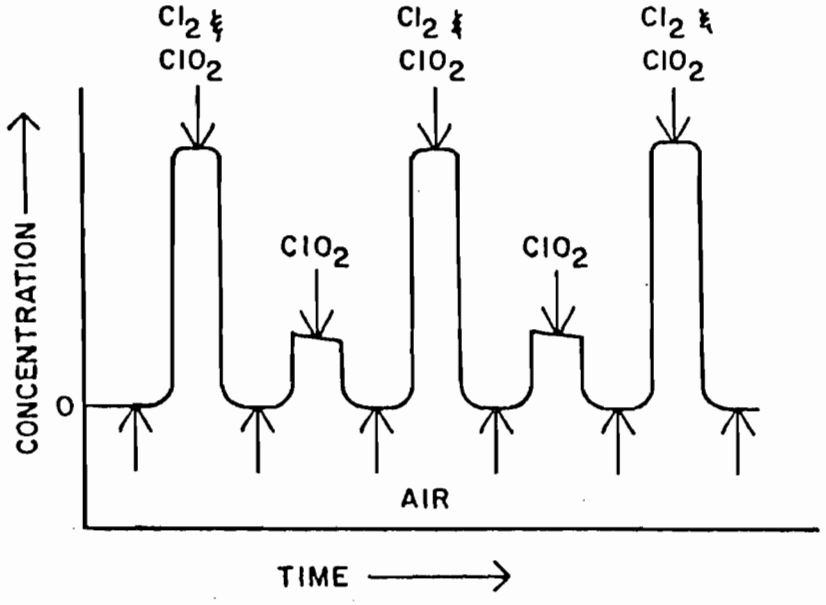
Cl_2 & ClO_2
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Cl_2 & ClO_2
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CONCENTRATION
0
AIR
TIME

P 408 533 734

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. Richard E. Olson	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 2/17/86	

PS Form 3800, Feb. 1982

PS Form 3811, July 1983

● **SENDER: Complete items 1, 2, 3 and 4.**

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

1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:

Mr. Richard E. Olson
Champion International Corporation
Post Office Box 87
Contonment, FL 32533

4. Type of Service:	Article Number
☐ Registered ☐ Insured ☒ Certified ☐ COD ☐ Express Mail	P 408 533 734

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X D Bradbury

7. Date of Delivery
2-20-86

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

DOMESTIC RETURN RECEIPT

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMIT

Mr. Richard E. Olson
Vice President Manufacturing Printing
and Writing Papers
Champion International Corporation
Post Office Box 87
Cantonment, Florida 32533

Enclosed are Permit Numbers AC 17-111195, AC 17-113551, AC 17-113552, and AC 17-113553 to Champion International Corporation to convert the existing mill in Cantonment, Escambia County to the production of only bleached kraft fine paper.

Any Party to these permits has the right to seek judicial review of the permits pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this permit is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

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

Copies furnished to:

Willard John David, P.E.
Jack Preece

CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF PERMIT and all copies were mailed before the close of business on 17 Feb 86 to the listed persons.

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

Clerk _____ Date _____

Final Determination

Champion International Corporation
Escambia County
Pensacola, Florida

Permit Numbers: AC 17-111195
AC 17-113551
AC 17-113552
AC 17-113553

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

February 11, 1986

Final Determination

The construction applications and attachments have been reviewed by the department. Public notice of the department's intent to issue was published in the Pensacola News Journal issue on January 7, 1986. The technical evaluation and preliminary determination were available for public inspection at the DER's Northwest District office and Bureau of Air Quality Management office.

Comments were received by phone (Interoffice Memorandum (IM) dated 1/11/86) on January 10, 1986 and by letter on January 21, 1986 from Mr. Charles H. Ayer, Manager-Air Programs with Champion International Corporation. The comments will become attachments to the appropriate permits. The bureau's comments will follow and be numbered so as to correspond with the number assigned to Mr. Ayer's comments in the IM and the letter, which will not be restated.

1. Due to the IM clarification, the following Specific Condition will be changed:

Affected Permit:

AC 17-113552

No. 6:

FROM: A scrubber system will be installed to control pollutant emissions from the lime slaker. PM emissions shall not exceed 0.05 gr/sdcfm (1.59 lb/hr, 6.68 TPY). Visible emissions (VE) shall be limited to less than 20% opacity. Compliance tests for PM shall be demonstrated using EPA MEthods 1, 2, 3, and 5, in accordance with 40 CFR 60, Appendix A, and FAC Rule 17-2.700. Compliance tests for VE shall be demonstrated using DER Method 9 in accordance with FAC Rule 17-2.700. Both initial compliance tests shall be conducted concurrently and while the causticizing system is operating at an equivalent rate of 66.67 (AO 17-105854) tons per hour. The test facilities for the lime slaker shall comply with all applicable provisions of FAC Rule 17-2.700(4)(c). Sampling ports shall be located pursuant to FAC Rule 17-2.700(4)(c)1.c.i. Future compliance tests shall be demonstrated while operating at 90-100% of the maximum permitted rate.

TO: A scrubber system will be installed to control pollutant emissions from the lime slaker. PM emissions shall not exceed 0.05 gr/dscfm (1.59 lb/hr, 6.68 TPY). Visible emissions (VE) shall be limited to less than 20% opacity. Compliance tests for PM shall be demonstrated using EPA methods 1, 2, 3, and 5, in accordance with 40 CFR

60, Appendix A, and FAC Rule 17-2.700. Compliance tests for VE shall be demonstrated using DER Method 9 in accordance with FAC Rule 17-2.700. Both initial compliance tests shall be conducted concurrently and while the causticizing system/lime kiln are operating at an equivalent production rate of 66.67 (AO 17-105854) tons per hour of air dried pulp (ADP; based on the maximum permitted production rate of 48,857 pounds per hour lime mud ($CaCO_3$ and inerts) and the conversion factor of "2.729 x lime mud = tons ADP"). The test facilities for the lime slaker shall comply with all applicable provisions of FAC Rule 17-2.700(4)(c). Sampling ports shall be located pursuant to FAC Rule 17-2.700(4)(c)1.c.i. Future compliance tests shall be demonstrated while operating at 90-100% of the maximum permitted production rate.

2. The bureau agrees with the request and the following will be changed:

Affected Permits:

AC 17-111195, -113551, -113552, and -113553

Expiration Date

From: December 31, 1986
To: July 1, 1987

3. The bureau agrees with the request and the following Specific Condition will be changed:

Affected Permit:

AC 17-113551

No. 8:

FROM: Chlorine dioxide generator system:
° Maximum ClO_2 (chlorine dioxide) generation shall not exceed 16 TPD and the existing ClO_2 generator will be removed from service.

°Two in-series chlorine (Cl_2) absorption tower control systems will be installed to control exit gases from the ClO_2 absorption system. The absorbing agent in the first absorption tower will be water and in the second absorption tower, 10% NaOH (sodium hydroxide).

°A tail gas scrubber will be installed to treat the gases not absorbed in the two in-series chlorine absorption tower control systems. The scrubbing medium to be used in the tail gas scrubber is weak sodium hypochlorite. The tail

gas scrubber will also receive and treat gases from the vacuum pump on the salt cake drum filter, the salt cake dissolving tank, the ClO_2 absorber seal pot, the generator dump tank, and the scrubber for the ClO_2 storage tank vents.

°In the event chill water is lost to either the ClO_2 absorber or ClO_2 vent scrubber, an auto-shutdown sequence in accordance with the contingency plan, submitted as an attachment with the application package, shall be activated. The DER Northwest District office shall be notified of these events when they occur.

°The following table will reflect the maximum allowable pollutant emission standards/limits applicable to the ClO_2 generator system:

Source	Pollutant	Maximum Allowable Emissions Standards/Limits
Chlorine Dioxide Generator		
Storage Tank Vent	Cl_2	Not to exceed 2.8 lb/hr and 11.8 TPY per absorption tower
	ClO_2	Not to exceed 0.28 lb/hr and 1.2 TPY per absorption tower
Tail Gas Scrubber Vent	Cl_2	Not to exceed 1.9 lb/hr and 8.0 TPY
	ClO_2	Not to exceed 3.7 lb/hr and 15.5 TPY

°The test method to be used to quantify the effectiveness of the control systems shall be CPPA Standard Testing Method J14P or other method(s) approved by the department. The compliance tests shall be conducted while the ClO_2 generator is generating at an equivalent rate of 16 TPD ClO_2. The compliance tests shall be a one time requirement to verify that the allowable pollutant emissions standards/limits are not exceeded. After verification, the permittee shall be required to submit in the annual operating report (AOR) the annual hours of operation of and the TPY generation of ClO_2 from the ClO_2 generator.

TO: Chlorine dioxide generator system:

°Maximum ClO_2 (chlorine dioxide) generation shall not exceed 16 TPD and the existing ClO_2 generator will be removed from service.

°The chlorine dioxide generation system consists of two process absorption towers operated either in series or parallel utilizing water and caustic (10%) as the process absorption medium. A tail gas scrubber will be installed to treat the gases not absorbed in these two process towers. The scrubbing medium to be used is weak sodium hypochlorite. The tail gas scrubber will also receive and treat gases from the vacuum pump on the salt cake drum filter, the salt cake dissolving tank, ClO_2 absorber seal pot, and the generator dump tank.

°In the event chill water is lost to either the ClO_2 absorber or ClO_2 vent scrubber, an auto-shutdown sequence in accordance with the contingency plan, submitted as an attachment with the application package, shall be activated. The DER's Northwest District office shall be notified of these events when they occur.

°The following table will reflect the maximum allowable pollutant emissions standards/limits applicable to the ClO_2 generator system:

Source	Pollutant	Maximum Allowable Emissions Standards/Limits
Chlorine Dioxide Generator		
Storage Tank Vent	Cl_2	Not to exceed 2.8 lb/hr and 11.8 TPY per absorption tower
	ClO_2	Not to exceed 0.28 lb/hr and 1.2 TPY per absorption tower
Tail Gas Scrubber Vent	Cl_2	Not to exceed 1.9 lb/hr and 8.0 TPY
	ClO_2	Not to exceed 3.7 lb/hr and 15.5 TPY

°The test method to be used to quantify the effectiveness of the control systems shall be CPPA Standard Testing Method J14P or other method(s) approved by the department. The compliance tests shall be conducted while the ClO_2

generator is generating at an equivalent rate of 16 TPD ClO_2. The compliance tests shall be a one time requirement to verify that the allowable pollutant emission standards/limits are not exceeded. After verification, the permittee shall be required to submit in the annual operating report (AOR) the annual hours of operation of and the TPY generation of ClO_2 from the ClO_2 generator.

Attachments to be incorporated are:

Affected Permit:

AC 17-113552

6. Interoffice Memorandum dated January 11, 1986.

7. Mr. Charles H. Ayer's letter dated January 20, 1986.

Affected Permits:

AC 17-111195, -113551 and -113553

6. Mr. Charles H. Ayer's letter dated January 20, 1986.

The bureau will incorporate the changes to the Specific Conditions in the affected construction permits, as referenced above in the Final Determination. It is recommended that the construction permits be issued as drafted, with the above changes and attachments incorporated.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Champion International Corp.
P. O. Box 87
Cantonment, Florida 32533

Permit Number: AC 17-111195
Expiration Date: July 1, 1987
County: Escambia
Latitude/Longitude: 30° 36' 20" N/
87° 19' 26" W
Project: P-5 Paper Machine
Operation Conversion

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

For the conversion of the P-5 Paper Machine to produce bleached kraft fine paper at the permittee's existing facility. The pearl starch silo and receiver vents pollutant emissions will be controlled by two baghouse systems. The dry additives make down system's pollutant emissions will be controlled by a single wet rotoclone scrubber system. The UTM coordinates are Zone 16, 468.85 km East and 3386.06 km North.

The standard industrial codes are: Major Group No. 26 - Paper and Allied Products; Industry No. 2611 - Pulp Mills.

Construction shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted on pages 5-8 of the Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202 with attachments received October 10, 1985.

2. Mr. Charles H. Ayer's letter with attachment dated October 18, 1985.

3. Mr. Charles H. Ayer's letter with attachments dated October 21, 1985.

4. Mr. C. H. Fancy's letter dated November 8, 1985.

5. Mr. Charles H. Ayer's letter dated November 21, 1985.

6. Mr. Charles H. Ayer's letter dated January 20, 1986.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-111195
Expiration Date: July 1, 1987

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. Annual hours of operation shall not exceed 8400.

2. In accordance with FAC Rule 17-2.620(2), objectionable odors shall not be allowed off plant property.

3. In accordance with FAC Rule 17-2.240, Circumvention, no person shall circumvent any air pollution control device, or allow the emissions of air pollutants without the applicable pollution control device operating properly.

4. The P-5 Paper Machine operations are subject to the provisions of FAC Rule 17-2.250, Excess Emissions.

SPECIFIC CONDITIONS:

5. In accordance with FAC Rule 17-2.610(3), Unconfined Emissions of particulate matter (PM), reasonable precautions to control emissions of unconfined PM shall include, but not be limited to the following:

a) Reduced speeds for vehicular traffic.

b) Use of liquid resinous adhesives or other liquid dust suppressants or wetting agents.

c) Use of paving or other asphaltic materials.

d) Removal of particulate matter from paved roads and/or other paved areas by vacuum cleaning or otherwise by wetting prior to sweeping.

e) Covering of trucks, trailers, front end loaders, and other vehicles or containers to prevent spillage of particulate matter during transport.

f) Use of mulch, hydroseeding, grassing and/or other vegetative ground cover on barren areas to prevent or reduce windblown particulate matter.

g) Use of hoods, fans, filters, and similar equipment to contain, capture, and vent particulate matter.

h) Enclosure or covering of conveyor systems.

6. A separate baghouse system will be installed on the pearl starch silo and the receiver vents to control PM emissions and VE (visible emissions). The emissions standard for each baghouse system shall be no visible emissions (5% opacity). Compliance test(s) shall be conducted using DER Method 9 in accordance with FAC Rule 17-2.700.

7. A wet rotoclone scrubber system will be installed on the dry additives batch make down system to control PM emissions and VE. The emissions standard shall be no visible emissions (5% opacity). Compliance test(s) shall be conducted using DER Method 9 in accordance with FAC Rule 17-2.700.

SPECIFIC CONDITIONS:

8. Failure of any operation to meet the VE standard, described in Specific Conditions Nos. 6 and 7, shall necessitate a meeting with the appropriate mill personnel and the DER's Northwest District office to discuss and plan appropriate course(s) of action. If a PM mass emissions test is required, compliance test(s) methods shall be EPA Methods 1, 2, 3, and 5, pursuant to 40 CFR 60, Appendix A, and FAC Rule 17-2.700. Testing facilities shall comply with all applicable provisions of FAC Rule 17-2.700(4)(c). Sampling ports shall be located in accordance with FAC Rule 17-2.700(4)(c)1.c.i.

9. Failure of a control system(s) to meet the applicable and maximum allowable particulate matter or visible emissions limiting standard and/or limit shall not be grounds for requesting a variance or relaxation of that standard and/or limit.

10. A pressure gauge meter shall be installed on the scrubber system for the dry additives batch make down system to measure the scrubbing liquid supply pressure and the pressure sensor or tap is to be located close to the scrubber liquid discharge point. The monitoring device is to be certified by the manufacturer to be accurate within $\pm$ 15 percent of design scrubbing liquid supply pressure.

11. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, he must notify the Department in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit. (FAC Rule 17-4.09)

To obtain a permit to operate, the applicant must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with test results and Certificate of Completion, to the Department's Northwest District office 90 days prior to the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate. (FAC Rule 17-4.22 and 17-4.23)

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-111195
Expiration Date: July 1, 1987

SPECIFIC CONDITIONS:

If the construction permit expires prior to the applicant requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application. (FAC Rule 17-4.10)

Issued this 11th day of Feb
1986

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

VICTORIA J. TSCHINKEL, Secretary

____ pages attached.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Champion International Corp.
P. O. Box 87
Cantonment, Florida 32533

Permit Number: AC 17-113551
Expiration Date: July 1, 1987
County: Escambia
Latitude/Longitude: 30° 36' 20" N/ 87° 19' 26" W
Project: Two Oxygen Delignification Systems, Two 3-Stage Bleaching Systems, and a Chlorine Dioxide Generator System

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

For the construction of two oxygen delignification systems followed by two 3-stage bleaching systems at the permittee's existing facility. The new lines will be designed for 800 TPD and 600 TPD air dried bleached pulp. In addition, a new chlorine dioxide (ClO_2) generator (R-3H), designed for 16 TPD ClO_2, will replace the existing ClO_2 generator (R-2). Also, a dry salt unloading system and make down tank will be constructed. Various pollutant control systems in association with the above sources and systems will be constructed. The UTM coordinates are Zone 16, 468.85 km East and 3386.06 km North.

The standard industrial codes are: Major Group No. 26 - Paper and Allied Products; Industry No. 2611 - Pulp Mills.

Construction shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted on pages 5-10 of the Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202 with attachments received October 10, 1985.
2. Mr. Charles H. Ayer's letter with attachment dated October 18, 1985.
3. Mr. Charles H. Ayer's letter with attachments dated October 21, 1985.
4. Mr. C. H. Fancy's letter dated November 8, 1985.
5. Mr. Charles H. Ayer's letter dated November 21, 1985.
6. Mr. Charles H. Ayer's letter dated January 20, 1986.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113551
Expiration Date: July 1, 1987

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. Annual hours of operation shall not exceed 8400.

2. In accordance with FAC Rule 17-2.620(2), objectionable odors shall not be allowed off plant property.

3. In accordance with FAC Rule 17-2.240, Circumvention, no person shall circumvent any air pollution control device, or allow the emissions of air pollutants without the applicable pollution control device operating properly.

4. The oxygen delignification systems(2), the 3-stage bleaching systems(2), and the chlorine dioxide generator system are subject to the provisions of FAC Rule 17-2.250, Excess Emissions.

SPECIFIC CONDITIONS:

5. In accordance with FAC Rule 17-2.610(3), Unconfined Emissions of particulate matter (PM), reasonable precautions to control emissions of unconfined PM shall include, but not be limited to the following:

a) Reduced speeds for vehicular traffic.

b) Use of liquid resinous adhesives or other liquid dust suppressants or wetting agents.

c) Use of paving or other asphaltic materials.

d) Removal of particulate matter from paved roads and/or other paved areas by vacuum cleaning or otherwise by wetting prior to sweeping.

e) Covering of trucks, trailers, front end loaders, and other vehicles or containers to prevent spillage of particulate matter during transport.

f) Use of mulch, hydroseeding, grassing and/or other vegetative ground cover on barren areas to prevent or reduce windblown particulate matter.

g) Use of hoods, fans, filters, and similar equipment to contain, capture, and vent particulate matter.

h) Enclosure or covering of conveyor systems.

6. Failure of a control system(s) to meet the applicable and maximum allowable pollutant emissions limiting standard and/or limit shall not be grounds for requesting a variance or relaxation of that standard and/or limit.

7. A spray tower scrubber system will be installed on the rock salt make down tank vent to control PM emissions and visible emissions (VE). The emissions standard for the control system shall be no visible emissions (5% opacity). Compliance test(s) for VE shall be conducted using DER Method 9 in accordance with FAC Rule 17-2.700.

SPECIFIC CONDITIONS:

8. Chlorine dioxide generator system:

   - Maximum ClO_2 (chlorine dioxide) generation shall not exceed 16 TPD and the existing ClO_2 generator will be removed from service.

   - The chlorine dioxide generation system consists of two process absorption towers operated either in series or parallel utilizing water and caustic (10%) as the process absorption medium. A tail gas scrubber will be installed to treat the gases not absorbed in these two process towers. The scrubbing medium to be used is weak sodium hypochlorite. The tail gas scrubber will also receive and treat gases from the vacuum pump on the salt cake drum filter, the salt cake dissolving tank, ClO_2 absorber seal pot, and the generator dump tank.

   - In the event chill water is lost to either the ClO_2 absorber or ClO_2 vent scrubber, an auto-shutdown sequence in accordance with the contingency plan, submitted as an attachment with the application package, shall be activated. The DER Northwest District office shall be notified of these events when they occur.

   - The following table will reflect the maximum allowable pollutant emissions standards/limits applicable to the ClO_2 generator system:

Source	Pollutant	Maximum Allowable Emissions Standards/Limits
Chlorine Dioxide Generator		
Storage Tank Vent	Cl_2	Not to exceed 2.8 lb/hr and 11.8 TPY per absorption tower
	ClO_2	Not to exceed 0.28 lb/hr and 1.2 TPY per absorption tower
Tail Gas Scrubber Vent	Cl_2	Not to exceed 1.9 lb/hr and 8.0 TPY
	ClO_2	Not to exceed 3.7 lb/hr and 15.5 TPY

SPECIFIC CONDITIONS:

- The test method to be used to quantify the effectiveness of the control systems shall be CPPA Standard Testing Method J14P or other method(s) approved by the department. The compliance tests shall be conducted while the ClO_2 generator is generating at an equivalent rate of 16 TPD ClO_2. The compliance tests shall be a one time requirement to verify that the allowable pollutant emissions standards/limits are not exceeded. After verification, the permittee shall be required to submit in the annual operating report (AOR) the annual hours of operation of and the TPY generation of ClO_2 from the ClO_2 generator.

9. Two 3-stage bleach plant operations will be installed and the maximum production through-put shall not exceed 800 TPD and 600 TPD of air dried bleached pulp (ADBP).

- The existing 285 TPD bleached pulp operations shall be removed from service and its operating permits surrendered to the department.

- A hood and a scrubber system followed by a caustic scrubber will be installed for each 3-stage bleach plant operation to control pollutant emissions from the Cl_2-ClO_2 and ClO_2 washing stages.

- The following table will reflect the maximum allowable pollutant emissions standards/limits applicable to the two 3-stage bleach plant operations.

Source	Pollutant	Maximum Allowable Emissions Standard/Limit
Beach Plant		
800 TPD Operation	Cl_2	Not to exceed 17 ppm (1.7 lb/hr and 7.1 TPY)
	ClO_2	Not to exceed 17 ppm (1.6 lb/hr and 6.7 TPY)
600 TPD Operation	Cl_2	Not to exceed 17 ppm (1.2 lb/hr and 5.0 TPY)
	ClO_2	Not to exceed 17 ppm (1.1 lb/hr and 4.6 TPY)

- The test method to be used to quantify the effectiveness of the control systems shall be CPPA Standard Testing Method J14P or other method(s) approved by the department. Compliance tests shall be conducted while each bleach plant operation is operating at the maximum permitted production throughput, i.e., 800 TPD and 600 TPD ADBP. The compliance tests shall be a one

SPECIFIC CONDITIONS:

time requirement to verify that the allowable pollutant emissions standards/limits are not exceeded. After verification, the permittee shall be required to submit in the AOR the annual operating hours and the TPY production through-put per operation.

10. A pressure gauge meter shall be installed on all of the scrubber systems to measure the scrubbing liquid supply pressure and the pressure sensor or tap is to be located close to the scrubber liquid discharge point. The monitoring device is to be certified by the manufacturer to be accurate within $\pm$ 15 percent of design scrubbing liquid supply pressure.

11. An AOR shall be submitted to the DER's Northwest District office by February 1 of each year.

12. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, he must notify the Department in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit. (FAC Rule 17-4.09)

To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with test results and Certificate of Completion, to the Department's Northwest District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate. (FAC Rule 17-4.22 and 17-4.23)

If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application. (FAC Rule 17-4.10)

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113551
Expiration Date: July 1, 1987

SPECIFIC CONDITIONS:

Issued this 11th day of Feb 1986.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Victoria J. Tschinkel, Secretary

____ pages attached.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Champion International Corp.
P. O. Box 87
Cantonment, Florida 32533

Permit Number: AC 17-113552
Expiration Date: July 1, 1987
County: Escambia
Latitude/Longitude: 30° 36' 20" N/
87° 19' 26" W
Project: Lime Slaker

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

For the construction of a new lime slaker with an associated wet scrubber system and will replace the existing lime slaking operation at the permittee's existing facility. The UTM coordinates are Zone 16, 468.85 km East and 3386.06 km North.

The standard industrial codes are: Major Group No. 26 - Paper and Allied Products; Industry No. 2611 - Pulp Mills.

Construction shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted on pages 5-7 of the Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202 with attachments received October 10, 1985.

2. Mr. Charles H. Ayer's letter with attachment dated October 18, 1985.

3. Mr. Charles H. Ayer's letter with attachments dated October 21, 1985.

4. Mr. C. H. Fancy's letter dated November 8, 1985.

5. Mr. Charles H. Ayer's letter dated November 21, 1985.

6. Interoffice memorandum dated January 11, 1986.

7. Mr. Charels H. Ayer's letter dated January 20, 1986.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113552
Expiration Date: July 1, 1987

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. Annual hours of operation shall not exceed 8400.

2. In accordance with FAC Rule 17-2.620(2), objectionable odors shall not be allowed off plant property.

3. In accordance with FAC Rule 17-2.240, Circumvention, no person shall circumvent any air pollution control device, or allow the emissions of air pollutants without the applicable pollution control device operating properly.

4. The lime slaker is subject to the provisions of FAC Rule 17-2.250, Excess Emissions.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113552
Expiration Date: July 1, 1987

SPECIFIC CONDITIONS:

5. In accordance with FAC Rule 17-2.610(3), Unconfined Emissions of particulate matter (PM), reasonable precautions to control emissions of unconfined PM shall include, but not be limited to the following:

a) Reduced speeds for vehicular traffic.

b) Use of liquid resinous adhesives or other liquid dust suppressants or wetting agents.

c) Use of paving or other asphaltic materials.

d) Removal of particulate matter from paved roads and/or other paved areas by vacuum cleaning or otherwise by wetting prior to sweeping.

e) Covering of trucks, trailers, front end loaders, and other vehicles or containers to prevent spillage of particulate matter during transport.

f) Use of mulch, hydroseeding, grassing and/or other vegetative ground cover on barren areas to prevent or reduce windblown particulate matter.

g) Use of hoods, fans, filters, and similar equipment to contain, capture, and vent particulate matter.

h) Enclosure or covering of conveyor systems.

6. A scrubber system will be installed to control pollutant emissions from the lime slaker. PM emissions shall not exceed 0.05 gr/sdcfm (1.59 lb/hr, 6.68 TPY). Visible emissions (VE) shall be limited to less than 20% opacity. Compliance tests for PM shall be demonstrated using EPA Methods 1, 2, 3, and 5, in accordance with 40 CFR 60, Appendix A, and FAC Rule 17-2.700. Compliance tests for VE shall be demonstrated using DER Method 9 in accordance with FAC Rule 17-2.700. Both initial compliance tests shall be conducted concurrently and while the causticizing system is operating at an equivalent rate of 66.67 (AO 17-105854) tons per hour of air dried pulp (ADP; based on the maximum permitted production rate of 48,857 pounds per hour lime mud ($CaCO_3$ and inerts) and the conversion factor of "2.729 x lime mud = tons ADP"). The test facilities for the lime slaker shall comply with all applicable provisions of FAC Rule 17-2.700(4)(c). Sampling ports shall be located pursuant to FAC Rule 17-2.700(4)(c)1.c.i. Future compliance tests shall be demonstrated while operating at 90-100% of the maximum permitted rate.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113552
Expiration Date: July 1, 1987

SPECIFIC CONDITIONS:

7. Failure of a control system(s) to meet the applicable and maximum allowable particulate matter or visible emissions limiting standard and/or limit shall not be grounds for requesting a variance or relaxation of that standard and/or limit.

8. A pressure gauge meter shall be installed on the scrubber system for the lime slaker to measure the scrubbing liquid supply pressure and the pressure sensor or tap is to be located close to the scrubber liquid discharge point. The monitoring device is to be certified by the manufacturer to be accurate within ± 15 percent of design scrubbing liquid supply pressure.

9. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, he must notify the Department in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit. (FAC Rule 17-4.09)

To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with test results and Certificate of Completion, to the Department's Northwest District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate. (FAC Rule 17-4.22 and 17-4.23)

If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application. (FAC Rule 17-4.10)

Issued this 11th day of Feb, 19 86.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

VICTORIA J. TSCHINKEL, Secretary

_____pages attached.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Champion International Corp.
P. O. Box 87
Cantonment, Florida 32533

Permit Number: AC 17-113553
Expiration Date: July 1, 1987
County: Escambia
Latitude/Longitude: 30° 36' 20" N/
87° 19' 26" W
Project: Woodyard and Related Activity

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

For the construction, as an addition to the existing woodyard, of a truck dumper (chips), new chip storage, chip stacker, chip reclaimer and chip screener in order to handle the increased usage of hardwood at the permittee's existing facility. The permittee will apply various control measures to minimize fugitive and unconfined particulate matter emissions. The UTM coordinates are Zone 16, 468.85 km East adn 3386.06 km North.

The standard industrial codes are: Major Group No. 26 - Paper and Allied Products; Industry No. 2611 - Pulp Mills.

Construction shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted on pages 5-7 of the Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202 with attachments received October 10, 1985.
2. Mr. Charles H. Ayer's letter with attachment dated October 18, 1985.
3. Mr. Charles H. Ayer's letter with attachments dated October 21, 1985.
4. Mr. C. H. Fancy's letter dated November 8, 1985.
5. Mr. Charles H. Ayer's letter dated November 21, 1985.
6. Mr. Charles H. Ayer's letter dated January 20, 1986.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113553
Expiration Date: July 1, 1987

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. Annual hours of operation are 8760.

2. Fugitive and unconfined particulate matter (PM) emissions shall be minimized in accordance with the following operational parameters, which are commitments by the permittee:

a) Chips manufactured on site will be screened prior to storage, thus reducing the potential for fugitive emissions.

b) Chips will be screened once removed from storage prior to conveying to the digesters.

SPECIFIC CONDITIONS:

c) Drop distance for chip storage stacker will be maintained to a minimum. Chips will be conveyed to stacker and will be distributed on the storage pile by mechanical conveyors which will be covered.

d) All conveyor systems will be covered or enclosed.

e) Paving of all roadways for ingress and egress.

3. In accordance with FAC Rule 17-2.610(3), Unconfined Emissions of PM, reasonable precautions to control emissions of unconfined PM shall include, but not be limited to the following:

a) Reduced speeds for vehicular traffic.
b) Use of liquid resinous adhesives or other liquid dust suppressants or wetting agents.
c) Removal of particulate matter from paved roads and/or other paved areas by vacuum cleaning or otherwise by wetting prior to sweeping.
d) Covering of trucks, trailers, front end loaders, and other vehicles or containers to prevent spillage of particulate matter during transport.
e) Use of mulch, hydroseeding, grassing and/or other vegetative ground cover on barren areas to prevent or reduce windblown particulate matter.
f) Use of hoods, fans, filters, and similar equipment to contain, capture, and vent particulate matter.

4. The annual projected roundwood and purchased chips to be processed through the woodyard are:

	(1000 cords/yr)	
	Softwood	Hardwood
Roundwood	325	74
Purchased Chips	170	288

Note: A roundwood cord weighs approximately 5400 lbs.
A purchased chip cord weighs approximately 5000 lbs.

5. The annual amounts of roundwood and purchased chips by type processed through the woodyard shall be submitted in the annual operating report to the DER Northwest District office by February 1 of each year.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113553
Expiration Date: July 1, 1987

SPECIFIC CONDITIONS:

7. The projected potential PM emissions from the woodyard and related activities are exhibited in the following table:

Source	Projected Potential PM Emissions (TPY)
Roadways	5.7
Woodyard	
Debarking	12.9
Unloading, Storing, Handling Chips	5.7
Total:	24.3

Note: The total represents a 3.9 TPY increase over current operations.

8. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, he must notify the Department in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit. (FAC Rule 17-4.09)

To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with test results and Certificate of Completion, to the Department's Northwest District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate. (FAC Rule 17-4.22 and 17-4.23)

If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application. (FAC Rule 17-4.10)

Issued this 11th day of Feb, 19 86

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

VICTORIA J. TSCHINKEL, Secretary

____ pages attached.

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

FOR ROUTING TO OTHER THAN THE ADDRESSEE

To: _____ Loctn: _____
To: _____ Loctn: _____
To: _____ Loctn: _____
From: _____ Date: _____

TO: Victoria J. Tschinkel

FROM: for Clair Fancy

DATE: February 11, 1986

SUBJ: Approval of Attached Air Construction Permits

Attached for your approval and signature are four Air Construction Permits to Champion International Corporation to convert their existing mill to the production of only bleached kraft fine paper.

Day 90, after which the permits would be issued by default, is March 17, 1986.

The Bureau recommends your approval and signature.

CF/pa

Attachment

One Champion Plaza
Stamford, Connecticut 06921
203 358-7000

Champion
Champion International Corporation

DER
JAN 21 1986
BAQM

January 20, 1986

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

Dear Mr. Fancy:

Champion appreciates this opportunity to comment on the proposed air quality construction permits for its Pensacola facility conversion project.

A. Construction Permit Expiration Date (Permits NOS - AC 17-111195, AC 17-113551, AC 17-113552, AC 17-113553)

Construction is scheduled to be completed December 31, 1986, which is also the proposed expiration date for all construction permits. In order to comply with the DER requirement for submittal of a
(2) complete operating permit application, which includes compliance testing and certification of completion, ninety days prior to the construction permit expiration date; Champion is requesting that the December 31, 1986 expiration date be changed to July 1, 1987.

B. Permit No. AC 113551 - Specific Condition 8, Paragraph 2 and 3

These statements should be combined to read as follows:

- The chlorine dioxide generation system consists of two process absorption towers operated either in series or parallel utilizing water and caustic (10%) as the process absorption medium. A tail gas scrubber will be installed
(3) to treat the gases not absorbed in these two process towers. The scrubbing medium to be used is weak sodium hypochlorite. The tail gas scrubber will also receive and treat gases from the vacuum pump on the salt cake drum filter, the salt cake dissolving tank, ClO_2 absorber seal pot, and the generator dump tank.

Note: The changes reflected are:

1) storage tank vents do not go to tail gas scrubber. These vents have their own scrubber and are listed separately.

2) the absorption towers are process units which can be operated in series or parallel and can use either water or caustic on both towers or in combination.

Sincerely,

Charles H. Ayer
Manager, Air Programs

CHA:lbb

cc: Ed Clem
Tom Moody
Dick Wigger

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

FOR ROUTING TO OTHER THAN THE ADDRESSEE

To: _____ Locth: _____
To: _____ Locth: _____
To: _____ Locth: _____
From: _____ Date: _____

TO: File - Champion International Corporation

FROM: Bruce Mitchell

DATE: January 11, 1986

SUBJ: Comments on Specific Condition No. 6 contained in the draft construction permit No. AC 17-113552.

Mr. Charles H. Ayer called and requested clarification on the causticizing system production equivalent rate contained in the above referenced Specific Condition and operating permit No. AC 17-105854. The following is a clarification: (1)

- The 66.67 tons per hour (TPH) represents tons of air dried pulp (TADP)
- It is based on the maximum permitted production rate of:
  48,857 lbs/hr lime mud ($CaCO_3$+inerts)
- The conversion factor is:
  2.729 x lime mud = TADP
- Therefore,
  48,857 x 2.729 ÷ 2000 = 66.67 TPH ADP

BM/bjs

PETITION FOR ADMINISTRATIVE HEARING
UNDER FLORIDA STATUTES 120.57 (1)

To:

State of Florida
Office of General Council
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

By: Richard D. Radford
4649 Soundside Drive
Gulf Breeze, Florida 32561

In re Champion International Corporation's Permit, Legal Notice No. 30782 1 T Dec. 31, 1985 & 30806 1 T Jan. 7, 1986

Petitioner requests pursuant to sections 120.57 (1) of Florida Statutes, an adm inistrative hearing regarding the above identified request for permit. This request is based, inter alia, upon the following considerations.

1. Substantial interest of the petitioner will be adversely affected by grant of the permit.

Petitioner states that he is a citizen of the State of Florida and owner of land and a shoreline residence situated at 4649 Soundside Drive, Gulf Breeze, Florida 32561, and that he resides at said property.

2) Notice of Agency intent.

Petitioner received notice of the Department of Envinmental Regulations Intent to Issue from Legal Notice No. 30782 1-TDec. 31, 1985 in the Pensacola News Journal of that date.

3) Disputed issues

A. Petitioner lives on local esturine waters and and makes use of them for recreational and avocational pursuits. This plant as permitted will substantially degrade the esturine environment.

B. Petitioner lives in an area of hardwood wetlands

DEPARTMENT OF ENVIRONMENTAL REGULATION

ROUTING AND TRANSMITTAL SLIP

ACTION NO

ACTION DUE DATE

	Initial	Date
1. TO: (NAME, OFFICE, LOCATION) Patty Adams - 4-10		
2.		
3. Bill - Doug Strickoff is the attorney assigned to this - Please return for /		
4.		

REMARKS: Pete -
OGC #'s 86-0049
86-0050
86-0051
86-0052

Patty / file
How does notice # correlate with ours. None of the complaints have any bearing on air permit.
BT

FROM: Kathy Carter

INFORMATION	
	Review & Return
	Review & File
	Initial & Forward

DISPOSITION	
	Review & Respond
	Prepare Response
	For My Signature
	For Your Signature
	Let's Discuss
	Set Up Meeting
	Investigate & Report
	Initial & Forward
	Distribute
	Concurrence
	For Processing
	Initial & Return

DATE 1/15

PHONE 8-9730

with upland pine logging being done in the immediate area. This mill will use 50 % or more hardwoods and petitioners property values can be substantially degraded without a much more definitive plan of hardwood logging and transportation being presented.

C. The affects of hardwood wetlands logging on the environment are not mentioned in this permit and they ahould be covered.

D. The bleached pulp process is separate and after the previously used Kraft process. It uses chlorine and chlorine dioxide, both toxic gasses, in quantity for bleaching, no containment, evacuation, and disaster plan are given and the process is not identified as being destinct and new to the paper processing.

E. The waste streams from the bleaching process are not described as being non burnable as opposed to the lignin wastes from the separate Kraft process. They will go to holding ponds for aerobic degradation and there is no mention that they contain toxic and hazardous chlotinated phenols. Compositions of similar streams from similar mills in Texas and North Carolina need to be presented and monitoring and separation processes need to be specified in the permit.

4) <u>Demands for relief</u>

A. Petitioner requests the proposed flow sheets for the proposed plant, the quantities of water and the expected waste contaminants to the holding ponds, and the expected composition of the outfall stream.

B. Petitioner requests similar data from other Champion plants using the same or similar mixed softwood/ hardwood processes.

Preece

RECEIVED

JAN 10 1986

NORTHWEST FLORIDA
DER

PENSACOLA
News Journal

PUBLISHED DAILY
PENSACOLA, ESCAMBIA COUNTY, FLORIDA

State of Florida,
County of Escambia.

Before the undersigned authority personally appeared
J. Diane Deal

who on oath says that she is Legal Advertising Supervisor of the Pensacola News Journal, a daily newspaper published at Pensacola in Escambia County, Florida; with general circulation in Escambia, Santa Rosa, Okaloosa and Walton Counties that the attached copy of advertisement, being a NOTICE in the matter of

Proposed Agency DER

in the _____ Court,

was published in said newspaper in the issues of

Jan 7, 1986

Affiant further say that the said The Pensacola N
Journal is a newspaper published at Pensacola, in said Es
bia County, Florida, and that the said newspaper has hereto
been continuously published in said Escambia County, Flor
each day and has been entered as second class mail matte
the post office in Pensacola, in said Escambia County, Flor
for a period of one year next preceding the first publicatio
the attached copy of advertisement; and affiant further s
that he has neither paid nor promised any person, firm or c
poration any discount, rebate, commission or refund for
purpose of securing this advertisement for publication in
said newspaper.

J Diane Deal

Sworn to and subscribed before me this 7th
day of Jan, A.D., 19 86

Betty J. Poston
NOTARY PUBLIC.

My Commission Expires Oct. 16, 1987

interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code, and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period constitutes a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

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

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

Dept. of Environmental Regulation
Bureau of Air Quality
Management
2600 Blair Stone Road
Tallahassee, Florida 3230

Dept. of Environmental Regulation
Northwest District
106 Governmental Cente
Pensacola, Florida 32501

Any person may send w
ten comments on the
posed action to Mr.
Thomas at the departm
Tallahassee address
comments mailed with
days of the publication
notice will be consider
the department's final
mination.

LEGAL NO. 30806 1-T
JANUARY 7, 1986

State of Florida
Department of
Environmental Regulation
Notice of
Proposed Agency Action
On Permit Applications

The Department of Environmental Regulation gives notice of its intent to issue permits to Champion International Corporation to convert their existing mill to the production of only bleached kraft fine paper. The modification will affect the existing P-5 paper machine, bleach plant, lime slaking operation and woodyard at their existing facility in Cantonment, Escambia County, Florida. A determination of best available control technology (BACT) was not required.

Persons whose substantial

DEPARTMENT OF ENVIRONMENTAL REGULATION

ROUTING AND TRANSMITTAL SLIP

ACTION NO

ACTION DUE DATE

1. TO: (NAME, OFFICE, LOCATION) Bruce Mitchell - BAQM - Tall.	Initial	
	Date	
2.	Initial	
	Date	
3. DER	Initial	
	Date	
4. JAN 30 1986 BAQM	Initial	
	Date	

REMARKS:

For your files

INFORMATION	
	Review & Return
	Review & File
	Initial & Forward

DISPOSITION	
	Review & Respond
	Prepare Response
	For My Signature
	For Your Signature
	Let's Discuss
	Set Up Meeting
	Investigate & Report
	Initial & Forward
	Distribute
	Concurrence
	For Processing
	Initial & Return

FROM: R. A. Rhea

DATE 1-29-86

PHONE

C. Petitioner requests identification of the type of hardwood areas (wetland hardwoods?) to be logged, reforestation proposed, and Landsat, U 2 or other similar aerial photographs of the proposed 100 mile radius logging area.

D. Petitioner requests process flow sheets for existing Champion mills using this or similar processes, material quantities into and out of the holding ponds on these mills and processes being used to measure and remove color, ammonia, TOC, SO_4, and COD in particular on the streams.

E. Petitioner wishes to review the proposed logging, reforestration, and hardwood wetlands mitigation methods proposed for this process.

Certificate of Service

I hereby certify that the original and one true copy hereof have been furnished to the Office of General Council, Department of Environmental Regulation, 2600 Blair Stone Road, Tallahassee, Florida 32301 on this 9th day of January 1986.

Richard D. Radford

Richard D. Radford
4649 Soundside Drive
Gulf Breeze, Florida 32561

Venue

Petitioner requests that this hearing take place in Pensacola, Florida, preferably at the Department of Environmental Regulation, 160 Govenmental Center.

CC to:

J:D. Brown
400 Colbert Avenue
Pensacola, Fl. 32507

John Hankinson
203 N. Gadsden Street Suite 7
Tallahassee, Fl. 32301

Elaine Harrington
927 Delores Drive
Tallahassee, Fl. 32301

Charles Lee
1101 Audubon Way
Maitland, Fl. 32751

Vauter Parker
Sierra Club Legal Defense Fund
730 Polk St.
San Francisco, CA 94109

Colleen O'Sullivan
1304 Morrison Ave.
Tampa Fl. 33606

David Gluckman
Rt. 5, Box 3965
Tallahassee, Fl. 32301

Murial Wagner
6060 Drexel Drive
Pensacola, Fl. 32504

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

FOR ROUTING TO OTHER THAN THE ADDRESSEE

To: _____ LOCTN: _____
To: _____ LOCTN: _____
To: _____ LOCTN: _____
FROM: _____ DATE: _____

TO: File - Champion International Corporation

FROM: Bruce Mitchell BBM

DATE: January 11, 1986

SUBJ: Comments on Specific Condition No. 6 contained in the draft construction permit No. AC 17-113552.

Mr. Charles H. Ayer called and requested clarification on the causticizing system production equivalent rate contained in the above referenced Specific Condition and operating permit No. AC 17-105854. The following is a clarification: (1)

- The 66.67 tons per hour (TPH) represents tons of air dried pulp (TADP)
- It is based on the maximum permitted production rate of:
  48,857 lbs/hr lime mud ($CaCO_3$+inerts)
- The conversion factor is:
  2.729 x lime mud = TADP
- Therefore,
  48,857 x 2.729 ÷ 2000 = 66.67 TPH ADP

BM/bjs

P 408 533 643

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. Richard E. Olson	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 12/31/85	

PS Form 3800, Feb. 1982

PS Form 3811, July 1983

SENDER: Complete items 1, 2, 3 and 4.

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

1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:

Mr. Richard E. Olson
Champion International Corp.
P. O. Box 87
Cantonment, Florida 32533

4. Type of Service:

☐ Registered ☑ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number: P 408 533 643

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X D. Bradberry

7. Date of Delivery
1-2-86

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

DOMESTIC RETURN RECEIPT

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

December 31, 1985

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. Richard E. Olson
Vice President Manufacturing Printing
and Writing Papers
Champion International Corporation
Post Office Box 87
Cantonment, Florida 32533

Dear Mr. Olson:

Attached is one copy of the Technical Evaluation and Preliminary Determination, and proposed permits to modify your existing facility in Escambia County, Florida.

Before final action can be taken on your draft permits, you are required by Florida Administrative Code Rule 17-103.150 to publish the attached Notice of Proposed Agency Action in the legal advertising section of a newspaper of general circulation in Escambia County no later than fourteen days after receipt of this letter. The department must be provided with proof of publication within seven days of the date the notice is published. Failure to publish the notice may be grounds for denial of the permits.

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

Sincerely,

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

CHF/pa

Attachments

cc: Willard John David, P.E.
Jack Preece

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of Application for Permits by:	)	
Champion International Corp. P. O. Box 87 Cantonment, Florida 32533	) DER File No.	AC 17-111195 AC 17-113551 AC 17-113552 AC 17-113553

INTENT TO ISSUE

The Department of Environmental Regulation hereby gives notice of its Intent to Issue, and proposed order of issuance for, permits pursuant to Chapter 403, Florida Statutes, for the proposed project as detailed in the applications specified above. The Department is issuing this Intent to Issue for the reasons stated in the attached Technical Evaluation and Preliminary Determination.

The applicant, Champion International Corporation, applied on October 10, 1985, to DER for permits to convert to the production of only bleached kraft fine paper at the applicant's existing facility in Cantonment, Escambia County, Florida

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

This intent to issue shall be placed before the Secretary for final action unless an appropriate petition for a hearing pursuant to the provisions of Section 120.57, Florida Statutes, is filed within fourteen (14) days from receipt of this letter or

publication of the public notice (copy attached) required pursuant to Rule 17-103.150, Florida Administrative Code, whichever occurs first. The petition must comply with the requirements of Section 17-103.155 and Rule 28-5.201, Florida Administrative Code (copy attached) and be filed pursuant to Rule 17-103.155(1) in the Office of General Counsel of the Department of Environmental Regulation at 2600 Blair Stone Road, Tallahassee, Florida 32301.

Petitions which are not filed in accordance with the above provisions are subject to dismissal by the Department. In the event a formal hearing is conducted pursuant to Section 120.57(1), all parties shall have an opportunity to respond, to present evidence and argument on all issues involved, to conduct cross-examination of witnesses and submit rebuttal evidence, to submit proposed findings of facts and orders, to file exceptions to any order or hearing officer's recommended order, and to be represented by counsel. If an informal hearing is requested, the agency, in accordance with its rules of procedure, will provide affected persons or parties or their counsel an opportunity, at a convenient time and place, to present to the agency or hearing officer, written or oral evidence in opposition to the agency's action or refusal to act, or a written statement challenging the grounds upon which the agency has chosen to justify its action or inaction, pursuant to Section 120.57(2), Florida Statutes.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition, may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Model Rule 28-5.207 at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of

Administrative Hearings, 2009 Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

Executed the 31 day of December, 1985, in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

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

Copies furnished to:

Mr. Richard E. Olson
Mr. Jack Preece

CERTIFICATION

This is to certify that the foregoing Intent to Issue and all copies were mailed before the close of business on 31 DECEMBER, 1985.

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

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

Patricia G. Adams
Clerk

December 31, 1985
Date

State of Florida
Department of Environmental Regulation
Notice of Proposed Agency Action
on Permit Applications

The Department of Environmental Regulation gives notice of its intent to issue permits to Champion International Corporation to convert their existing mill to the production of only bleached kraft fine paper. The modification will affect the existing P-5 paper machine, bleach plant, lime slaking operation and woodyard at their existing facility in Cantonment, Escambia County, Florida. A determination of best available control technology (BACT) was not required.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code, and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32301, within fourteen (14) days of publication of this notice. Failure to file a request for hearing within this time period constitutes a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

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

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

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

Dept. of Environmental Regulation
Northwest District
106 Governmental Center
Pensacola, Florida 32501

Any person may send written comments on the proposed action to Mr. Bill Thomas at the department's Tallahassee address. All comments mailed within 30 days of the publication of this notice will be considered in the department's final determination.

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

28-5.15 Requests for Formal and Informal Proceedings

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

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

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

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

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

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

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

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

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

Technical Evaluation
and
Preliminary Determination

Champion International Corporation
Escambia County
Pensacola, Florida

Permit Numbers:
AC 17-111195
AC 17-113551
AC 17-113552
AC 17-113553

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

December 31, 1985

I. PROJECT DESCRIPTION

A. Applicant

Champion International Corporation
P. O. Box 87
Cantonment, Florida 32533

B. Project and Location

The applicant intends to convert the existing mill to the production of only bleached kraft fine paper. The modification will affect the existing P-5 paper machine, bleach plant, lime slaking operation and woodyard.

The existing P-5 paper machine operation will be modified such that it can produce bleached kraft fine papers. There will be an increase in particulate matter (PM) emissions generated from the proposed dry additives system. There will be three PM control systems associated with the proposed P-5 paper machine operation.

The existing 285 TPD (ton per day) air dried bleached pulp (ADBP) operation will be replaced with two proposed oxygen delignification systems followed by two proposed 3-stage bleaching operations. The two proposed new lines will be designed for 800 TPD and 600 TPD ADBP. There will be associated control systems to minimize Cl_2, ClO_2, and SO_2 emissions from the proposed operations.

The applicant proposes to replace the existing R-2 chlorine dioxide generator with a new chlorine dioxide generator (R-3H) designed for 16 TPD Cl_2 and ClO_2. There will be associated control systems to minimize Cl_2 and ClO_2 emissions from the operation.

The existing lime slaking operations will be shutdown and the applicant proposes to construct a new lime slaker with an associated scrubber system to control PM emissions.

Within the woodyard, the proposed conversion will include the addition of a truck dumper for chips, chip storage area, stacker, reclaimer and chip screening to handle the increased usage of hardwood. There is an increase in fugitive and unconfined PM emissions projected from the woodyard conversion. There will be control systems and strategies used to minimize fugitive and unconfined PM emissions.

The increase in road traffic will increase fugitive and unconfined PM emissions. Fugitive and unconfined PM emissions will be minimized by having all roads paved used for ingress and egress.

The existing facility is located at the intersection of State Road 184 and U.S. 29 in Escambia County. The UTM coordinates are Zone 16, 469.0 km East and 3385.8 km North.

The standard industrial codes (SIC) for the facility being modified are:

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

C. Process and Controls

- Woodyard and Related Activities:

Due to increased usage of hardwood, the mill intends to have all roadways used for ingress and egress paved to minimize fugitive and unconfined PM (particulate matter) emissions.

The wood material is received in either the long-form (roundwood) or chips and is either softwood or hardwood. The roundwood is debarked, chipped, screened and transferred to a storage pile or to the wood cooking systems. The wood cooking systems are batch and continuous. The chips are screened and then transferred to a storage pile or to the wood cooking systems. When the chips are reclaimed from a storage pile, they are again screened prior to being transferred to the wood cooking systems.

Due to the woodyard conversion to handle the increased usage of hardwood, fugitive and unconfined PM emissions from the chip unloading, conveying, and storage systems will be minimized by the following mill proposals, but shall not be limited to:

- All conveyors will be covered.
- Chips manufactured on site will be screened prior to storage, thus reducing the potential for fugitive emissions.
- Chips will be screened once removed from storage prior to conveying to the digesters.
- Drop distance from the chip storage stacker will be maintained to a minimum. Chips will be conveyed to stacker and will be distributed on the storage pile by mechanical conveyors which will be covered.

o Oxygen Delignification System (2) and Bleach Plant (2):

After cooking, the pulp is separated from the black liquor and screened to remove knots and undesirable material. Magnesium salts are added to form magnesium silicate, which is then washed out and is a measure used for the protection of the carbohydrates. The pulp now enters a proposed oxygen delignification system (ODS). There will be an ODS associated with each of the wood cooking systems.

The pulp is placed in a steam mixer with oxidized white liquor and recycled ODS liquor. The pulp material is subjected to additional oxygen (O_2) and further mixed. The pulp material is then placed in the oxygen reactor for delignification. The addition of the oxidized white liquor and O_2 is necessary to maintain the required level of delignification, thus enhancing bleachability.

The pulp is then separated from the ODS liquor in a blow cyclone, discharged to a blow tank, subjected to further washing, and then transferred to the proposed bleaching systems for further lignin reduction. There will be an associated bleaching system with each of the proposed ODS. The chlorine dosage is determined by the lignin content of the unbleached pulp.

The pulp is first subject to Cl_2-ClO_2 (chlorine-chlorine dioxide) treatment. Liquid SO_2 (sulfur dioxide) is vaporized in a steam heat exchanger and SO_2 gas is injected into the pulp stream prior to entering the next stage, the Cl_2-ClO_2 washer. The SO_2 gas is used to control Cl_2-ClO_2 residuals in the pulp stream. The washings will be discharged to the sewer. However, since only about half of the reaction products result from chlorination and oxidative bleaching, the extraction of the remainder can be accomplished with the addition of strong bases such as hydroxides. The applicant proposes to subject the pulp to NaOH and O_2 and the treatment is known as alkali extraction. The mixing will occur in the caustic tower and removal of the reaction products will occur in the caustic washer. The washings will be discarded into the sewer system. The alkaline extraction is a very important step in achieving brightness.

To the washed pulp is added more NaOH while being transferred to the ClO_2 tower. The pulp mixture is subjected to ClO_2 treatment within the ClO_2 tower. Again, vaporized SO_2 gas is injected into the pulp stream prior to entering the next stage, the ClO_2 washer. The washings will be discharged into the sewer. The pulp is transferred to storage for further processing.

Any SO_2, Cl_2, and ClO_2 gases escaping the pulp stream will be collected by the washer hoods and vented to a ClO_2 scrubber followed by a caustic scrubber. Liquid SO_2 is unloaded from tank cars by a compressed gas displacement system and there will be no venting to the atmosphere.

o Chlorine Dioxide Generator:

The generator system is made up of the generator crystallizer, reboiler, circulating pump and manifold, and catalyst system. The five feed chemicals (chlorate, brine, hydrochloric acid, sulfuric acid and catalyst) are metered into the generator system to obtain the desired conditions.

At the point where the concentrated sulfuric acid and HCl is mixed with the recirculated chemicals from the generator and the fresh chlorate and brine, a great quantity of heat is generated. Boiling occurs almost instantly and vapors are generated. However, in order to evaporate the water entering the process with the chemicals, heat must be added; this is done by means of steam in the reboiler section.

When the stream of liquor leaves the reboiler and reenters the generator cavity (the volume above the liquid level), which is under vacuum, it rapidly expands and releases the dissolved and entrained gases (chlorine dioxide, chlorine, etc.). To maintain the chlorine dioxide concentration below the level at which it will decompose, air is metered into the generator cavity at a rate proportional to the rate at which chlorine dioxide is produced.

When the generator liquor becomes saturated with sodium sulfate (salt cake), crystals start forming in the solution. Generator liquor, containing the salt cake crystals, is withdrawn from the botton cone of the generator and is pumped to the hydroclone, where separation of the crystals from most of the mother liquor takes place. The crystals fall into a drum filter where the salt cake crystals are filtered from the liquid. The cake is washed with warm water (100-120°F) on the drum filter after which it is dissolved in warm water for recovery in the normal kraft mill chemical reclaim system.

The generator gases are cooled in an indirect cooler to 122°F so that the chlorine dioxide can be absorbed efficiently by the 40-50°F water used in the chlorine dioxide absorption tower. As the cooled gases pass up the absorption tower, about 99.7% of the chlorine dioxide is absorbed from the gas stream by the cold water fed into the top of the tower. The flow rate of cold water is adjusted to achieve a strength of 8-10 grams/liter.

The exit gases from the chlorine dioxide absorption system, which contain air, chlorine, traces of chlorine dioxide, and water vapor, are drawn into the generator vacuum, which discharges them to the two in-series chlorine absorption towers. The first is using water as absorbing agent, the second 10% NaOH. The flow rate of water and NaOH is controlled to produce the practical maximum strength of chlorine water, and sodium

hypochlorite. The chlorine water is pumped from the chlorine absorption tower to the chlorine-chlorine dioxide stage chlorine mixer, the hypochlorite is pumped to the hypochlorite storage tank for use in the bleach plant.

The gases not absorbed in the second chlorine absorption tower flow to a packed tail gas scrubber where weak sodium hypochlorite is used to absorb left over chlorine. Emissions from the tail gas scrubber contain 0.5 mg/l of Cl_2 and 1.0 mg/l of ClO_2.

The tail gas scrubber also receives gases from the vacuum pump on the salt cake drum filter, the salt cake dissolving tank, the ClO_2 absorber seal pot, the generator dump tank, and the scrubber for the ClO_2 storage tank vents. The dilute chlorine dioxide solution produced in the small absorber for the ClO_2 storage tank vents is sent to the main chlorine dioxide absorber for strengthening before use.

In the event chill water is lost to either the ClO_2 absorber or ClO_2 vent scrubber, an auto-shutdown sequence is activated. Chemical feed to the generator (H_2SO_4, $NaClO_3$ and HCl) is shut off. Purge air is automatically injected into the absorber and recycle of ClO_2 solution is activated through the ClO_2 absorber. Recycle of ClO_2 solution continues to provide removal of ClO_2 gas by increasing the concentration of the ClO_2 solution. Shutdown procedure takes 10-15 minutes.

PM emissions and visible emissions (VE) will occur from the dry salt (rock salt) unloading and make down tank system associated with the proposed new ClO_2 generator. Salt will be delivered in trucks and unloaded pneumatically into a salt solution make down tank. Salt is injected into the tank and water is added to make the proper concentration. The tank vent is equipped with a spray tower scrubbing system.

o Lime Slaker:

The proposed new lime slaker will become a part of the causticizing system. Clarified green liquor will be pumped into the lime slaker, where it will be reacted with calcium oxide. Here, the slaking and initial causticizing reactions take place. The unreactive material, called grits, will be removed from the classifying section and discarded. The new slaker will be equipped with a wet scrubber to control PM emissions and VE. The existing lime slaking operations will be shutdown and removed from service.

o P-5 Paper Machine Operation:

The only pollutant emissions from the P-5 Paper Machine operation will be PM and VE from the dry additives system. Pearl starch will be unloaded pneumatically into a starch silo and the

PM emissions and VE from the starch silo and starch receiver vents will be controlled by its own baghouse filter system. All batch make down systems for the dry additives will be collected into a single header and vented to a single wet rotoclone scrubber to control PM emissions and VE.

II. RULE APPLICABILITY

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (FAC) Rules 17-2 and 17-4.

The application package was designated complete on November 21, 1985.

The existing facility is located in an area designated attainment for all criteria pollutants.

The existing mill is a major emitting facility in accordance with FAC Rule 17-2.100(98) for the pollutants particulate matter (PM), sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), total reduced sulfur (TRS), and volatile organic compounds (VOC).

There have not been any contemporaneous pollutant emissions changes since October, 1980, when a PSD (prevention of significant determination) permit was issued.

The following table will reflect the maximum potential pollutant emissions from the proposed conversion:

Table 1

Source	Maximum Potential Pollutant Emissions (TPY)				
	PM	SO_2	TRS	Cl_2	ClO_2
Lime Slaker Scrubber	6.7		0.8		
Woodyard and Related Activities					
Roadways	5.7				
Woodyard					
Debarking	12.9				
Unloading, Storing & Handling Chips	5.7				
P-5 Paper Machine					
Starch Silo & Receiver Vents					
Baghouse(2)	0.2				
Dry Additives Make Down Scrubber	3.5				
Chlorine Dioxide Generator					
Storage Tank Vent Absorption Towers(2)				23.6	2.4
Tail Gas Vent Scrubber				8	15.6
Bleach Plant					
Salt Unloading/Make Down Scrubber	0.6				
Line #1 (600 TPD)					
Washing Stages Scrubbers(2)		0.33		5.0	4.6
Line #2 (800 TPD)					
Washing Stages Scrubbers(2)		0.33		7.1	6.7
Total:	35.3	0.66	0.8	43.7	29.3

The following table will reflect the reduction in actual pollutant emissions projected from the retirement of some existing stationary sources:

Table 2

Source	Actual Pollutant Emissions (TPY)			
	PM	TRS	Cl_2	ClO_2
Lime Slaker	27.7	0.8		
Chlorine Dioxide Generator				
Storge Tank Vent			18	12
Tail Gas Vent Scrubber			3	6
Bleach Plant				
Cl_2 Stage			35	
ClO_2 Stage				22
Total:	27.7	0.8	56	40

The following table will reflect the current potential pollutant emissions from affected sources due to the conversion;

Table 3

Source	Current Potential Pollutant Emissions (TPY) PM
Woodyard and Related Activities	
Roadways	3.9
Woodyard	
Debarking	12.6
Unloading, Storing & Handling Chips	3.9
Total:	20.4

The following table will reflect the net pollutant emissions from the proposed facility conversion, which is the result of subtracting Tables 2 and 3 from Table 1:

Table 4

Source	Pollutant Emissions (TPY) PM	SO_2	TRS	Cl_2	ClO_2
Table 1	35.3	0.66	0.8	43.7	29.7
Table 2	-27.7		-0.8	-56.0	-40.0
Table 3	-20.4				
Net:	-12.8	0.66	0	-12.3	-10.7

Since there are no significant net emissions increase of a pollutant pursuant to Table 500-2 for the proposed conversion, the pollutants are not subject to PSD review pursuant to FAC Rule 17-2.500. Therefore, the pollutant emissions are subject to review pursuant to FAC Rule 17-2.520, Sources Not Subject to PSD or Nonattainment Requirements.

The proposed conversion shall be subject to FAC Rules 17-2.210, 17-2.220, 17-2.240, 17-2.250, 17-2.610(2) and (3), 17-2.620(2), and 17-2.700.

In accordance with FAC Rule 17-2.210, the proposed project is required to obtain the proper permits from the department. Before any construction permit from the department can be issued to any source of air pollution, the department shall provide an opportunity for public comment on the notice of proposed agency action pursuant to FAC Rule 17-2.220.

The proposed project is subject to the provision of FAC Rule 17-2.240, Circumvention, and FAC Rule 17-2.250, Excess Emissions.

Since there is not a visible emissions (VE) standard for a lime slaker, whose VE are controlled with a scrubber system, the source shall be subject to the provisions of FAC Rule 17-210(2), General VE Standard. Compliance tests shall be performed using DER Method 9 pursuant to FAC Rule 17-2.700.

Because there is not a specific source PM emissions limiting standard for a lime slaker, the applicant proposed a limit of 1.59 lb/hr (6.68 TPY), which is based on 0.05 gr/sdcfm and is acceptable to the department. The department will require PM mass emissions compliance test, using EPA Methods 1, 2, 3, and 5, in accordance with 40 CFR 60, Appendix A, and FAC Rule 17-2.700.

The pearl starch silo and receiver vents will each have a baghouse system to control both PM emissions and VE. The projected potential PM emissions of the pearl starch silo are 0.14 lb/hr and 0.1 TPY. The projected potential PM emissions of the pearl starch receiver vents are 0.16 lb/hr and 0.1 TPY. Both baghouse sytems are based on 0.02 gr/acfm, which is acceptable to the department. Operational activity is such that these sources are subject to FAC Rule 17-2.610(3), Unconfined Emissions of PM. The use of a baghouse system is considered to be reasonable control for this type of operational activity. Therefore, the department will only impose a VE standard of no visible emissions (5% opacity). Compliance testing shall be performed using DER Method 9 in accordance with FAC Rule 17-2.700. Failure to comply with the VE standard will necessitate the requirement to perform a PM mass emissions test(s) using EPA Methods 1, 2, 3, and 5, in accordance with 40 CFR 60, Appendix A, and FAC Rule 17-2.700.

The dry additives batch make down system associated with the P-5 Paper Machine operations will have a wet rotoclone scrubber system to control both PM emissions and VE. The efficiency of the control system is 90%, resulting in PM emissions of 3.5 TPY. Operational activity is such that the source is subject to FAC Rule 17-2.610(3), Unconfined Emissions of PM. The use of a scrubber system is considered to be reasonable control. Therefore, the department will only impose a VE standard of no visible emissions (5% opacity) while operating the batch make down system. Compliance testing shall be performed using DER Method 9 in accordance with FAC Rule 17-2.700. Because of the batch mode of operation, there will not be a mass emission rate and mass compliance testing requirement imposed at this time. Failure to meet the VE limit specified will necessitate a meeting with the appropriate mill personnel and the DER's Northwest District office to resolve the violation and future operational parameters.

The applicant has committed to the following operational parameters to minimize fugitive and unconfined PM emissions for the woodyard conversion, but shall not be limited to:

- Chips manufactured on site will be screened prior to storage, thus reducing the potential for fugitive emissions.

- Chips will be screened once removed from storage prior to conveying to the digesters.

- o Drop distance for chip storage stacker will be maintained to a minimum. Chips will be conveyed to stacker and will be distributed on the storage pile by mechnical conveyors which will be convered.

- o All conveyor systems will be covered or enclosed.

- o Paving of all roadways for ingress and egress.

In accordance with FAC Rule 17-2.610(3), Unconfined Emissions of PM, reasonable precautions to control emissions of unconfined PM shall include, but not be limited to the following:

a) Reduced speeds for vehicular traffic.
b) Use of liquid resinous adhesives or other liquid dust suppressants or wetting agents.
c) Use of paving or other asphaltic materials.
d) Removal of particulate matter from paved roads and/or other paved areas by vacuum cleaning or otherwise by wetting prior to sweeping.
e) Covering of trucks, trailers, front end loaders, and other vehicles or containers to prevent spillage of particulate matter during transport.
f) Use of mulch, hydroseeding, grassing and/or other vegetative ground cover on barren areas to prevent or reduce windblown particulate matter.
g) Use of hoods, fans, filters, and similar equipment to contain, capture, and vent particulate matter.
h) Enclosure or covering of conveyor systems.

In accordance with FAC Rule 17-2.620(2), objectionable odors shall not be allowed off plant property.

A meter shall be installed to measure the scrubbing liquid supply pressure on all scrubber systems and the pressure sensor or tap is to be located close to the scrubber liquid discharge point. The monitoring device is to be certified by the manufacturer to be accurate within $\pm$15 percent of design scrubbing liquid supply pressure.

The pollutant emissions projected for the chlorine dioxide generator and the bleach plant have been reviewed in accordance with Chapter 403, Florida Statutes, and FAC Rules 17-2 and 17-4. The emission rates and limits proposed by the applicant are acceptable and will become a part of the specific conditions in the appropriate construction permit. Higher emissions above these proposed levels could subject the sources to a review under other rules and regulations. The test method to be used to quantify the effectiveness of the control systems shall be CPPA Standard Testing Method J14P or other method(s) approved by the department.

III. SUMMARY OF EMISSIONS AND AIR QUALITY ANALYSIS

A. Emission Limitations

The regulated pollutant emissions from the proposed modification are visible emissions (VE), particulate matter (PM), chlorine (Cl_2), and chlorine dioxide (ClO_2). Table 5 will reflect the maximum allowable emission standards and limits applicable to the proposed conversion.

The emission limiting standards and limits are consistent with the applicable requirements pursuant to FAC Rules 17-2 and 17-4 and what the applicant requested.

B. Air Quality Analysis

From a technical review of the application package and its amendments, the department has determined that the proposed modification does not require an air quality analysis.

IV. CONCLUSION

The allowable pollutant emissions limiting standards and limits from the proposed modification should not cause any violation to Florida's ambient air quality standards.

Credits are to be given to the following technical documents:

- Bleach Plant Vent Gas Scrubber System; T.A. Freshwater, Federal Paper Board Company, Inc., Riegelwood, N.C.
- Tappi Journal, July 1985, Vol. 68, No. 7; Delignifying High-Yield Pulps with Oxygen and Alkali; P.J. Kleppe and S. Storebraten; (pp. 68-73).
- Pulp and Paper Manufacturing, The Pulping of Wood, Vol. 1; 2nd Edition; Joint Textbook Committee of the Paper Industry; McGraw-Hill Book Co.

The General and Specific Conditions listed in the proposed permits (attached) will assure compliance with all applicable requirements of FAC Rules 17-2 and 17-4.

Table 5

Source	Pollutant	Maximum Allowable Emissions Standard/Limit
Lime Slaker	PM	Not to exceed 0.05 gr/sdcfm (1.59 lb/hr, 6.7 TPY)
	VE	Not to exhibit 20% opacity or greater
Pearl Starch Silo	VE	Not to exhibit any VE (5% opacity)
Pearl Starch Receiver Vents	VE	Not to exhibit any VE (5% opacity)
Dry Additives Batch Make Down System	VE	Not to exhibit any VE (5% opacity)
Rock Salt Unloading Operations	VE	Not to exhibit any VE (5% opacity)
Bleach Plant*		
800 TPD Operation	Cl_2	Not to exceed 17 ppm (1.7 lb/hr and 7.1 TPY)
	ClO_2	Not to exceed 17 ppm (1.6 lb/hr and 6.7 TPY)
600 TPD Operation	Cl_2	Not to exceed 17 ppm (1.2 lb/hr and 5.0 TPY)
	ClO_2	Not to exceed 17 ppm (1.1 lb/hr and 4.6 TPY)
Chlorine Dioxide Generator*		
Storage Tank Vent	Cl_2	Not to exceed 2.8 lb/hr and 11.8 TPY per absorption tower
	ClO_2	Not to exceed 0.28 lb/hr and 1.2 TPY per absorption tower
Tail Gas Scrubber Vent	Cl_2	Not to exceed 1.9 lb/hr and 8.0 TPY
	ClO_2	Not to exceed 3.7 lb/hr and 15.5 TPY

* Applicant's requested emission standards and limits.

Note: Based on 8400 hours per year operation.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Champion International Corp.
P. O. Box 87
Cantonment, Florida 32533

Permit Number: AC 17-111195
Expiration Date: December 31, 1986
County: Escambia
Latitude/Longitude: 30° 36' 20" N/
87° 19' 26" W
Project: P-5 Paper Machine
Operation Conversion

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

For the conversion of the P-5 Paper Machine to produce bleached kraft fine paper at the permittee's existing facility. The pearl starch silo and receiver vents pollutant emissions will be controlled by two baghouse systems. The dry additives make down system's pollutant emissions will be controlled by a single wet rotoclone scrubber system. The UTM coordinates are Zone 16, 468.85 km East and 3386.06 km North.

The standard industrial codes are: Major Group No. 26 - Paper and Allied Products; Industry No. 2611 - Pulp Mills.

Construction shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted on pages 5-8 of the Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202 with attachments received October 10, 1985.

2. Mr. Charles A. Ayer's letter with attachment dated October 18, 1985.

3. Mr. Charles A. Ayer's letter with attachments dated October 21, 1985.

4. Mr. C. H. Fancy's letter dated November 8, 1985.

5. Mr. Charles A. Ayer's letter dated November 21, 1985.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-111195
Expiration Date: December 31, 1986

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. Annual hours of operation shall not exceed 8400.

2. In accordance with FAC Rule 17-2.620(2), objectionable odors shall not be allowed off plant property.

3. In accordance with FAC Rule 17-2.240, Circumvention, no person shall circumvent any air pollution control device, or allow the emissions of air pollutants without the applicable pollution control device operating properly.

4. The P-5 Paper Machine operations are subject to the provisions of FAC Rule 17-2.250, Excess Emissions.

SPECIFIC CONDITIONS:

5. In accordance with FAC Rule 17-2.610(3), Unconfined Emissions of particulate matter (PM), reasonable precautions to control emissions of unconfined PM shall include, but not be limited to the following:

a) Reduced speeds for vehicular traffic.

b) Use of liquid resinous adhesives or other liquid dust suppressants or wetting agents.

c) Use of paving or other asphaltic materials.

d) Removal of particulate matter from paved roads and/or other paved areas by vacuum cleaning or otherwise by wetting prior to sweeping.

e) Covering of trucks, trailers, front end loaders, and other vehicles or containers to prevent spillage of particulate matter during transport.

f) Use of mulch, hydroseeding, grassing and/or other vegetative ground cover on barren areas to prevent or reduce windblown particulate matter.

g) Use of hoods, fans, filters, and similar equipment to contain, capture, and vent particulate matter.

h) Enclosure or covering of conveyor systems.

6. A separate baghouse system will be installed on the pearl starch silo and the receiver vents to control PM emissions and VE (visible emissions). The emissions standard for each baghouse system shall be no visible emissions (5% opacity). Compliance test(s) shall be conducted using DER Method 9 in accordance with FAC Rule 17-2.700.

7. A wet rotoclone scrubber system will be installed on the dry additives batch make down system to control PM emissions and VE. The emissions standard shall be no visible emissions (5% opacity). Compliance test(s) shall be conducted using DER Method 9 in accordance with FAC Rule 17-2.700.

SPECIFIC CONDITIONS:

8. Failure of any operation to meet the VE standard, described in Specific Conditions Nos. 6 and 7, shall necessitate a meeting with the appropriate mill personnel and the DER's Northwest District office to discuss and plan appropriate course(s) of action. If a PM mass emissions test is required, compliance test(s) methods shall be EPA Methods 1, 2, 3, and 5, pursuant to 40 CFR 60, Appendix A, and FAC Rule 17-2.700. Testing facilities shall comply with all applicable provisions of FAC Rule 17-2.700(4)(c). Sampling ports shall be located in accordance with FAC Rule 17-2.700(4)(c)1.c.i.

9. Failure of a control system(s) to meet the applicable and maximum allowable particulate matter or visible emissions limiting standard and/or limit shall not be grounds for requesting a variance or relaxation of that standard and/or limit.

10. A pressure gauge meter shall be installed on the scrubber system for the dry additives batch make down system to measure the scrubbing liquid supply pressure and the pressure sensor or tap is to be located close to the scrubber liquid discharge point. The monitoring device is to be certified by the manufacturer to be accurate within $\pm$ 15 percent of design scrubbing liquid supply pressure.

11. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, he must notify the Department in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit. (FAC Rule 17-4.09)

To obtain a permit to operate, the applicant must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with test results and Certificate of Completion, to the Department's Northwest District office 90 days prior to the expiration date of the construction permit. The applicant may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate. (FAC Rule 17-4.22 and 17-4.23)

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-111195
Expiration Date: December 31, 1986

SPECIFIC CONDITIONS:

If the construction permit expires prior to the applicant requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application. (FAC Rule 17-4.10)

Issued this_____day of_____
19__.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

_____
VICTORIA J. TSCHINKEL, Secretary

____ pages attached.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Champion International Corp.
P. O. Box 87
Cantonment, Florida 32533

Permit Number: AC 17-113551
Expiration Date: December 31, 1986
County: Escambia
Latitude/Longitude: 30° 36' 20" N/ 87° 19' 26" W
Project: Two Oxygen Delignification Systems, Two 3-Stage Bleaching Systems, and a Chlorine Dioxide Generator System

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

For the construction of two oxygen delignification systems followed by two 3-stage bleaching systems at the permittee's existing facility. The new lines will be designed for 800 TPD and 600 TPD air dried bleached pulp. In addition, a new chlorine dioxide (ClO_2) generator (R-3H), designed for 16 TPD ClO_2, will replace the existing ClO_2 generator (R-2). Also, a dry salt unloading system and make down tank will be constructed. Various pollutant control systems in association with the above sources and systems will be constructed. The UTM coordinates are Zone 16, 468.85 km East and 3386.06 km North.

The standard industrial codes are: Major Group No. 26 - Paper and Allied Products; Industry No. 2611 - Pulp Mills.

Construction shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted on pages 5-10 of the Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202 with attachments received October 10, 1985.
2. Mr. Charles A. Ayer's letter with attachment dated October 18, 1985.
3. Mr. Charles A. Ayer's letter with attachments dated October 21, 1985.
4. Mr. C. H. Fancy's letter dated November 8, 1985.
5. Mr. Charles A. Ayer's letter dated November 21, 1985.

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. Annual hours of operation shall not exceed 8400.

2. In accordance with FAC Rule 17-2.620(2), objectionable odors shall not be allowed off plant property.

3. In accordance with FAC Rule 17-2.240, Circumvention, no person shall circumvent any air pollution control device, or allow the emissions of air pollutants without the applicable pollution control device operating properly.

4. The oxygen delignification systems(2), the 3-stage bleaching systems(2), and the chlorine dioxide generator system are subject to the provisions of FAC Rule 17-2.250, Excess Emissions.

SPECIFIC CONDITIONS:

5. In accordance with FAC Rule 17-2.610(3), Unconfined Emissions of particulate matter (PM), reasonable precautions to control emissions of unconfined PM shall include, but not be limited to the following:

a) Reduced speeds for vehicular traffic.

b) Use of liquid resinous adhesives or other liquid dust suppressants or wetting agents.

c) Use of paving or other asphaltic materials.

d) Removal of particulate matter from paved roads and/or other paved areas by vacuum cleaning or otherwise by wetting prior to sweeping.

e) Covering of trucks, trailers, front end loaders, and other vehicles or containers to prevent spillage of particulate matter during transport.

f) Use of mulch, hydroseeding, grassing and/or other vegetative ground cover on barren areas to prevent or reduce windblown particulate matter.

g) Use of hoods, fans, filters, and similar equipment to contain, capture, and vent particulate matter.

h) Enclosure or covering of conveyor systems.

6. Failure of a control system(s) to meet the applicable and maximum allowable pollutant emissions limiting standard and/or limit shall not be grounds for requesting a variance or relaxation of that standard and/or limit.

7. A spray tower scrubber system will be installed on the rock salt make down tank vent to control PM emissions and visible emissions (VE). The emissions standard for the control system shall be no visible emissions (5% opacity). Compliance test(s) for VE shall be conducted using DER Method 9 in accordance with FAC Rule 17-2.700.

SPECIFIC CONDITIONS:

8. Chlorine dioxide generator system:

   - Maximum ClO_2 (chlorine dioxide) generation shall not exceed 16 TPD and the existing ClO_2 generator will be removed from service.

   - Two in-series chlorine (Cl_2) absorption tower control systems will be installed to control exit gases from the ClO_2 absorption system. The absorbing agent in the first absorption tower will be water and in the second absorption tower, 10% NaOH (sodium hydroxide).

   - A tail gas scrubber will be installed to treat the gases not absorbed in the two in-series chlorine absorption tower control systems. The scrubbing medium to be used in the tail gas scrubber is weak sodium hypochlorite. The tail gas scrubber will also receive and treat gases from the vacuum pump on the salt cake drum filter, the salt cake dissolving tank, the ClO_2 absorber seal pot, the generator dump tank, and the scrubber for the ClO_2 storage tank vents.

   - In the event chill water is lost to either the ClO_2 absorber or ClO_2 vent scrubber, an auto-shutdown sequence in accordance with the contingency plan, submitted as an attachment with the application package, shall be activated. The DER Northwest District office shall be notified of these events when they occur.

   - The following table will reflect the maximum allowable pollutant emissions standards/limits applicable to the ClO_2 generator system:

Source	Pollutant	Maximum Allowable Emissions Standards/Limits
Chlorine Dioxide Generator		
Storage Tank Vent	Cl_2	Not to exceed 2.8 lb/hr and 11.8 TPY per absorption tower
	ClO_2	Not to exceed 0.28 lb/hr and 1.2 TPY per absorption tower
Tail Gas Scrubber Vent	Cl_2	Not to exceed 1.9 lb/hr and 8.0 TPY
	ClO_2	Not to exceed 3.7 lb/hr and 15.5 TPY

SPECIFIC CONDITIONS:

- The test method to be used to quantify the effectiveness of the control systems shall be CPPA Standard Testing Method J14P or other method(s) approved by the department. The compliance tests shall be conducted while the ClO_2 generator is generating at an equivalent rate of 16 TPD ClO_2. The compliance tests shall be a one time requirement to verify that the allowable pollutant emissions standards/limits are not exceeded. After verification, the permittee shall be required to submit in the annual operating report (AOR) the annual hours of operation of and the TPY generation of ClO_2 from the ClO_2 generator.

9. Two 3-stage bleach plant operations will be installed and the maximum production through-put shall not exceed 800 TPD and 600 TPD of air dried bleached pulp (ADBP).

- The existing 285 TPD bleached pulp operations shall be removed from service and its operating permits surrendered to the department.

- A hood and a scrubber system followed by a caustic scrubber will be installed for each 3-stage bleach plant operation to control pollutant emissions from the Cl_2-ClO_2 and ClO_2 washing stages.

- The following table will reflect the maximum allowable pollutant emissions standards/limits applicable to the two 3-stage bleach plant operations.

Source	Pollutant	Maximum Allowable Emissions Standard/Limit
Beach Plant		
800 TPD Operation	Cl_2	Not to exceed 17 ppm (1.7 lb/hr and 7.1 TPY)
	ClO_2	Not to exceed 17 ppm (1.6 lb/hr and 6.7 TPY)
600 TPD Operation	Cl_2	Not to exceed 17 ppm (1.2 lb/hr and 5.0 TPY)
	ClO_2	Not to exceed 17 ppm (1.1 lb/hr and 4.6 TPY)

- The test method to be used to quantify the effectiveness of the control systems shall be CPPA Standard Testing Method J14P or other method(s) approved by the department. Compliance tests shall be conducted while each bleach plant operation is operating at the maximum permitted production throughput, i.e., 800 TPD and 600 TPD ADBP. The compliance tests shall be a one

SPECIFIC CONDITIONS:

time requirement to verify that the allowable pollutant emissions standards/limits are not exceeded. After verification, the permittee shall be required to submit in the AOR the annual operating hours and the TPY production through-put per operation.

10. A pressure gauge meter shall be installed on all of the scrubber systems to measure the scrubbing liquid supply pressure and the pressure sensor or tap is to be located close to the scrubber liquid discharge point. The monitoring device is to be certified by the manufacturer to be accurate within $\pm$ 15 percent of design scrubbing liquid supply pressure.

11. An AOR shall be submitted to the DER's Northwest District office by February 1 of each year.

12. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, he must notify the Department in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit. (FAC Rule 17-4.09)

To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with test results and Certificate of Completion, to the Department's Northwest District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate. (FAC Rule 17-4.22 and 17-4.23)

If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application. (FAC Rule 17-4.10)

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113551
Expiration Date: December 31, 1986

SPECIFIC CONDITIONS:

Issued this_____day of _____19__.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

_____
Victoria J. Tschinkel, Secretary

____ pages attached.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Champion International Corp.
P. O. Box 87
Cantonment, Florida 32533

Permit Number: AC 17-113552
Expiration Date: December 31, 1986
County: Escambia
Latitude/Longitude: 30° 36' 20" N/
87° 19' 26" W
Project: Lime Slaker

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

For the construction of a new lime slaker with an associated wet scrubber system and will replace the existing lime slaking operation at the permittee's existing facility. The UTM coordinates are Zone 16, 468.85 km East and 3386.06 km North.

The standard industrial codes are: Major Group No. 26 - Paper and Allied Products; Industry No. 2611 - Pulp Mills.

Construction shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted on pages 5-7 of the Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202 with attachments received October 10, 1985.

2. Mr. Charles A. Ayer's letter with attachment dated October 18, 1985.

3. Mr. Charles A. Ayer's letter with attachments dated October 21, 1985.

4. Mr. C. H. Fancy's letter dated November 8, 1985.

5. Mr. Charles A. Ayer's letter dated November 21, 1985.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113552
Expiration Date: December 31, 1986

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. Annual hours of operation shall not exceed 8400.

2. In accordance with FAC Rule 17-2.620(2), objectionable odors shall not be allowed off plant property.

3. In accordance with FAC Rule 17-2.240, Circumvention, no person shall circumvent any air pollution control device, or allow the emissions of air pollutants without the applicable pollution control device operating properly.

4. The lime slaker is subject to the provisions of FAC Rule 17-2.250, Excess Emissions.

SPECIFIC CONDITIONS:

5. In accordance with FAC Rule 17-2.610(3), Unconfined Emissions of particulate matter (PM), reasonable precautions to control emissions of unconfined PM shall include, but not be limited to the following:

a) Reduced speeds for vehicular traffic.

b) Use of liquid resinous adhesives or other liquid dust suppressants or wetting agents.

c) Use of paving or other asphaltic materials.

d) Removal of particulate matter from paved roads and/or other paved areas by vacuum cleaning or otherwise by wetting prior to sweeping.

e) Covering of trucks, trailers, front end loaders, and other vehicles or containers to prevent spillage of particulate matter during transport.

f) Use of mulch, hydroseeding, grassing and/or other vegetative ground cover on barren areas to prevent or reduce windblown particulate matter.

g) Use of hoods, fans, filters, and similar equipment to contain, capture, and vent particulate matter.

h) Enclosure or covering of conveyor systems.

6. A scrubber system will be installed to control pollutant emissions from the lime slaker. PM emissions shall not exceed 0.05 gr/sdcfm (1.59 lb/hr, 6.68 TPY). Visible emissions (VE) shall be limited to less than 20% opacity. Compliance tests for PM shall be demonstrated using EPA Methods 1, 2, 3, and 5, in accordance with 40 CFR 60, Appendix A, and FAC Rule 17-2.700. Compliance tests for VE shall be demonstrated using DER Method 9 in accordance with FAC Rule 17-2.700. Both initial compliance tests shall be conducted concurrently and while the causticizing system is operating at an equivalent rate of 66.67 (AO 17-105854) tons per hour. The test facilities for the lime slaker shall comply with all applicable provisions of FAC Rule 17-2.700(4)(c). Sampling ports shall be located pursuant to FAC Rule 17-2.700(4)(c)1.c.i. Future compliance tests shall be demonstrated while operating at 90-100% of the maximum permitted rate.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113552
Expiration Date: December 31, 1986

SPECIFIC CONDITIONS:

7. Failure of a control system(s) to meet the applicable and maximum allowable particulate matter or visible emissions limiting standard and/or limit shall not be grounds for requesting a variance or relaxation of that standard and/or limit.

8. A pressure gauge meter shall be installed on the scrubber system for the lime slaker to measure the scrubbing liquid supply pressure and the pressure sensor or tap is to be located close to the scrubber liquid discharge point. The monitoring device is to be certified by the manufacturer to be accurate within ± 15 percent of design scrubbing liquid supply pressure.

9. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, he must notify the Department in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit. (FAC Rule 17-4.09)

To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with test results and Certificate of Completion, to the Department's Northwest District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate. (FAC Rule 17-4.22 and 17-4.23)

If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application. (FAC Rule 17-4.10)

Issued this_____day of _____, 19____.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

_____
VICTORIA J. TSCHINKEL, Secretary

_____pages attached.

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

PERMITTEE:
Champion International Corp.
P. O. Box 87
Cantonment, Florida 32533

Permit Number: AC 17-113553
Expiration Date: December 31, 1986
County: Escambia
Latitude/Longitude: 30° 36' 20" N/
87° 19' 26" W
Project: Woodyard and Related Activity

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

For the construction, as an addition to the existing woodyard, of a truck dumper (chips), new chip storage, chip stacker, chip reclaimer and chip screener in order to handle the increased usage of hardwood at the permittee's existing facility. The permittee will apply various control measures to minimize fugitive and unconfined particulate matter emissions. The UTM coordinates are Zone 16, 468.85 km East adn 3386.06 km North.

The standard industrial codes are: Major Group No. 26 - Paper and Allied Products; Industry No. 2611 - Pulp Mills.

Construction shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted on pages 5-7 of the Specific Conditions.

Attachments are as follows:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202 with attachments received October 10, 1985.

2. Mr. Charles A. Ayer's letter with attachment dated October 18, 1985.

3. Mr. Charles A. Ayer's letter with attachments dated October 21, 1985.

4. Mr. C. H. Fancy's letter dated November 8, 1985.

5. Mr. Charles A. Ayer's letter dated November 21, 1985.

PERMITTEE:
Champion International Corp.

Permit Number: AC 17-113553
Expiration Date: December 31, 1986

GENERAL CONDITIONS:

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

13. This permit also constitutes:

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

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

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

GENERAL CONDITIONS:

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

c. Records of monitoring information shall include:

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

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

SPECIFIC CONDITIONS:

1. Annual hours of operation are 8760.

2. Fugitive and unconfined particulate matter (PM) emissions shall be minimized in accordance with the following operational parameters, which are commitments by the permittee:

a) Chips manufactured on site will be screened prior to storage, thus reducing the potential for fugitive emissions.

b) Chips will be screened once removed from storage prior to conveying to the digesters.

SPECIFIC CONDITIONS:

c) Drop distance for chip storage stacker will be maintained to a minimum. Chips will be conveyed to stacker and will be distributed on the storage pile by mechanical conveyors which will be covered.

d) All conveyor systems will be covered or enclosed.

e) Paving of all roadways for ingress and egress.

3. In accordance with FAC Rule 17-2.610(3), Unconfined Emissions of PM, reasonable precautions to control emissions of unconfined PM shall include, but not be limited to the following:

a) Reduced speeds for vehicular traffic.
b) Use of liquid resinous adhesives or other liquid dust suppressants or wetting agents.
c) Removal of particulate matter from paved roads and/or other paved areas by vacuum cleaning or otherwise by wetting prior to sweeping.
d) Covering of trucks, trailers, front end loaders, and other vehicles or containers to prevent spillage of particulate matter during transport.
e) Use of mulch, hydroseeding, grassing and/or other vegetative ground cover on barren areas to prevent or reduce windblown particulate matter.
f) Use of hoods, fans, filters, and similar equipment to contain, capture, and vent particulate matter.

4. The annual projected roundwood and purchased chips to be processed through the woodyard are:

	(1000 cords/yr)	
	Softwood	Hardwood
Roundwood	325	74
Purchased Chips	170	288

Note: A roundwood cord weighs approximately 5400 lbs.
A purchased chip cord weighs approximately 5000 lbs.

5. The annual amounts of roundwood and purchased chips by type processed through the woodyard shall be submitted in the annual operating report to the DER Northwest District office by February 1 of each year.

SPECIFIC CONDITIONS:

7. The projected potential PM emissions from the woodyard and related activities are exhibited in the following table:

Source	Projected Potential PM Emissions (TPY)
Roadways	5.7
Woodyard	
Debarking	12.9
Unloading, Storing, Handling Chips	5.7
Total:	24.3

Note: The total represents a 3.9 TPY increase over current operations.

8. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, he must notify the Department in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit. (FAC Rule 17-4.09)

To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with test results and Certificate of Completion, to the Department's Northwest District office 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate. (FAC Rule 17-4.22 and 17-4.23)

If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application. (FAC Rule 17-4.10)

Issued this_____day of_____, 19__.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

_____
VICTORIA J. TSCHINKEL, Secretary

____ pages attached.

ATTACHMENT 1

Available Upon Request

ATTACHMENT 2

One Champion Plaza
Stamford, Connecticut 06921
203 358-7000

Champion
Champion International Corporation

November 21, 1985

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

Re: Champion Permit Application to Construct/Modify Air Pollution Sources (No. AC 17-11195) Completeness Summary.

Dear Mr. Fancy:

The following are Champion's comments relative to your letter of November 8, 1985. If you or your staff have additional questions, please do not hesitate to call.

ITEM 1 - Champion is not claiming confidentiality on information submitted in the permit application or the following responses to your letter of November 8, 1985.

ITEM 2 - There were no contemporaneous changes since October 1980.

ITEM 3 - The term "miscellaneous bags" used in Section 3, Page 17, (Batch Dry Handling System), does not refer to new materials. This refers to the potential use of additional amounts of additives already listed and is accounted for in the emission estimates.

ITEM 4 - Titanium Dioxide and extender are received in bulk (water slurry). These materials are also listed in the Batch Dry Handling System for the purpose of emergency back-up. Emission estimates include the use of these materials. (Section 3 - Computation of Emissions).

ITEM 5 - The facility will be utilizing 18-wheel trucks. The supplement letter dated October 21, 1985, corrected the equation and calculations presented in the Permit Application. The term "(T/4)" is a correction factor for converting from 4 to 18 wheels.

ITEM 6 - The existing lime slaker will be removed from service and dismantled.

ITEM 7 - Mg SO_4 will be delivered in tank cars in dry form. Unloading will be accomplished by adding water to the tank car and pumping to storage. This method of unloading will not result in atmospheric emissions.

ITEM 8 - If the projected design wood mix is compared to current design wood mix, the net reduction in particulate emissions would be greater than that presented in the permit application. The proposed conversion of the Pensacola facility will not increase production capacity nor will there be an increase in emissions beyond the current permitted levels. Pulping capacity at the Pensacola facility was increased in an expansion project in 1979 through 1981 which was permitted in accordance with Florida's NSPS and PSD permitting process. Since the start-up of these facilities, which was to provide a pulp production of 1560 tons/day, the facility has not had a normal production year as is evident in the following production history.

YEAR	Actual Pulp Production T/D
1981	928
1982	1,040
1983	1,090
1984	1,204
1985 (thru Sept.)	1,020

Therefore, Champion's assessments of the conversion project is in accordance with 40 CFR, Part 51.24 and 40 CFR, Part 52.21.

ITEM 9&10 - With the existing wood mix, a ton of unbleached pulp requires 8,160 pounds of wood (@ 50% moisture). With the proposed wood mix after conversion, a ton of unbleached pulp will require 7,874 pounds of wood (@ 50% moisture). It does not take any additional wood to bleach a ton of unbleached pulp. Bleaching a ton of unbleached pulp results in 0.9 tons of bleached pulp. The existing mill is designed to produce 1,560 tons of unbleached pulp which is the same unbleached production after conversion. Bleaching 1,560 tons of unbleached pulp will result in 1,400 tons of bleached pulp. Losses which occur in the bleaching process are due to fiber destruction.

Sincerely,

Charles H. Ayer
Manager, Air Programs

CHA:lbb

203 358-7246 11/24
Bill 11/25 letter rec.
Inc. response
Bruce + Dist.
copied -

Please return
for file
Patty

P 408 533 667

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Champ - Int - Corp -	
Street and No. P-O - BOX 87	
P.O., State and ZIP Code Cantonment, Fl. 32533	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 11/8/85	

PS Form 3800, Feb. 1982

PS Form 3811, July 1983

SENDER: Complete items 1, 2, 3 and 4.

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

1. ☑ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:
Champion Int. Corp.
P-O - BOX 87 Fl. 32533
Cantonment,
Attn: Richard Olson

4. Type of Service:
☐ Registered ☑ Insured
☑ Certified ☐ COD
☐ Express Mail

Article Number: P 408 533 667

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X D Bradberry

7. Date of Delivery
11-12-85

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

DOMESTIC RETURN RECEIPT

File Copy

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

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

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

November 8, 1985

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Richard E. Olson
Vice President
Manufacturing Printing & Writing Papers
Champion International Corporation
P.O. Box 87
Cantonment, Florida 32533

Dear Mr. Olson:

Re: Completeness Review of the Application to Construct/Modify Air Pollution Sources: No. AC 17-11195

The department is in receipt of the above referenced application package. The application has been deemed incomplete and the following information, including all assumptions, reference documents and calculations, shall be submitted before the status can again be ascertained.

1. If there is any proprietary information required in any response(s) to the following requests, please identify and submit as a separate document and the bureau will maintain confidentiality.

2. Since October, 1980, what contemporaneous pollutant changes have occurred by source and permit(s) affected?

3. What are the products, materials, etc., described as "miscellaneous bags" in Section 3, page 17, A.3.-Batch Dry Handling System?
4. In Section 2, page 7, the form that titanium dioxide and extender is received is listed as water slurry-bulk. On page 8, the dry additives section (A-1) describes a bulk unloading system for titanium dioxide and extender, among others. Is this a discrepancy in information? If so, please provide a correction.

5. In Section 3, page 16, the emissions factor for traffic fugitive PM emissions was based on 18-wheeled trucks. A

supplemental letter dated October 21, 1985, changed the emission factor and based it on the use of 4-wheeled trucks. Exactly what type of trucks by wheels will be utilizing the roadways and what is the correct emission factor based on the response to the first part of this question?

6. Will the existing lime slaker be removed from service and dismantled after the installation of the proposed new lime slaker?

7. Within the bleach plant, will there be any PM emissions from the unloading and use of $MgSO_4$?

8. Based on Table IV, Section 2, page 12, the woodyard activity indicates an annual increase in usage of roundwood plus purchased chips of 397,000 TPY, which is better than a 1100 TPD increase in usage of roundwood plus purchased chips. Will this increase not affect both directly and indirectly the hourly and annual pollutant emissions from all unit operations at the mill? If not, please explain. If so, quantify all affected pollutants in lbs/hr and TPY on a per source basis, whether permitted or unpermitted.

9. How many pounds of wood chips does it currently take to make a ton of air dried unbleached pulp and bleached pulp?

10. How many pounds of wood chips will it take to make a ton of the proposed air dried bleached pulp?

11. The bureau acknowledges the note at the bottom of page 21, Section 3.

If there are any questions, please call Bruce Mitchell at (904) 488-1344 or write to me at the above address.

Sincerely,

for W. H. Thomas

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

CHF/BM/b

cc: Tom Moody
Willard John Davis

One Champion Plaza
Stamford, Connecticut 06921
203 358-7000

Champion
Champion International Corporation

October 21, 1985

Mr. R. Bruce Mitchell, Engineer
Bureau of Air Quality Management
Florida Department of Environmental Regulation
2600 Blair Stone Road
Twin Towers Office Building
Tallahassee, FL 32301

Dear Mr. Mitchell:

In our meeting of October 10, 1985, a number of questions were addressed relative to Champion's proposed conversion of its Pensacola facility. The following are our responses to those questions:

A. Question - Will the increase in white liquor affect TRS emissions from the lime Kiln?

Purpose - White Liquor demand will increase slightly due to the addition of two oxygen delignification stages. The lime equivalent for the increased demand of white liquor is 17 tons per day. Currently the lime system is designed for 425 tons per day. Lime demand currently ranges from 380 to 400 tons per day. After conversion the lime demand will range from 397 to 417 tons per day. This represents approximately a 4 percent increase. This amount of increase in lime demand will have no measurable effect upon emissions from the lime kiln operations.

B. Question - What are the sulfur dioxide emissions from the liquid sulfur dioxide system?

Response - Liquid sulfur dioxide is required to control chlorine and chlorine dioxide residuals in the pulp stream prior to the washing stages in order to prevent corrosion.

Liquid sulfur dioxide is unloaded from tank cars by a compressed gas displacement system (no venting).

The liquid is then vaporized by a steam heat exchanger and SO_2 gas is injected into the pulp stream prior to the CL_2 and CLO_2 washing stages. The addition of sulfur dioxide is controlled by a redox - feed back controller. Any sulfur dioxide gas escaping at this point would be collected by the washers enclosed hoods and vented to a CLO_2 scrubber followed by a caustic scrubber. Assuming one percent of sulfur dioxide is unreacted and vented to the CLO_2 and caustic scrubbers with a 99 percent overall efficiency, approximately 1.8 lbs per day of SO_2 (0.33 T/yr) would be emitted. This estimate is in our opinion high, when one considers the environment in which SO_2 gas is subjected.

C. Question - What is the impact on TRS emissions from the lime slaker?

Response- The lime slaking operation is not a major TRS emitter by virtue of its position within the pulp liquor cycle. Green liquor which is produced by dissolving chemical smelt from the recovery boiler in water is clarified and reacted with lime. The chemical reaction which takes place produces caustic (white liquor) and calcium carbonate. Hydrogen sulfide would not be produced since this is an extremely caustic solution. Other TRS compounds such as RSR, RSSR, and RSH which could potentially be stripped from the solution would be present in very small quantities. Essentially, there are no official reportings of TRS emissions from the slaker operation. It would be our best estimate that the TRS emissions from the slaker operation would be less than 10 ppm or 0.8 tons per year. The increased lime demand due to oxygen delignification of approximately four percent would not result in a measurable increase in TRS emission from the lime slaker.

In addition to a response to the above questions, you requested a copy of the documents which we referenced in our fugitive dust analysis and a copy of the State of Florida emissions report for the existing lime slaker. These documents are attached for your review.

In reviewing these documents, we have noted two errors. The equation presented on Page 16, Section 3 of our permit application, for calculating fugitive dust from vehicle traffic was in error. The equation should read:

$EF = 0.9 \ (E) + 0.2 \ (T/4) + 5.07 \ (T/4)$ instead of

$EF = 0.9 \ (E) + 0.6 \ T/4 + 15.21 \ (T/4)$.

With this correction, EF is equal to .05 lbs/VMT instead of 0.144 lb/VMT. Therefore, the annual tons of emissions for road way traffic is 1.8 tons per year instead of 5.1 tons per year. In the attached emission report to the State of Florida on lime slaker emissions, the Pensacola facility reported an annual particulate emission of 16 tons.

This was however an error, and the correct value should have been 27.7 tons per year. The facility will be submitting a corrected report within the next ten days.

Due to these errors, I have attached a corrected copy of the net emissions summary presented on Page 5, Section 2 of our permit application. I apologize for any inconvenience this may have caused.

If you have any additional questions, please do not hesitate to call.

Sincerely,

Charles H. Ayer
Manager, Air Programs

CHA:lbb

Attachments

cc: Thomas W. Moody
Special Programs Supervisor
Northwest District

P. O. Box 87
Cantonment, FL 32533

D-15

Champion
Champion International Corporation

February 28, 1985

Mr. Thomas Moody, P.E.
Florida Department of
Environmental Regulation
160 Governmental Center
Pensacola, FL 32501

Dear Mr. Moody:

Enclosed are the 1984 "Annual Operations Reports" for the fourteen permitted air emissions sources at Pensacola Mill of Champion International Corporation

Sincerely,

Justus C. Tracy

Justus C. Tracy
Environmental Engineer

emd

Enclosures

cc:
R. F. Cashen
E. O. Clem
T. P. Crane, Jr.
M. T. Still

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

ANNUAL OPERATIONS REPORT FORM FOR AIR EMISSIONS SOURCES

For each permitted emission point, please submit a separate report for calendar year 19 8 4 prior to March 1st of the following year.

I GENERAL INFORMATION

1. Source Name: Champion International Corporation
2. Permit Number: A017-30112
3. Source Address: P. O. Box 87
   Cantonment, FL 32533
4. Description of Source: Lime Slaker

II OPERATING SCHEDULE: 24 hrs/day 7 days/wk 51 wks/yr

III RAW MATERIAL INPUT PROCESS WEIGHT:

Raw Material	Input Process Weight	
Green Liquor Solids	261,820	tons/yr
Lime	116,952	tons/yr
		tons/yr
		tons/yr
		tons/yr

IV TOTAL FUEL USAGE, including standby fuels. If fuel is oil, specify type and sulfur content (e.g., No. 6 oil with 1 % S).

_____ 10^6 cubic feet Natural Gas
_____ 10^3 gallons _____ Oil, _____ %S
_____ 10^3 gallons Propane
_____ 10^3 gallons Kerosene
_____ tons Coal
_____ 10^6 lb Black Liquid Solids
_____ tons Carbonaceous
_____ tons Refuse
Other (Specify type and units) _____

V EMISSION LEVEL (tons/yr):

A. 16.05 Particulates
_____ Sulfur Dioxide
_____ Total Reduced Sulfur
_____ Nitrogen Oxide
_____ Carbon Monoxide
_____ Fluoride
_____ Hydrocarbon
Other (Specify type and units) _____

B. Method of calculating emission rates (e.g., use of fuel and materials balance, emission factors drawn from AP 42, etc.)

VI CERTIFICATION:

I hereby certify that the information given in this report is correct to the best of my knowledge.

Justus C. Tracy
SIGNATURE OF OWNER OR AUTHORIZED REPRESENTATIVE

Justus C. Tracy, Environmental Engineer
TYPED NAME AND TITLE

February 28, 1985
DATE

The regulated pollutants affected by the mill conversion project are particulates for which the area has been designated as attainment of the NAAQS. A summary of the net emissions for the proposed mill conversion are as follows:

A. Particulate	Net Emissions (Tons/Yr)	Reference Calculations Pages
1. Fugitive Particulate Emissions		
Woodyard	+2.1	12,14,15
Road Traffic	* +5.1 1.8	16
Subtotal	+7.2 3.9	
2. Point Source Emissions		
Starch Silo Vent Collector	+0.1	17
Starch Receiver Vent Collector	+0.1	17
Rotoclone Collector	+3.5	17
Lime Slaker (New)	+6.7	23
Old Lime Slaker (Shutdown)[1]	-16.0 -27.7	--
Salt Unloading	+0.6	23
Subtotal	-5.0 -16.7	--
TOTAL NET EMISSIONS INCREASE	+2.2 -12.8	

B. Unregulated Pollutants	Net Emissions (Tons/Yr)	Reference Calculations Pages
1. Bleach Plant		
Chlorine	-12	--
Chlorine Dioxide	-11	--
Total	-23	9,18-22

The proposed conversion of the Pensacola facility does not represent a major modification as defined by the Florida DER regulation 17-2.500.

1) Reported Emission in 1984.

*Corrected by Charles Ayer 10/16/85

SUPPLEMENT NO. 1

FOR

REASONABLY AVAILABLE CONTROL MEASURES FOR FUGITIVE DUST SOURCES

Ohio Environmental Protection Agency

Division of Air Pollution Control

Engineering Section

361 East Broad Street

Columbus, Ohio 43216

August, 1983

2.1.1 Plant Roadways and Parking Areas

2.1.1.1 Source Description--

The roadways and parking areas located on plant property can be significant sources of fugitive dust. The potential that a given road or parking area surface has for generating fugitive dust is dependent upon traffic volume and the nature of its surface. The surface can be categorized as either paved (concrete or asphalt) or unpaved (gravel or dirt).

Dust generated from paved surfaces results from vehicle activity that agitates the "surface loading" and causes that loading to become airborne. Surface loading is defined as the amount of foreign material present on a paved surface having the potential to become suspended. The amount of surface loading on a paved surface is the composite result of: 1) deposition of mud and dirt carryout, 2) spillage or leakage from moving vehicles, 3) pavement surface wear, 4) runoff or erosion of adjacent land areas, 5) atmospheric fallout, 6) biological debris, 7) wear from tires and brake linings, 8) exhaust emissions, 9) litter, and 10) application of ice control materials.[1]

In contrast to paved surfaces the source of dust generation from unpaved and untreated surfaces is largely from actual road bed material rather than any "surface loading".

In both cases, paved and unpaved, the actual suspension of fugitive dust is the result of vehicular traffic on the surface. Both road bed and surface loading material are mechanically

broken down by the tires and subsequently entrained in the ambient air by the air turbulence created by the moving vehicle. In addition to vehicle entrainment, a smaller amount of dust may also be suspended as a result of wind disturbance of the surface loading.

In some instances the unpaved road shoulders can be another source of fugitive dust. This occurs when the roadway is narrow and is ineffectively curbed. Vehicles traveling the road may at times stray from the road surface onto the shoulders and cause significant additional dust generation.

2.1.1.2 Fugitive Dust Emission Factors--

Emission factors for both paved and unpaved surfaces have been determined from field test data on public roadways. Adequate data on the condition of plant roads or parking areas serving private property is not available. Lacking specific data for private plant roads, the public roadway emission factors are modified for use here.

Emission factors for both paved and unpaved surfaces are directly related to the number of vehicle miles travelled (VMT).

The U.S. Environmental Protection Agency provides an average emission factor for dust entrainment from paved roads as 5.6 g/mi.[1] This average emission factor includes tire wear and exhaust emissions (0.53 g/mi), and entrained fugitive dust (5.07 g/mi). Although this "average" value could be used, it would probably not be representative of industrial and commercial roadways as it is based on light duty, four-wheeled vehicles.

A more vehicle-specific emission factor can be determined through modifications to the components of the "average" emission factor.

The method for calculating a specific emission factor for vehicles travelling paved surfaces is given in the following equation:[1]

$$EF = P[(E) + 0.20\ (T/4) + 5.07\ (T/4)] \qquad \text{Equation 1}$$

where:

EF = emission factor, g/VMT,

P = fraction of particulate which will remain suspended (diameter less than 30 μm) from a paved road surface, 0.90 (Reference 1, p. 11.2.5-1),

E = particulate emission originating from vehicle exhaust (see Table 2.1.1-1),

0.20 = tire wear in g/VMT, representing a four-wheeled vehicle,

5.07 = entrained dust in g/VMT, representing a four-wheeled vehicle, and

T = number of tires per vehicle.

The average and specific vehicle emission factors for paved surfaces are given in Table 2.1.1-1. The exhaust emissions and tire wear included in the EPA's average paved road emission factor[1] are representative of a fleet composed primarily of light-duty, four-wheeled gasoline vehicles. However, because of the great variety of vehicles which transit plant property, specific emission factors are presented for ten, twelve, and eighteen-wheeled, heavy-duty gasoline and diesel vehicles.

TABLE 2.1.1-1. EMISSION FACTORS FOR VEHICLES TRAVELLING PAVED SURFACES
(g/mi)

Vehicle type	Exhaust (E)[a]	Tire wear[b,c]	Reentrained[c] dust	Initial[d] emission factor	Final emission factor[e]	Emission factor reliability
Average[f]	0.53		5.07	5.6	5.0	g
Light-duty gasoline (4-wheeled)	0.34	0.20	5.07	5.6	5.0	g
Heavy duty gasoline (10-wheeled)	0.91	0.50	12.68	14.1	12.7	g
Heavy duty diesel						
(12-wheeled)	1.30	0.60	15.21	17.1	15.4	g
(18-wheeled)	1.30	0.90	22.82	25.0	22.5	g

[a] Exhaust emissions are specific for fuel and vehicle type.[1]

[b] The tire wear component is based upon 0.20 g/VMT for a four-wheeled vehicle and can be adjusted upwards for vehicles with large numbers of wheels.[1]

[c] The reentrained dust component is estimated to be directly proportional to the number of tires. An additional multiplication factor of 2.5 should also be applied to the tire wear and reentrained dust columns when considering large wheeled equipment, i.e., mining haul trucks and wheeled-tractors, loaders or dozers.[2]

[d] The initial emission factor is the sum of the exhaust, tire wear, and reentrained dust components.

[e] The final emission factor is the initial emission factor multiplied by a factor of 0.90. The factor of 0.90 accounts for that amount of particulate which will remain suspended.[1]

[f] Reference 1.

[g] Reference 1 fugitive dust emission factor equations and their resulting emission factors are not assigned reliability values.

Fugitive dust from unpaved surfaces can be determined using the EPA's published procedure. This procedure is expressed in the following equation:[1]

$$EF = (P)\ (0.81)\ (s)\ (S/30)\ ((365-W)/365)\ (T/4) \quad \text{Equation 2}$$

where:

EF = emission factor, lb/VMT,

P = fraction of particulate which will remain suspended (diameter less than 30 μm) from a gravel road bed, 0.62; from a dirt road bed, 0.32 (see Table 2.1.1-2),

s = silt content of road bed material, percent; 12 percent approximate average value (values range between 5 and 15 percent),

S = average vehicle speed, mph,

W = days with 0.01 inch or more of precipitation,[2] and

T = average number of tires per vehicle.

When using Equation 2 for vehicles with oversized tires, a multiplication factor of 2.5 should be included. This factor will account for the comparative difference in the width of tire faces between average road vehicles and oversized tire vehicles. This factor (2.5) can be used to estimate entrained dust emissions from most wheeled construction equipment, i.e., wheeled-tractors, loaders or dozers, and mining haul trucks.[3]

Emission factors or emission factor equations have not been developed specifically for dust generation from road shoulders, and such emissions have not received much attention in the literature. If dust from this source is considered a significant problem, it is suggested that the unpaved road emission factor be

used to estimate the emissions from a dirt or gravel shoulder in lieu of a specific emission factor.

2.1.1.3 Characterization of Fugitive Dust Emissions--

The chemical or mineral composition of road dust depends directly on the type of material deposited on the paved surface or the type of material used in the road bed of the unpaved surface.

Size distribution--The particle size range for fugitive dust from plant roadways and parking lots depends upon the type of road surface. Table 2.1.1-2 gives the size distribution of fugitive dust by surface type.

TABLE 2.1.1-2. TYPICAL SIZE DISTRIBUTION OF FUGITIVE DUST PARTICLES BY SURFACE TYPE[a]
(percentages)

Size range	Paved surface	Unpaved surfaces	
		gravel	dirt
<5 μm	50	23	8
5-30 μm	40	39	24
>30 μm	10	38	68

[a] Reference 1, p. 11.2.1-4.

Density and composition--The density and composition of fugitive dust from paved and unpaved surfaces will vary widely depending upon the type of material used to construct the pavement or road bed and the type of material deposited on the surface.

SOUTHERN REGIONAL CENTER
P.O. Box 14483
Gainesville, FL 32604
(904) 377-4708

ncasi

NATIONAL COUNCIL OF THE PAPER INDUSTRY FOR AIR AND STREAM IMPROVEMENT, INC.

November 18, 1983

Mr. David T. Arceneaux
Champion International, Inc.
P. O. Box 872
Pasadena, TX 77501

Dear David:

In response to your request for information on fugitive emissions from the unloading of wood chips, I attach hereto portions of a Technical Bulletin draft by David Rovell-Rixx which address this subject. The complete list of references for this soon-to-be released Bulletin is also attached. Please let us know if this material will satisfy your needs.

Should you require more detailed information please call David Rovell-Rixx at this Center.

Very truly yours,

Herbert F. Berger
Regional Manager

cc: R. O. Blosser

Enclosure

HFB:tlb

VI FACTORS AFFECTING AND CONTROL TECHNOLOGIES FOR FUGITIVE EMISSIONS FROM WOOD CHIP AND BARK STORAGE AND HANDLING

A. Introduction

The storage and handling of wood chips and bark present a potential for fugitive emissions. Wood chips and bark may be obtained as such from sources outside a mill. If so, these materials generally arrive by truck or rail car, both of which are usually unloaded by dumping into a hopper. The chips are usually screened after unloading, with the undersize "fines" (less than 0.25 inch) being mixed with the bark for burning, and the oversize pieces being returned to a chipper. A certain small percent of the fines will escape the screens and remain with the chips. Both the chips and the bark (with fines) are then conveyed to storage piles. Alternately, logs are delivered to a mill, again either by truck or rail car, and are then processed through a debarker and a chipper. The chips are then screened as before and the chips and bark (with fines) are conveyed to storage piles by belt or pneumatic conveyors. They are then dropped or blown out onto pile surfaces. Both debarking and chipping may generate fugitive emissions, although most debarking is done wet, which will reduce potential emissions.

As material is dropped to a pile surface from a belt conveyor, it is exposed to wind which may suspend any fine particles present. As the material strikes the pile surface, small particles which are stuck to other particles may be broken loose and suspended. If the chips or bark are blown out, it is even more likely that small particles will be separated out and be carried by wind entrainment. While in storage piles the bark or chips may be moved about in order to shape the piles. Shaping of a pile is usually done with a dozier. The disruption of the pile caused by the action of the dozier may generate emissions. The bark and chips are eventually reclaimed, the bark being conveyed to a boiler for burning, and the chips to a digester. Some reclaiming may be done with a screw conveyor located beneath the pile. This method generally causes little disruption and low emissions. Other installations may use front end loaders or similar devices to transfer bark or chips to conveyors. These may cause emissions. There is also the possibility of spillage of the material at transfer points along a conveyor system, which may also be a source of fugitive emissions.

B. Factors Affecting Fugitive Emissions

(1) Mechanical Action and Wind Speed - The generation of fugitive particulate emissions (i.e., wood dust) is related to the amount of energy applied to the particles, and to the amount of energy necessary to suspend them. As wood chips and bark are handled during transfer and storage, energy is applied to it through mechanical action. This agitation may be sufficient to suspend some particles which are then subject to transport by

winds. Likewise, as wood chips and bark are dropped from a conveyor to a pile surface, the particles are subject to wind action as they fall. The speed at which a particle falls (settling velocity) is a balance between the force of gravity and the fluid drag of air on the particle. Small particles settle slowly and can be greatly affected by ambient wind velocity. If the settling velocity of suspended particles is sufficiently small compared to wind velocities and turbulent updrafts, these particles may remain suspended and travel a significant distance (i.e., beyond the mill's boundary).

Particles also may become airborne solely by the action of wind. Phenomena important to the wind erosion of soils have been studied and are applicable to wind erosion of other materials. It has been determined that a minimum (or threshold) wind velocity is necessary to initiate wind erosion. A theoretical analysis by Lee and Wilson (18) indicates that the threshold velocity necessary to raise a 10 micron particle (ρ = 1 gm/cm^3) is 10 mph. This is in good agreement with other observations. Typically the rate of dust emission decays with time until the wind speed is increased or the pile surface is disturbed again. If the pile is partially enclosed or sheltered from the wind, the emission potential is reduced.

Davies (40) examined the problems experienced by a Canadian pulp mill by using field observation and water flume modeling. He determined that the emissions from static storage piles were not significant unless the ambient wind speed exceeded a threshold value of 15-25 mph. Davies estimated that at a typical site the wind speed will exceed that threshold value less than about 20 percent of the time. The rest of the time the primary sources of emissions were pneumatic chip handling and vehicle movement. High wind speeds also caused resuspension of previous emissions, which had settled onto the ground around the mill.

A separate study of wood dust emissions (reference 60, report not yet available) concluded that 90 percent of the emissions from wood chip and bark storage and handling were emitted during chip transfer, and 10 percent were blown from static storage piles. It was also noted that when the wind speed exceeded 20 mph, noticeable particles were carried downwind from a pneumatic chip blower transferring chips onto a pile.

(2) Particle Size and Density - Particle size and density are factors which affect the amount of energy necessary to suspend a wood particle and keep it suspended. Since it is the small particles (assuming equal density) which are most readily suspended and borne by wind, the relative amount of small particles present in a given sample is an important factor. Particle size as determined by dry sieving is frequently used to define the percent silt (by mass) of coal and other materials (10,12) (refer to Section II), with silt defined as the material passing a 200 mesh screen (less than 75 microns diameter). This same type of analysis would be beneficial in determining the

relative amount of material with a potential for becoming airborne. Because wood is much less dense than coal, it would be advisable to consider particles up to at least 150 microns diameter (100 mesh).

(3) Moisture Content - The moisture content (percent by weight) of the wood particles is a factor affecting emissions. A high moisture content causes the small particles to stick to themselves and to larger particles, effectively decreasing the amount of small particles which might become airborne. The beneficial effect of a high moisture content can continue even after it has been reduced by evaporation if the surface layer forms a crust. If the particles continue to stick together in a surface crust, the potential for wind erosion is reduced. Cowherd, Bohn, and Cuscino (17) found in tests with an open floor wind tunnel that undisturbed crusted coal had a wind threshold velocity 40 percent higher than coal where the crust had been disrupted. They also noted that the erosion rate of the coal decayed substantially with time for a given wind velocity, indicating that the surface has a finite potential for emissions (i.e., finite amount of particles small enough to become suspended). If the air velocity was increased, or if the surface was disturbed, the emission rate increased and again decayed with time. It is reasonable to assume that this same phenomena might occur with wood chips and bark, although this has not been demonstrated.

C. Fugitive Emission Factors for Wood Chip and Bark Storage and Handling

(1) Reported Emission Factors - Jutze, et al. (36) estimated emission factors for log debarking, sawing, and sawdust pile loading, unloading, and storage (Table 28). They consider these estimates to be accurate only to the order of magnitude. These estimates are also used in AP-42 (61).

TABLE 28 EMISSION FACTORS FOR WOOD PRODUCTS MILL (36)

	SOURCE	EMISSION FACTOR
(1)	Log debarking	0.024 lb/ton of logs debarked
(2)	Sawing	0.35 lb/ton of logs sawed
(3)	Sawdust pile loading, unloading and storage	1.0 lb/ton of sawdust handled

The results of an evaluation of the fugitive emissions from a large particleboard plant were reported by Spawn (62). He

found that the major sources of emissions were the truck dump and material storage piles. Minor sources were leaks in the pneumatic transport system, and conveyor belt losses. The truck dump is used to unload planer shavings and plywood trim. The dump is enclosed except for the entrance opening. Emissions were observed when the wind was from a direction opposite the opening. The storage piles were enclosed in buildings with a doorway. Emissions out of the doorways of the buildings were measured for the truck dump and storage piles. Average emission rates were determined for particles above and below 10 microns aerodynamic diameter (ρ = 1 gm/cm^3). The average values for load-in and load-out activities inside the enclosures are shown in Table 29.

TABLE 29 EMISSION FACTORS FOR WOOD WASTE STORAGE (62)

SOURCE	LB/HR <10 μm	LB/HR >10 μm
Truck dump	.4	5.1
Storage building	.33	10.84

Although nothing to this point has been published in the accessible literature, it should be possible to develop an emission factor equation for wood chip and bark storage and handling similar to the predictive equations suggested for coal storage and handling (Section III). The mechanical operations involved in the storage and handling of materials are similar, so that the factors affecting fugitive emissions should be similar. The major difference would be in the density of the materials (0.5 gm/cm^3 for wood, 1.4 gm/cm^3 for coal).

(2) Level of Confidence to be Placed in Reported Emission Factors - The emission factors discussed above as reported by Jutze, et al. (36) and Spawn (62) were obtained from observations of operations involving wood processing. Although these factors may be useful to an undetermined degree for the prediction of emissions from sources functioning similarly, there is no basis for using these factors for predicting emissions from other kinds of wood-derived material handling, specifically the important area of wood chip storage and handling.

D. Control Measures for Fugitive Emissions from Wood Chip and Bark Storage and Handling

Details of the effectiveness of control methods for fugitive emissions from wood chip and bark storage and handling have not been reported in the accessible literature. General considerations indicate that control measures similar to those

applied to coal storage and handling (Section III-D of this bulletin) should be appropriate.

(1) Wetting - It may be feasible to use a water or chemical spray to control emissions during wood chip transfer and storage. Water is often used in the debarking and chipping operations, reducing air emissions to insignificant levels. Water is sometimes used to prevent spontaneous combustion in storage piles, but chemical sprays would need to be compatible with process requirements. Several sprays have been developed to reduce degradation of wood chips during storage. These may also increase agglomeration of fines to the larger chips and thereby reduce fugitive particulate emissions, although this has not been demonstrated. Excessive wetting might also cause problems with pneumatic conveyors.

(2) Enclosures and Windscreens - Complete or partial enclosure of emission prone operations is one option, and enclosures have been used around truck and rail car dump areas (62). Ventilation of enclosures to a particulate control device would provide a high degree of control, but no such installations are known to exist. Some plants have installed windscreens (discussed in Section III-D-(3)) either in place of, or along with, enclosures. Semi-porous windscreens can reduce the wind velocity at an unloading (dump) site and hence windborne emissions. Windscreens have also been employed around chip storage piles to reduce wind induced fugitive emissions. The most common placement of windscreens is upwind of the pile to reduce the wind speed across the pile surface. Wind induced emissions have been reported to be minimal for wind speeds below some threshold value (34).

Davies (40) studied fugitive emissions from a Canadian pulp mill using a water flume model. He recommended that a windscreen be used for a sawdust pile, and that the lower two-thirds of the screen be 80 percent solid and the upper one-third, 50 percent solid. Pile height was not to exceed seventy percent of the screen height.

Other plants have placed screens downwind of chip piles and unloading sites to filter out particles and to promote settling of particles in the calm area downwind of the screen. The effectiveness of this control has not been documented, however.

(3) Chip Transfer Equipment Modifications - Since a large portion of emissions may be from the transfer of chips to a pile surface, the control of this source could be important. The use of belt conveyors with telescoping chutes or the installation of a cyclone on the exhaust of the chip blower has been suggested (59).

E. Summary of Factors Affecting and Control Technologies for Fugitive Emissions from Wood Chip and Bark Storage and Handling

There is little information available related directly to fugitive particulate emissions from bark and wood chip storage

and handling. Because the process of generation of fugitive emissions is intuitively analogous to that of the generation of emissions from coal storage and handling, factors affecting emissions, and control technologies for reducing those emissions, should be similar, and where wood and bark emission control technology has been employed, this technology has been similar. This technology has included or could include enclosing transport operations, employing belt conveyors with telescoping discharge chutes vs. pneumatic conveyors with blowers, using windscreens, directing attention to chip pile orientation and shape, and minimizing disturbances of the chip pile surface.

One area in which the transfer of research results obtained from coal storage and handling fugitive emissions studies to wood chip and bark storage and handling fugitive emissions considerations may not be valid, concerns the use of predictive fugitive emission equations. Due primarily to the difference in densities between coal (ca. 1.4 g/cm^3) and wood (ca. 0.5 g/cm^3), these equations are not directly applicable to wood chips and bark. It is possible that one way to compensate for the lighter weight of equivalent size particles would be to use a larger size range for percent silt (e.g., the percent mass passing a #100 sieve, or 150 microns, vs. the percent passing a #200 sieve, or 75 microns.) The validity of this suggestion has not been demonstrated, and the validity of the use of any predictive fugitive emission factor equations for wood and bark storage and handling fugitive emissions has not been demonstrated.

VII FUGITIVE EMISSIONS FROM OTHER PULP AND PAPER MANUFACTURING OPERATIONS

There are materials handling operations in pulp and paper manufacturing in addition to those described previously which intuitively may lead to fugitive particulate emissions. The degree to which these operations actually result in fugitive emissions, factors important to understanding the cause of these emissions, methods for predicting the magnitude of these emissions, and techniques for controlling these emissions, have not been reported in the literature. These operations include, but may not be limited to, the following:

(1) Salt cake unloading
(2) Burned lime handling
(3) Power boiler ash and fly ash handling
(4) Purchased limestone and lime storage and handling
(5) Dried lime mud storage and handling
(6) Miscellaneous bulk chemical handling and storage (TiO_2, dyes, clays, alum, sulfur, soda ash, etc.)

Although certain or all of these operations may contribute only slightly to total particulate fugitive emissions from a pulp and paper mill, that this is the case has not been reported. (An

(3) It was determined that a major information need is to determine what the significant sources of fugitive emissions are at a typical pulp and paper mill. Methods are available to determine the significant sources and to determine the factors affecting emissions, emission rates and control measures.

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APPENDIX A

IDENTIFICATION AND QUANTIFICATION OF POTENTIAL FUGITIVE PARTICULATE EMISSION POINTS

This appendix contains the remaining fugitive emission factor tables prepared for the guidance document. Note that these tables are presented as prepared for the guidance document. Table, section, and reference numbers refer to that document. These tables are presented to allow rapid dissemination of the information developed.

Table 2-59. IDENTIFICATION AND QUANTIFICATION OF POTENTIAL FUGITIVE PARTICULATE EMISSION POINTS FOR THE LUMBER AND FURNITURE INDUSTRY

Source of IPFPE	Uncontrolled fugitive emission factor	Emission factor reliability rating	Model plant fugitive emission inventory	
			Operating parameter, Mg/yr (tons/year)	Uncontrolled emissions Mg/yr (tons/yr)
Sawmill				
1. Log debarking	0.012 kg/Mg of logs debarked[a] (0.024 lb/ton of logs debarked)	E	Logs debarked 740,000 (820,000)	9 (10)
2. Sawing	0.18 kg/Mg of logs sawed[a] (0.35 lb/ton of logs sawed)	E	Logs sawed 650,000 (720,000)	117 (126)
3. Sawdust pile loading, unloading, and storage	0.5 kg/Mg sawdust handled[b] (1.0 lb/ton sawdust handled)	E	Sawdust handled 100,000 (110,000)	50 (55)
Furniture Manufacturing				
4. Wood waste storage bin vent	0.5 kg/Mg wood waste stored[b] (1.0 lb/ton wood waste stored)	E	Wood waste stored 1,360 (1,500)	1 (1)
5. Wood waste storage bin loadout	1.0 kg/Mg wood waste loaded out[b] (2.0 lb/ton wood waste loaded out)	E	Wood waste loaded out 1,360 (1,500)	1 (2)

[a] Estimate based on material balance of the waste produced by the specific operation and engineering judgement of the amount which becomes airborne.

[b] Engineering judgement based on observations on plant visits. It is recognized that in some plants this may be more of a severe problem.

ncasi technical bulletin

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FUGITIVE DUST EMISSION FACTORS AND CONTROL METHODS IMPORTANT TO FOREST PRODUCTS INDUSTRY MANUFACTURING OPERATIONS

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because less subsoil preparation is needed due to the improved distribution of weight provided by the fabric. The cost over existing aggregate or on firm soil is about 10 percent greater, but there is a reduction in typical maintenance costs. Also there may be a reduced cost because there is less need for other dust control measures (e.g., to oil or water the road). Measurements made on unpaved roads with and without road carpet indicated an average 46 percent reduction in TSP as measured with a high-volume sampler (54).

VIII SUMMARY OF FACTORS AFFECTING AND CONTROL TECHNOLOGIES FOR FUGITIVE EMISSIONS FROM UNPAVED ROADS

A. Factors Affecting Fugitive Emissions

Fugitive emissions from unpaved roads are affected by (a) the mechanical energy supplied to suspend the particles (e.g., vehicle speed, vehicle weight, tire contact area), (b) the size and density of the material (e.g., surface silt content), and (c) environmental factors (moisture content of the surface material).

B. Emission Factors

The best available emission factor for unpaved roads appears to be that reported by Cowherd, Bohn, and Cuscino (17) developed for EPA (Figure 14).

C. Control Technologies

From the limited testing done on control measures, surface sprays appear to be an effective short term control, while paving and soil stabilizers provide good long term control.

IX FACTORS AFFECTING AND MEANS FOR ESTIMATING FUGITIVE EMISSIONS FROM INDUSTRIAL PAVED ROADS

A. Introduction

As was the case for fugitive particulate emissions from unpaved roads, the dust emission rate from paved roads is influenced by a number of factors. Those factors which have been investigated extensively and which are reviewed here are (a) road surface silt accumulation, (b) vehicle speed, and (c) vehicle size. The particle size of accumulated silt is a factor also, as is discussed in Section C-(1), below.

B. Factors Affecting Fugitive Emissions from Paved Roads

(1) Surface Silt Accumulation - Surface silt loading is defined as the amount of material on the traveled portion of a road

surface which is subject to suspension. The silt content is the percentage of material smaller than about 75 microns in diameter. It is determined by dry sieving and is the percent of material passing through a number 200 sieve. Only the material on the roadway itself is considered. Material in curbs and gutters is excluded. Sartor and Boyd (55) have analyzed the material found on roads to determine its composition and probable origins. Although they were primarily concerned with the effects of runoff on water quality, their findings are valuable. They determined average loading rates as a function of adjoining land use and determined the distribution of material across the road width. They determined that almost 90 percent of the total material on the road is located within one foot of the curb. Cowherd, Maxwell and Nelson (47) measured emissions from a four lane road artificially loaded with known quantities of gravel or topsoil. They found that emission rates varied exponentially with loading rate over the range tested (30 to 114 gm/m^2). They estimated that for loading rates normally found on urban roads (less than 20 gm/m^2 on the traveled portion of the road), the emissions were linearly proportional to the loading rate.

Material may be deposited on a road surface by vehicle carry-on of mud and dirt from unpaved areas, truck spills of material, sanding and salting for snow and ice control, and by wind and water erosion of material from adjacent unpaved areas. Roberts, et al. (44,56) reported that a car driven 7.5 miles on a wet gravel road at 10 mph gained approximately 80 lb of mud. They also reported that an average of 0.74 lb/vehicle of mud was carried out of an unpaved parking area on the tires.

(2) Vehicle Speed - As discussed in VI-B-(1), fugitive emissions may be generated by the turbulent wake behind a moving vehicle, and the magnitude of the wake is related to the size and speed of the vehicle. Sehmel (45) measured the resuspension of tracer material placed on one lane (10 ft x 100 ft) of a seasoned asphalt road, and measurements of resuspension were made while driving alternately a car and a 3/4 ton truck through the test lane and through the adjacent lane. For cars, the resuspension rate appeared proportional to the square of the speed (s^2) between 5 and 30 mph and linearly proportional to the speed between 30 and 50 mph. (Cowherd, et al., (12) have reported sampling on (unpaved dirt and gravel) roads which indicated that emissions were linearly proportional to vehicle speed (s) for speeds between 30 and 50 mph.) Cowherd, Maxwell and Nelson (47), and Bohn, Cuscino, and Cowherd (13) assumed that since traffic-related deposition is the major source of surface material, vehicle generated emissions on paved roads are independent of traffic speed after an equilibrium between deposition and suspension is reached (i.e., averaged over a sufficient period of time).

(3) Vehicle Weight and Size - Based on experimental data from unpaved roads (discussed in Section VI-B-(5) above), vehicle weight (w) has been identified by Bohn, Cuscino, and Cowherd (13)

as a factor affecting emissions. The vehicle weight can be a factor in the amount of material crushed into smaller, suspendable particles, and it may also be an indicator of vehicle size, and therefore it may be related to vehicle induced wind turbulence.

C. Particle Size and Determined Emission Factors for Fugitive Emissions from Paved Roads

(1) Particle Size of Emissions - Cowherd, Maxwell, and Nelson (47) determined the particle size distribution for emissions from four paved road surfaces. Surface 1 was a four lane concrete roadway with light to medium industrial activity. Surface 2 was a four lane asphalt roadway with medium industrial activity. Surface 3 was a four lane roadway artificially loaded with pulverized topsoil. Surface 4 was a four lane roadway artificially loaded with gravel fines. Bohn, Cuscino, and Nelson (13) reported the particle size distribution of emissions from three paved roads at an iron and steel plant. Cowherd, Bohn, and Cuscino (17) reported the particle size distribution of emissions from five tests of two paved roads at an iron and steel plant. These data are summarized in Table 25.

TABLE 25 PARTICLE SIZE OF PAVED ROAD EMISSIONS

SITE* (REFERENCE)	ρ (gm/cm^3)	MASS MEDIAN DIAMETER, μm	WEIGHT PERCENT <30 μm	WEIGHT PERCENT <5 μm
1 (45)	2.5	3.7	94	61
2	2.5	6	90	42
3	2.5	83	32	10
4	2.5	36	47	16
3 roads (5)	3.0	7	84	43
2 roads (9)	3.0	18	71	33

*Refer to text

(2) Emission Factors - Mann and Cowherd (21) have listed the averages and ranges of emission rates determined in two separate

studies of fugitive emissions from paved roads (47,57). They suggest that the average of the two average values be used. This value is 0.012 lb/vehicle mile. The combined range of the emission rates from the two studies is from 0.0009 to 0.037 lb/vehicle mile.

One of the above referenced studies was conducted by Cowherd, Maxwell, and Nelson (47). These tests were conducted at three sites in Kansas City. Two of the sites were four lane arterial streets in areas with either residential or light-medium industry. One street was concrete and the other street was asphalt. The third site was a four lane road in an undeveloped industrial park, which was used for an artificial loading test. The tests were conducted on days with moderate crosswinds, 3-4 days after any significant rain. Samples were taken with an exposure profiler, high-volume samplers, deposition buckets, and Sierra high-volume impactors (Section II). The emission factor equation derived from the data is shown in Figure 15.

FIGURE 15 EMISSION FACTOR EQUATION FOR PAVED ROADS

$E = KLS$ (kg/vehicle-km) where

E = emission factor (kg/vehicle km)
K = constant, S = silt content %
L = surface loading excluding curbs per km
$K = 98.10^{-5}$/veh.:total emissions
$= 91.10^{-5}$/veh.:particles <30 μm
$= 50.10^{-5}$/veh.:particles <5 μm
valid for $L \leq 280$ kg/km (1000 lb/mi)

The value of K was determined from the tests on the artificially loaded segment. That value of K was applied to emission data collected at two other sites to compute an expected surface loading (L). These values of L compared favorably with loading values suggested by Sartor and Boyd (55) for appropriate land uses. A silt value of 10 percent was assumed.

Bohn, Cuscino, and Cowherd measured emissions from paved roads at an iron and steel plant (13). They refined the above equation to account for the vehicle weight in analogy with the equation for unpaved roads. It was noted, however, that industrial plant traffic had higher than predicted emissions, presumably due to resuspension of dust from vehicle underbodies.

Cowherd, Bohn, and Cuscino (17) further modified the above emission factor equation after additional tests at two paved roads at another iron and steel plant site. A recent supplement to AP-42 (25) recommends an equation which is identical except

for the addition of a particle size multiplier (K) which is used to determine the fraction of the total emissions (K=1) which is smaller than a particular particle size (Table 26). The range of source conditions tested in developing this equation is presented in this supplement and is shown in Table 27. This final equation is shown in Figure 16.

TABLE 26 AERODYNAMIC PARTICLE SIZE MULTIPLIER (K) FOR EQUATION IN FIGURE 18

<30 μm	<15 μm	<10 μm	<5 μm	<2.5 μm
0.86	0.64	0.51	0.32	0.17

TABLE 27 SOURCE CONDITIONS FOR FIGURE 16 (25)

SILT CONTENT (%)	SURFACE LOADING lb/mile	NO. OF LANES	VEHICLE WEIGHT Tons
5.1-92	149-7,100	2-4	3-13

It is interesting to note that in contrast to the emission factor equations for unpaved roads, the equation for paved roads does not have a correction factor for either vehicle speed or for moisture content. The reasoning for this is as explained above, based on the assumption that as traffic-related deposition of material on the road is a major source of surface material, the emission rate is independent of the vehicle speed after an equilibrium between deposition and reentrainment is reached (47). It is noted, however, that the vehicle speeds for emission measurements on the artificially loaded roads (47) were measured at 30 mph, and vehicle speeds for emission testing by Bohn, Cuscino, and Cowherd (13) were at 12 mph. No correction for moisture content was included because it was assumed that while precipitation will decrease emissions temporarily, it will also cause an increased deposition of mud onto the roadway. This will increase the surface loading and therefore the emissions upon the subsequent drying of the surface material.

(3) Level of Confidence to be Placed in Reported Emission Factors - The equation presented in Figure 16 was reported by its authors (17) to represent measured emissions within a factor of three. In comparison of predicted versus actual measured emissions (of particles less than 47 microns aerodynamic diameter)

from thirteen samples on paved roads (17), the predicted emissions averaged 1.21 times the measured emissions with a standard deviation of 0.606. Its EPA quality rating (see Section III-C-(2)) is B if the equation is applied to vehicles traveling only on paved surfaces (I = 1.0) and for source conditions within the range of Table 27. For roads with traffic entering from unpaved roads, or roads with unpaved shoulders (I = 3.5 or 7.0), the quality rating is reduced to D. For situations where the correction parameters cannot be determined for the specific road being modeled, the quality rating is dropped one letter.

FIGURE 16 REVISED EMISSION FACTOR EQUATION FOR PAVED ROADS (17)

$$EF = 0.025\ I\ K\ (4/n)(s/10)(L/280)(W/2.7)^{0.7}\ \text{kg/vehicle-km}$$

$$EF = 0.090\ I\ K\ (4/n)(s/10)(L/1000)(W/3)^{0.7}\ \text{lb/vehicle-mile}$$ where

EF = emission factor
I = industrial road augmentation factor
K = particle size multiplier
n = number of traffic lanes
s = silt content of road surface loading, percent
L = surface dust loading on travel portion of road (i.e., excluding curbs) (lb/mile or kg/km)
W = average vehicle weight (tons = 2200 lb)
I = 7 if resuspension of dust from underbodies of vehicles, accumulated from unpaved areas, is observed
I = 3.5:
a) if emission from unpaved shoulders from turbulent vehicle wake is observed
b) if travel on unpaved shoulder is observed as for two way traffic on narrow road, or
c) may be assumed for roads with unpaved shoulders bare of vegetation.

In addition, the same problems apply to the emission factors for paved roads as to the emission factors for coal handling and storage (III-C-(3)) and unpaved roads (VI-C-(3)). These include (a) the unknown degree of correlation between the sampling catch of the exposure profiler, and a standard high-volume sampler, (b) the dependence of the capture efficiency of high-volume samplers on wind direction and wind speed, (c) the effect of particle deposition with distance from the source, and (d) the lack of independent verification of the equations.

X CONTROL MEASURES FOR FUGITIVE EMISSIONS FROM PAVED ROADS

On the basis of reports which have appeared in the literature, the most important factor in paved road emissions appears

10200 Bellaire Boulevard
Houston, Texas 77072

Paper Division

Main file copy

Champion
Champion International Corporation

October 18, 1985

State of Florida
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301-8241

Attn: Mr. Bruce Mitchell

Dear Mr. Mitchell:

In reviewing our permit application, which was delivered to you on October 10, I noticed an omission which may be confusing. The word processor which was used does not have a division sign. In making the final copies for the permit, the hand inserted division signs were omitted. The resulting calculations in Appendix A appears to have a number of substractions which are actually divisions.

Rather than send new copies which would be difficult to insert in the binders, I am enclosing a copy of Appendix A with the division signs circled. Would you please arrange to insert division signs in the correct locations as indicated.

Again, I apologize for any inconvenience or misunderstanding that this omission caused. If there are any questions, please contact me.

Sincerely yours,

Charles A. Ayer

Charles A. Ayer
Manager, Air Programs

CAA:DTA:ls

Attachment

cc Tom Moody 10-21-85

DER
OCT 21 1985
BAQM

APPENDIX A

COMPUTATION OF EMISSIONS

FOR

PENSACOLA FACILITY CONVERSION

EMISSION CALCULATIONS

FOR

BULK STARCH & BATCH DRY HANDLING SYSTEM

A. 1. Starch Receiver Collector

Data Base:

Air Flow	940 ACFM
Residual Dust	0.02 gr/ACFM
Operating Hrs.	1334

Calculations

$$\frac{(ACFM) \times gr/SCF \times \frac{min}{hr.} \times \frac{hrs.}{yr.} \div 2{,}000}{7{,}000\ gr/lb}$$

$$\frac{(940) \times (.02) \times (60) \times (1334)}{7{,}000} \div 2000 = 0.1\ T/yr.$$

2. Bulk Starch Unloading - Silo Collector

Data Base:

Air Flow -	794 ACFM
Residual Dust from Collector	.02 gr/ACFM
Operating hrs.	1334

Calculations

$$\frac{\text{Flow (SCFM)} \times \text{gr./ACFM} \times \text{min/hr} \times \frac{\text{hrs.}}{\text{yr.}} \div 2{,}000\ \frac{\text{lbs.}}{\text{ton}} = \frac{\text{Tons}}{\text{Yr.}}}{7{,}000\ \text{gr./lb.}}$$

$$\frac{(794) \times (.02) \times (60) \times (1334)}{7{,}000} \div 2{,}000 = 0.1\ \text{Tons/Yr.}$$

3. Batch Dry Handling System

Data Base:

Wt. of material handled in bags	3,500 tons/yr.
Loss from Batch Handling (1%)	35 tons/yr.
Rotoclone Efficiency	90% minimum

Calculations

Tons/Yr. of Material x Handling Loss x Loss from Scrubber = Tons/Yr. Emissions

3,500 Tons/Yr. x .01 x .10 = 3.5 Tons/Yr.

Material Received in Bags	Tons/Yr.
Wet End Starch	2,230
Ammonium Persulfate	4
TiO_2 Emergency Supply	80
TiO_2 Extender(Emergency Supply)	80
Sodium Bicarbonate	740
Sulfamic Acid	200
Misc. Bags	166

EMISSIONS CALCULATIONS

FOR

NEW BLEACH PLANT FACILITIES

Data Base 800 Ton/Day Plant:

ACFM	10,200
SDCFM	9,000
Temp	100°F
Residual Cl_2 (ppm)	17
Residual ClO_2 (ppm)	17
Operating Hrs./Yr.	8,400

Data Base 600 Ton/Day Plant:

ACFM	7,350
SDCFM	6,500
Temp	100°F
Residual Cl_2 (ppm)	17
Residual ClO_2 (ppm)	17
Operating Hrs./Yr.	8,400

Calculations:
Flow (SDCFM) x Conc (ppm) x F = Emissions (Lbs./Hr.)
Emissions (Lbs./Hr.) x Operating Hrs. ÷ Lb./T = Tons/Yr.

$$F(\text{Gas}) = \text{Molecular Weight (Gas)} \left(\frac{\text{grams}}{\text{mole}}\right) \div 0.865 \text{ ft.}^3\text{/mole}$$

$$\div 454 \frac{\text{grams}}{\text{lbs.}} \times 60 \frac{\text{min.}}{\text{hr.}} \times 10^{-6} \text{ (ppm)}$$

$$F(Cl_2) = 1.08 \times 10^{-5}; \; F(ClO_2) = 1.03 \times 10^{-5}$$

$(9000) \times (17) \times 1.08 \times 10^{-5} = 1.7$ Lbs./Hr. $Cl_2 \times 8400 \div 2000 = 7.1$ T/yr.
$(9000) \times (17) \times 1.03 \times 10^{-5} = 1.6$ Lbs./Hr. $ClO_2 \times 8400 \div 2000 = 6.7$ T/yr.
$(6500) \times (17) \times 1.08 \times 10^{-5} = 1.2$ Lbs./Hr. $Cl_2 \times 8400 \div 2000 = 5.0$ T/yr.
$(6500) \times (17) \times 1.03 \times 10^{-5} = 1.1$ Lbs./Hr. $ClO_2 \times 8400 \div 2000 = 4.6$ T/yr.

Summary New Bleach Facility Emissions:

Cl_2 = 7.1 T/Yr. + 5.0 T/Yr. = 12 T/Yr.
ClO_2 = 6.7 T/Yr. + 4.6 T/Yr. = 11 T/Yr.

EMISSION CALCULATIONS
FOR
EXISTING BLEACH PLANT

Bleach Sequence - CEHDH

Data Base:

- o Existing bleaching stages are uncontrolled.
- o Emissions of Cl_2 are based on Cl_2 loadings to the new bleach plant scrubbers, ratioed to existing bleach plant production levels.
- o Emissions of ClO_2 are based on ClO_2 loadings to the new bleach plant scrubbers, ratioed to existing bleach plant production levels.

Calculations:

A. Existing Cl_2 Stage

(emissions from New Plant) ÷ (1 - New Scrubber Eff.)
x $\frac{\text{Existing Bleach Production}}{\text{New Bleach Production}}$ = Existing Bleach Plant Cl_2 Emissions

(12 T/Yr.) ÷ (1 - .93) x $\frac{285}{1400}$ = 35 Tons/Yr. Cl_2 from existing bleach plant.

B. Existing ClO_2 Stage

Formula same as A - substitute ClO_2 data for new bleach plant scrubbers.

- o New Bleach Plant ClO_2 emissions = 11 T/Yr.
- o New Bleach Plant ClO_2 scrubber eff. = 90% (minimum)

(11 T/Yr.) ÷ (1 - .90) x $\frac{285}{1400}$ = 22 T/Yr. ClO_2 emissions from existing bleach plant.

EMISSIONS CALCULATIONS

FOR

NEW CHLORINE DIOXIDE GENERATOR

A. STORAGE TANK VENT SCRUBBER

Data Base:

Air Flow	150 SDCFM
Residual Chlorine	5 mg/l
Residual Chlorine Dioxide	0.5 mg/l
Operating Hours	8400

Factors: F_1 = 454,000 mg/lb

F_2 = 28.3 l/ft.^{3}

F_3 = 60 min/hr

Calculations:

(Flow) x (Residual) x F_2 x F_3 ÷ F_1 = #/Hour

(#/Hour) x (Operating Hours) ÷ 2000 = Tons/Year

Cl_2 : (150) x (5) x (28.3) x (60) ÷ (454,000) = 2.8 #/Hour

(2.8) x (8400) ÷ 2000 = 12 Tons/Year

ClO_2: (150) x (0.5) x (28.3) x (60) ÷ (454,000) = 0.28 #/Hour

(0.28) x (8400) ÷ 2000 = 1.2 Tons/Year

B. TAIL GAS SCRUBBER VENT

Data Base:

Air Flow	1000 SDCFM
Residual Chlorine	0.5 mg/l
Residual Chlorine Dioxide	1.0 mg/l
Operating Hours	8400

Factors: F_1 = 454,000 mg/lb
F_2 = 28.3 l/ft.^{3}
F_3 = 60 min/hr

Calculations:

(Flow) x (Residual) x F_2 x F_3 ÷ F_1 = #/Hour
(#/Hour) x (Operating Hours) ÷ 2000 = Tons/Year

Cl_2 : (1000) x (0.5) x (28.3) x (60) ÷ 454,000 = 1.9 #/Hour
(1.9) x (8400) ÷ 2000 = 8 Tons/Year

ClO_2: (1000) x (1.0) x (28.3) x (60) ÷ (454,000) = 3.7 #/Hour
(3.7) x (8400) ÷ 2000 = 16 Tons/Year

C. TOTAL EMISSIONS

2 (Storage vents) + (Tail Gas)

Cl_2 : 2 (12) + (8) = 32 Tons/Year
ClO_2 : 2 (1.2) + (16) = 18 Tons/Year

NOTE: The emission rates are based on worst case operation.
Final design bases will be provided prior to construction.

EMISSION CALCULATIONS

FOR

EXISTING CHLORINE DIOXIDE GENERATOR

Data Base:

- Existing ClO_2 generator is an R-2 rated at 6 tons/day.
- The existing generator has a tail gas scrubber but no storage tank vent scrubbers.
- Emissions of Cl_2 and ClO_2 from the tail gas scrubber are based on loadings to the new tail gas scrubber ratioed to existing rated generator production.
- Emissions of Cl_2 and ClO_2 from the storage vents are based on loadings to the new ClO_2 storage vent scrubbers ratioed to existing rated generator production. The new scrubbers have a 50% efficiency for Cl_2 and 92% for ClO_2.

Calculations:

A. Existing tail gas scrubber

(Emissions from new tail gas scrubber) x $\frac{\text{Existing } ClO_2 \text{ Generator Production}}{\text{New } ClO_2 \text{ Generator Production}}$

Cl_2 : (8) * 6 ÷ 16 = 3 T/Yr.

ClO_2: (16) * 6 ÷ 16 = 6 T/Yr.

B. Existing ClO_2 storage tank vents

(Emissions from new vent scrubbers) ÷ (1 - efficiency)

* Existing ClO_2 Generator Production ÷ New ClO_2 Generator Producion

Cl_2: (24) ÷ (1 - .5) * (6) ÷ (16) = 18 Tons/Year

ClO_2: (2.4) ÷ (1 - .92) * (6) ÷ (16) = 12 Tons/Year

C. Total Existing Emissions

Cl_2 : 3 + 18 = 21 tons/year

ClO_2: 6 + 12 = 18 tons/year

EMISSION COMPUTATIONS
FOR
LIME SLAKER SCRUBBER

Data Base:

ACFM	12,500
SDCFM	3,700
Temperature	190°F
Gr/SDCFM Residual(max)	.05
Operating hrs./Yr.	8,400

Calculations

$$\frac{\text{Flow (SNCFM)} \times \text{Gr. Residual/SDCF} \times \text{Min/Yr.}}{\text{Gr. per Lb.}} \times \text{Operating Hrs.} \div 2{,}000 = \text{Tons/Yr. Emission}$$

$$\frac{3{,}700 \times .05 \times 60}{7{,}000} \times 8{,}400 \div 2{,}000 = 6.7 \text{ Tons/Yr.}$$

NOTE: Data Base is a preliminary estimate. Final design data will be provided prior to construction.

The existing Lime Slaker will be shutdown.

EMISSION COMPUTATIONS
FOR
SALT UNLOADING

Data Base:

Usage	17 Tons/Day
Dusting	1%
Scrubber Efficiency	99%
Truck Capacity	20 Tons/Truck
Unloading Rate	10 Tons/Hour
Operating Days/Yr.	350

Calculations

(Unloading Rate) x (Dusting) x (1-Scrubber Efficiency) x 2000 #/ton = #/hour

(#/Hour) x (Usage) ÷ (Unloading Rate) x (Operating Day) ÷ 2000 #/ton = Tons/Year

(10) x (0.01) x (1-.99) x 2000 = 2 #/Hour

(2) x (17) ÷ (10) x (350) ÷ 2000 = 0.6 Tons/Year

October 10, 1985

Champion International @ BAQM

Attendees

Bill Thomas	BAQM-CAPs	904-488-1344
Bruce Mitchell	BAQM-CAPs	904-488-1344
Tom Moody	DER PENSACOLA	904 436 8360
Charles Ayer	Champion (STAMFORD)	203-358-7117
DAVID ARCENEAUX	CHAMPION (HOUSTON)	713-575-5703
ED CLEM	CHAMPION (STAMFORD)	203-358-7847
DICK WIGGER	"	203-358-7246
FRANK WESTMARK	✓	904-968-4225
BILL THOMAS	DER-BAQM	904-488-1344
Mike Hadley	DER-BAQM	904-488-1349

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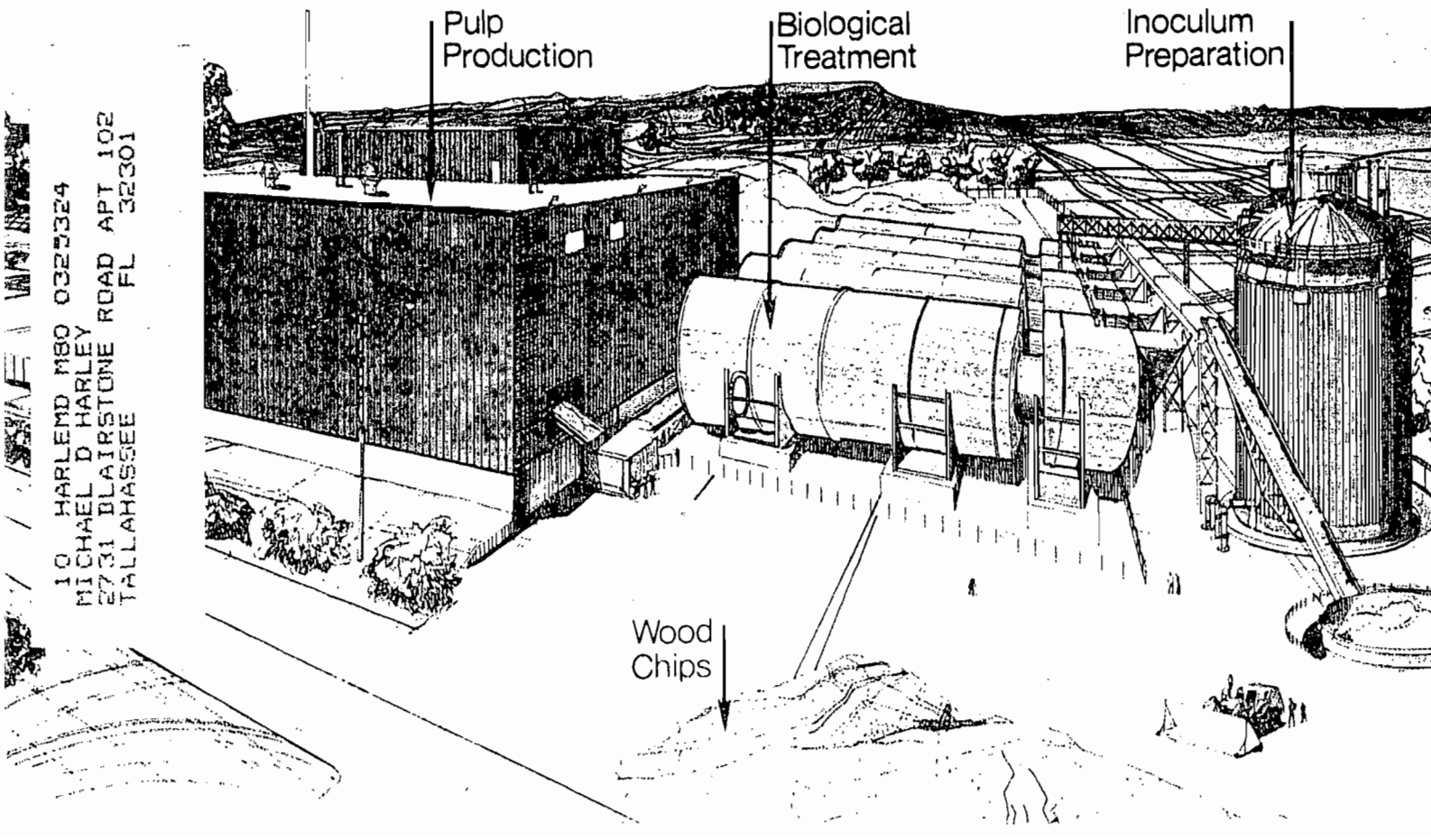
Bioprocessing of Wood Chips for Pulp Production



Delignifying high-yield pulps with oxygen and alkali

P. J. Kleppe and S. Storebraten*
M. Peterson & Son A/S, 1501 Moss, Norway

A plant has had four years of mill-scale experience with an oxygen/alkali delignification of medium-consistency pulp. Polysulfide pulp of kappa no. 60 is taken straight from the blowline of a dual-vessel Kamyr digester and delignified with oxygen and alkali to kappa no. 30. The pulps require less active bleaching chemicals, have a 3-4% higher bleached yield than conventional kraft pulps of kappa no. 30, and are used for the production of greaseproof paper, sackpaper, and top-layer linerboard. Presulfonation enhances kappa number reduction.

Laboratory experiments of a new two-stage pulping process for the production of sackpaper-grade pulps have been conducted. Compared with conventional kraft pulping, polysulfide pulping to kappa no. 100-110 followed by oxygen/alkali delignification to kappa no. 75 will yield about 20% higher pulp production without increasing wood consumption. The new pulp will improve important sackpaper properties such as tensile energy absorption (TEA) and porosity. High-consistency refining in a Frotapulper followed by high-consistency refining in a disc refiner may be needed to obtain the required tear strength.

Keywords: Delignification • Polysulfide pulping • Digestion • Sulfonation • Bleaching • Kappa number

In the future, a pulp mill's profitability will depend on minimizing expenditures for raw materials and investments, on stable pulp quality, on reducing consumption of oil-based energy, and on compliance with environmental regulations at low cost. Adoption of oxygen/alkali delignification of high-lignin-content kraft or polysulfide pulps may be the way to achieve most of these basic requirements for a profitable mill.

The potential for industrial use of oxygen/alkali delignification of high-yield softwood kraft and soda pulps was demonstrated in laboratory studies more than 14 years ago (*1-4*). Subsequently, mill-scale oxygen/alkali-delignification experiments on high-yield softwood pulps were started in September 1975 (*5*).

Polysulfide pulps of kappa no. 50-60 were taken straight from the blowline of the dual-vessel Kamyr digester at 8-9% consistency, heated by direct steam to about 105°C, defibered, and mixed with oxygen and alkali in an in-line refiner. From the refiner, the pulp passed through a reactor at a retention time of 30-40 min. The reactor, which was an old, rebuilt batch digester, used compressed air to maintain pressure at about 0.5 MPa. Using 2.5% oxygen and 3.5% sodium hydroxide (on pulp), the kappa number was reduced by 25 units without lowering the strength of the pulp. The capacity of the pilot plant was 100 tons of oxygen/alkali-delignified pulp per day.

Production experience

Based on the pilot plant trials, a new Kamyr medium-consistency (MC) oxygen/alkali-delignification plant with a designed capacity of 150 tons of pulp per day was started up in 1980. The installation, which incorporates several pieces of novel equipment (*6*), is depicted in Fig. 1.

The pulp is taken straight from the blowline of the Kamyr digester through a small flow-splitting device. The splitter acts as a coarse screen that prevents knots as well as foreign material from entering the plant. The pulp is blown to a receiver standpoint from where an MC pump is feeding the reactor system.

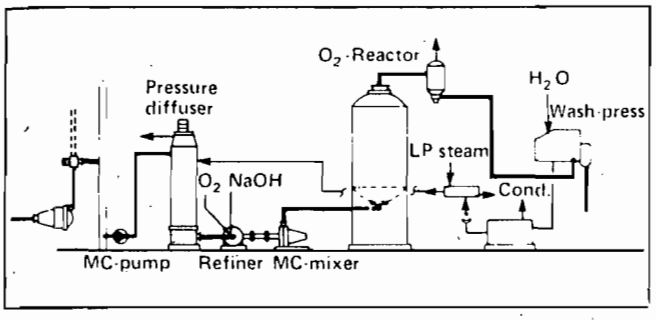
Heat economy and oxygen consumption are optimized by placing the prototype of the pressure-diffuser washer ahead of the reactor. This allows the black liquor in the pulp from the digester to be displaced by hot, recycled, oxidized liquor extracted from the wash press located after the reactor. A small flow of indirect low-pressure steam (0.2 ton/a.d. ton) is sufficient to achieve the required process temperature. The heat economy of the MC oxygen/alkali-delignification process is thus comparable with the high-consistency system.

The pressure-diffuser washer is followed by a small, 24-in. (610 mm), in-line disc refiner that defibrates the pulp at 750 rpm (8 kW·h/ton of pulp). This is then followed by an MC mixer for final dispersion of the oxygen gas, which is added at the inlet of the refiner. The alkali is added at the periphery of the refiner housing. The reactor is hydraulic and is equipped with a specially designed distributor in the bottom and a scraper at the top. Total power consumption for the plant is 50-60 kW·h/a.d. ton.

The pulp is blown from the reactor to a small flash cyclone where the pulp is diluted to 3-4% consistency before being pumped to the wash press. The wash liquor from the wash press is transported countercurrently through the pressure diffuser, where it joins the main stream of the wash liquor in transit to the digester. The pulp leaves the wash press at about 40% consistency to an outside storage area, where the stock is loaded into open

*Present address: Tofte Industrier A/S, N-3482 Tofte Hurum, Norway.

1. Flowsheet for oxygen/alkali-delignification plant.



trucks for delivery to a nearby bleach plant. There the oxygen/alkali-delignified pulp is bleached to an ISO-brightness of about 83% in a CEH sequence with peroxide in the extraction stage.

About two-thirds of the bleached pulp is used in making 20,000 tons/year of high-quality greaseproof paper. The rest of the bleached pulp is used to produce the top layer of a specialty linerboard grade (Petawhite) and also to produce sackpaper.

The new oxygen/alkali-delignification plant has now been in operation successfully for four years, with a reduction in kappa number from 60 to 30 for the polysulfide pulp. Both sodium hydroxide and fully oxidized white liquor are used as an alkali source in the reactor. By using oxidized white liquor instead of pure sodium-hydroxide liquor, the charge of oxygen and alkali has to be increased by about 20% to maintain the same kappa number reduction (*7*). Addition of magnesium salts for protection of the carbohydrates has not been necessary in our system.

We have discovered that pretreatment of the high-yield pulp with waste sulfite liquor from the stack-gas scrubber results in improved kappa number reduction at the oxygen/alkali-delignification stage (*8*). At an oxygen charge of 35 kg/a.d. ton and an alkali charge of 42 kg/a.d. ton, kappa number reduction without sulfite pretreatment was 32 units. With a sulfite pretreatment of 30–40 kg/a.d. ton, the kappa number fell by 40. The incidental conditions were a pH of 8–9.5, a reactor pressure of 0.6 MPa, inlet temperature of 104°C, and a retention time of 35 min. The polysulfide pulps were at an initial kappa number of 60–70.

2. Current yields.

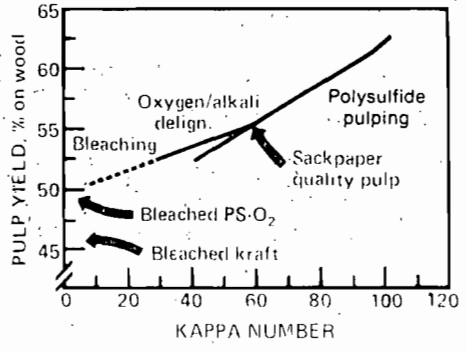


Figure 2 shows the high yields obtained in the production of sackpaper-quality pulp and oxygen/alkali-delignified pulp from spruce. Polysulfide pulping to a fairly high kappa number has resulted in about 10% lower wood consumption/ton of pulp than obtained with conventional kraft pulping. The high yield of the bleached polysulfide/oxygen pulp, 49–50% on o.d. wood, is caused mainly by higher retention of hemicellulose: as a result, the pulp can be beaten quite easily.

The pulp yield has recently been further enhanced by 1–1.5% on o.d. wood by the addition of anthraquinone to the pulping liquor at the rate of 0.6 kg/a.d. ton. A corresponding effect of anthraquinone has been reported earlier (*9*). The pulpwood for the mill is a mixture of Norway spruce and Scotch pine, and about 60% of the wood supply comes as chips from sawmills.

Pulp properties

The suitability of the bleached polysulfide/oxygen pulp for production of sackpaper is demonstrated in Table I. The most important sackpaper properties, TEA, porosity, and tear strength, are all comparable with those of sackpaper made from a conventional bleached softwood kraft pulp. All three pulps were beaten at high consistency (35–37%) in a Frotapulper before low-consistency refining (4%) in disc refiners. The bleached polysulfide/oxygen pulps possess good strength properties even at rather low viscosity.

Table II demonstrates the bleachability of oxygen/alkali-delignified high-yield polysulfide pulps compared with conventional kraft pulps (*10*) of equal lignin content. Both pulp types are bleached to a brightness of 88–89% ISO at mill scale. The oxygen/alkali-delignified pulp requires only four stages, with a consumption of 70 kg of active chlorine and 7 kg of peroxide/ton of pulp, as opposed to five stages with a consumption of 112 kg active chlorine for conventional kraft pulp.

Sackpaper production

An earlier study of the soda oxygen process (*11*) indicated that oxygen/alkali treatment of high-lignin-content kraft pulps could be used to obtain paper with improved elongation properties. This was indeed the case, as shown by Storebraten and Kvitvang (*12*).

Table III gives a comparison of papermaking properties between a regular kraft pulp (kappa no. 45) and a high-yield kraft pulp delignified with oxygen and alkali (kappa no. 75). By proper adjustment of the kappa number before and after the oxygen/alkali stage, it is possible by beating to obtain the same strength development for an oxygen/alkali-delignified kraft pulp as for a regular kraft pulp. The same applies to high-kappa-number polysulfide pulps delignified with oxygen and alkali, as also shown in Table III. A mill trial has verified the promising results from the

I. Strength characteristics of sackpaper produced from a conventional bleached kraft pulp and from two oxygen/alkali delignified polysulfide pulps

	Brightness, % ISO	Intrinsic viscosity, dm^3/kg	TEA, J/g		Tear index, Nm^2/kg	Gurley air resistance
			MD	CD	MD	
Conventional	89	>900	1.42	1.45	14.5	23
C/DE/PHD	88	790	2.01	1.67	13.7	24
CE/PH	82	550	1.70	1.28	12.5	22

II. Bleachability of a conventional kraft pulp and an oxygen/alkali delignified polysulfide pulp

	Conventional	$PS-O_2$
Bleached yield, % on wood	45.5	49
Brightness, % ISO	89.5	88
Intrinsic viscosity, dm^3/kg	950	790
Total active chlorine, kg/a.d. ton	112	70
Peroxide, kg/a.d. ton	...	7
Alkali, kg/a.d. ton	36	43

III. Papermaking properties

Pulp	Yield, % on wood	Beating, rev. PFI	TEA, J/kg	Gurley air resistance
		Sackpaper quality		
Kraft	51	6000/LC	2750	7
		8000/HC	2950	6
Kraft/oxygen	58	6000/LC	3300	7
		6000/HC	3500	6
PS	54	5000/HC	3100	7
PS/oxygen	61	7000/HC	3700	6

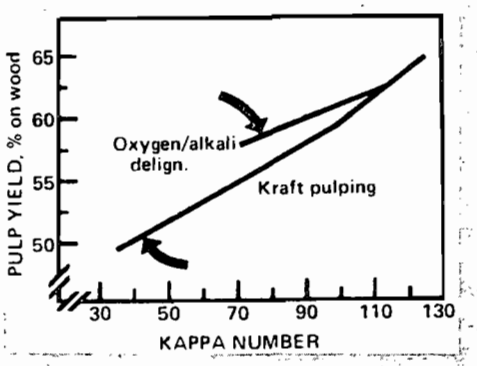
LC = low consistency, HC = high consistency. Freely dried handsheets.

IV. The influence of refining consistency on the tear strength of freely dried handsheets made from a polysulfide pulp of kappa no. 65

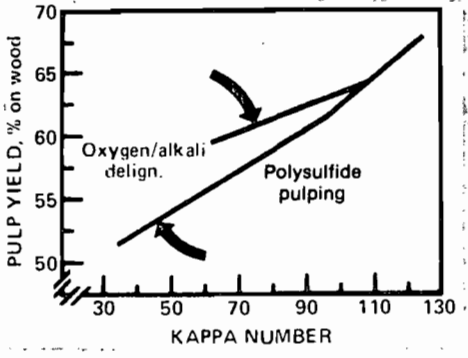
Consistency	Tear index, Nm^2/kg	Tensile index, kNm/kg	Elongation, %	TEA index, J/kg	Gurley air resistance
Low	18	72	8.5	3500	25
Medium	20	63	9.5	3500	14
High	22	53	11.4	3700	10

Frotapulper treatment at 35% consistency followed by disc refining at 4.5% (LC), 13% (MC), or 28% consistency in Sprout Waldron 13-in. lab refiner.

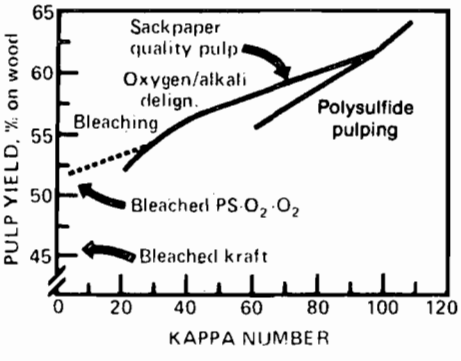
3. Pulp yield as a function of kappa number for conventional kraft pulping and for kraft pulping to kappa no. 110 followed by oxygen/alkali delignification.



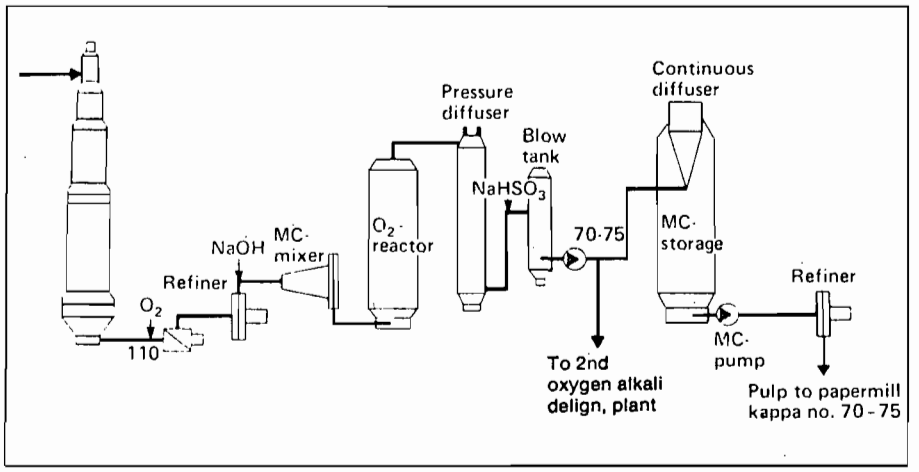
4. Pulp yield as a function of kappa number for polysulfide pulping and for polysulfide pulping to kappa no. 104 followed by oxygen/alkali delignification.



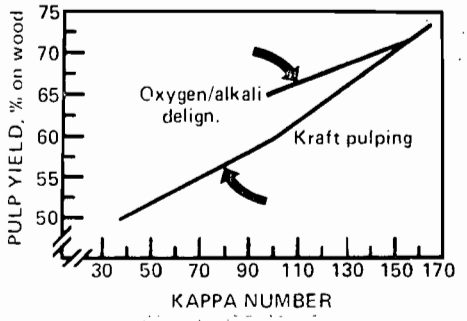
5. Anticipated yields for bleached and unbleached polysulfide/oxygen pulps.



6. Proposed high-yield pulping process for production of sackpaper-quality pulp.



7. Pulp yield as a function of kappa number for conventional kraft pulping and for kraft pulping to kappa no. 155 followed by oxygen/alkali delignification.



laboratory experiments.

Thus, the use of oxygen/alkali delignification of high-lignin-content kraft and polysulfide pulps will result in a considerably higher pulp yield than obtained with conventional kraft pulping, without lowering the important sackpaper properties of TEA and porosity. In fact, these properties may be improved. The kappa number reduction at the oxygen/alkali stage is the main parameter governing the production of an easily beaten, high-yield pulp (*12*). The kappa number reduction at the oxygen/alkali stage normally should be in the range of 15–50 units for final pulp yields of 55–65% on o.d. wood.

An oxygen/alkali-treated high-yield pulp does not yield paper with the same high tear strength as conventional low-kappa-number kraft pulps. However, we believe that high-consistency treatment in a Frotapulper, followed by disc refining at 10–35% consistency, will give sackpaper with more than the required tear strength. Even the TEA and the porosity of the sackpaper will be improved by this method of refining, as shown in Table IV.

The anticipated yields for high-yield oxygen/alkali-treated kraft and polysulfide sackpaper-quality pulps are shown in Figs. 3 and 4. Conventional kraft or polysulfide pulping of spruce chips (*Picea abies*) is interrupted at about kappa no. 110, at which point they are defibered in a refiner and then further delignified with oxygen and alkali at 10% consistency.

Compared with conventional kraft pulping to kappa no. 45, the proposed two-stage pulping process will result in approximately 14% higher production capacity when kraft/oxygen pulping to final kappa no. 75 is applied without changing the input of pulpwood. In the case of polysulfide/oxygen pulping, an even higher capacity gain will be obtained. In our pulp mill, the new two-stage polysulfide/oxygen process will result in both wood savings and higher production capacity. Bleached pulp yield will also be improved, as shown in Fig. 5.

A flowsheet of the proposed two-stage delignification process is depicted in Fig. 6. The new process equipment includes a tramp-material separator, an in-line disc refiner, a MC mixer, a pressure diffuser, a hydraulic oxygen reactor, and a small blow tank. A new MC pump is also included. Pretreatment of the pulp with sulfite liquor before the second oxygen/alkali-delignification stage should make a kappa number reduction of 40 units possible in a single step (*7*).

Linerboard production

High-yield pulps for production of linerboard can also be produced in a two-stage pulping process. The kraft or polysulfide pulping stage is interrupted at kappa no. 140–150. After defibering the cooked chips in an in-line refiner, the pulp is further delignified by oxygen and alkali to a final kappa no. of about 110. Compared with conventional kraft pulping, the yield gain will be considerable, as illustrated in Fig. 7.

Table V shows that the strength properties of the kappa-no.-110 kraft/oxygen pulp is comparable with the strength properties of a conventional kraft pulp of kappa no. 80. Edge stiffness, the important property for linerboard, is expected to be even higher for board made from the high-yield kraft/oxygen pulp because of the high hemicellulose content in the pulp.

A proposed configuration for the process equipment to be used in the production of high-yield kraft/oxygen linerboard pulps, and possibly to be combined with sackpaper-quality pulp production, is shown in Fig. 8.

V. Papermaking properties for a kraft pulp and a high-yield kraft pulp delignified with oxygen and alkali

Pulp	Yield, % on wood	Beating, rev. PFI	Density, kg/m³	Tensile index, kNm/kg	TEA, J/kg
Kraft	56	8000/LC	665	92	1910
Kraft/ oxygen	66	6000/LC	665	94	1860

A pulp mill of the future

The model shown in Fig. 9 incorporates good mixing of the softwood chips and chip-thickness screening. Pulping is done in a continuous dual-vessel digester system with polysulfide (Moxy) cooking liquor (*13*) supplemented by the addition of small amounts of anthraquinone. The control of white liquor sulfidity is accomplished by dissolving liquid sulfur in the cooking liquor. The pulp from the digester is refined in the blowline and further delignified with oxygen and alkali to the required kappa number. The pulp is then multistage washed, deshived in a refiner, and finally transferred to the paper or board mill. For a mill producing two pulp grades from the same digester, a second MC oxygen/alkali-delignification stage is needed for the production of lower-kappa-number pulps.

The alkali used for the oxygen/alkali-delignification stages should be fully oxidized white liquor, and it should be applied with compressed air and a carbon catalyst for oxidation (*13*). Most of the sulfur dioxide in the stack gases from the recovery boiler would be absorbed in a scrubber using fully oxidized white liquor or a sodium carbonate solution as the alkali source. The sodium carbonate solution could be a dilute waste liquor from chemical or petrochemical industries. A major part of the waste sulfite liquor from the scrubber would be used for presulfonation of the pulp before the oxygen/alkali-delignification stage, thereby enhancing the kappa number reduction and returning the "chemicals" back to the recovery cycle. A part of the sulfite liquor could also be used for postsulfonation of the pulp before chlorine bleaching and/or added to the effluent from the bleach plant to reduce the mutagenicity and toxicity of the effluent water (*14*).

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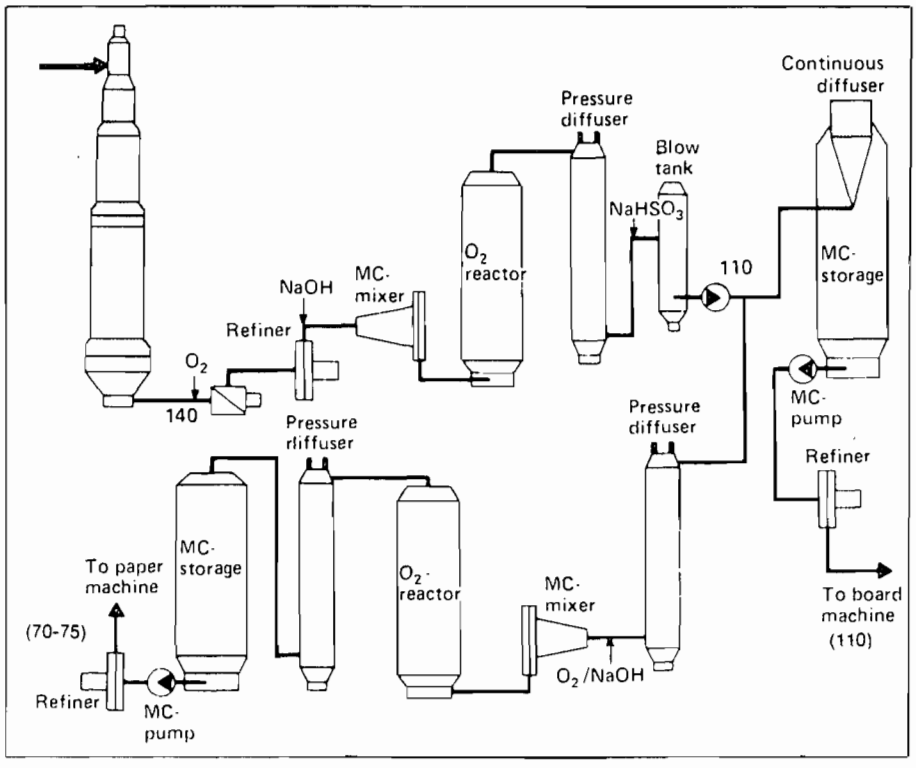
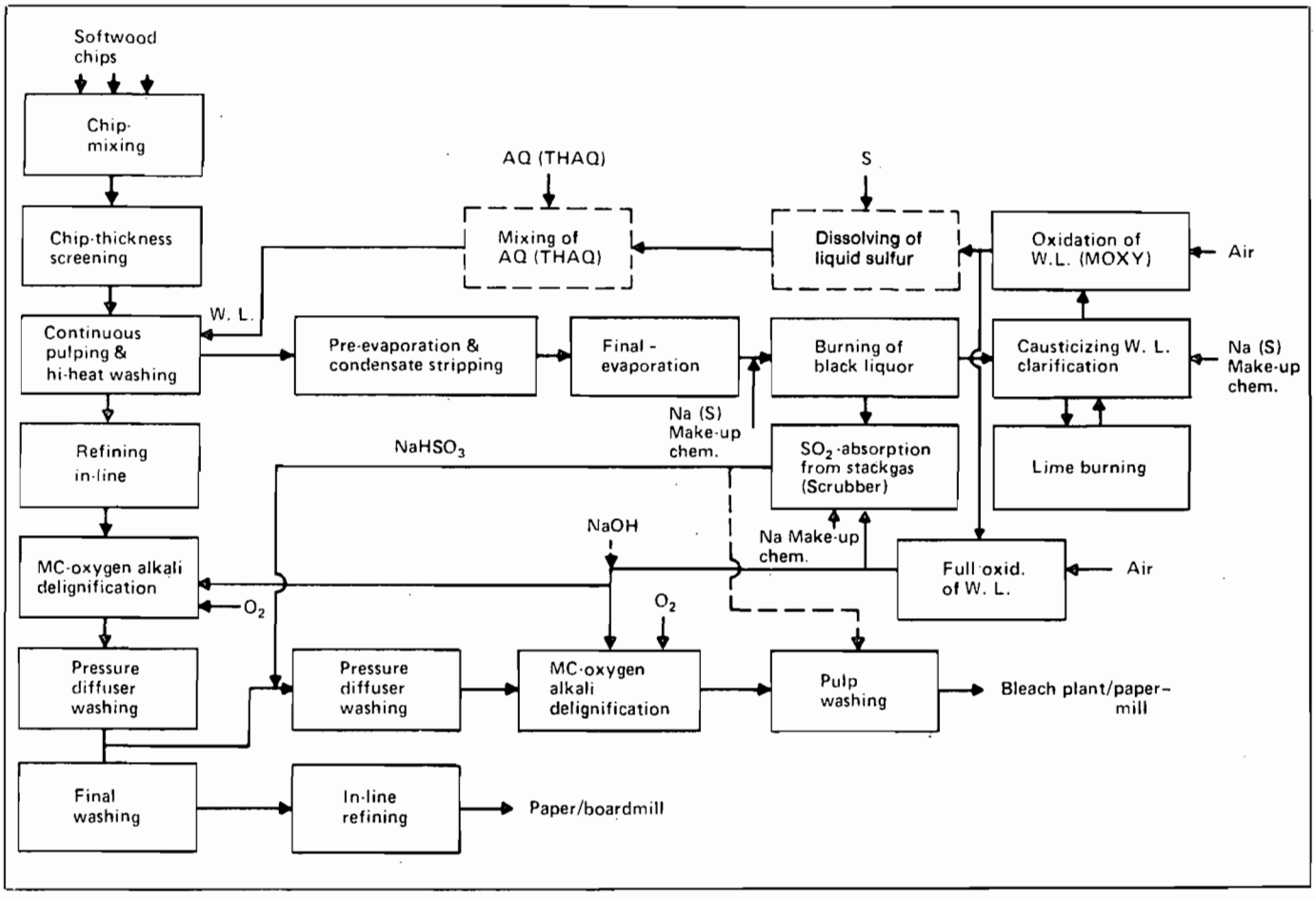
8. Proposed high-yield pulping process for production of linerboard pulp.



9. A pulp mill of the future.



the fact that the substituted quinones interfere with the residual chlorine determination and thus give unreliable data for chlorine consumption. We therefore do not know the distribution of chlorine between these two reactions, nor can we tell which one is the most important. So much is certain, however, that both are needed for satisfactory prebleaching, and one must not shorten chlorination time unduly. This holds particularly for sulphate pulps whose lignin is less reactive than that of the sulphites and the oxidation of which during the latter part of chlorination contributes materially to lignin breakdown and removal.

Practical application. As in any chemical system there are a number of variables that determine the results of bleaching of any given pulp, and we have five important ones for each stage. These are percent of reagent upon fiber, concentration of the reagent in the system, temperature, reaction time, and pH of system.

Percent of reagent upon fiber. The objective is to achieve a maximum lignin reduction in chlorination (and alkaline extraction), and the chlorine dosage is therefore determined by the lignin content of the unbleached pulp. Taking its Roe, Kappa, permanganate, or similar number as a measuring stick, it is customary to apply a set fraction of the indicated total requirement, usually between 60 and 70%. As was shown previously, delignification does not necessarily parallel the uptake of chlorine, and sulphite pulps require less chlorine per weight unit of lignin than sulphate pulps. The relative effect should therefore be checked in each mill by the determination of the pulp's Kappa number, etc., after alkaline extraction. For approximate guidance it is mentioned that sulphite pulps may require from 2 to 6% chlorine, sulphate pulps from 3 to 8%, and semichemical pulps from 10 to 15%.

Underchlorination must be avoided, because we cannot compensate for it later by severer conditions in subsequent stages and obtain high brightness without damage to the fibers. Overdosage is similarly dangerous when reaction time is excessive and temperature is high. Under such conditions chlorine may act upon the actual linkage of the cellulose chain and cleave it hydrolytically and oxidatively, thereby causing immediate strength loss. It may also form carbonyl groups in positions 2, 3, and 6, which would make the fiber susceptible to alkaline degradation and brightness reversion.

The dosage control is, therefore, very important. For many years mills used to control dosage by aiming at a set residual chlorine at the end of chlorination (say about 0.15 to 0.20% Cl on pulp). This practice is not recommended. First, as already stated, the customary iodine titration is liable to give erroneous information because of the interference of the substituted quinones, and, second, even if it were reliable, it could only tell what should have been done but not what is required now. Quite satisfactory dosage regulation is achieved by correctly installed oxidation-reduction potential (ORP) control as described in a later part of this chapter. In the absence of this control, chlorine application calculated as a fixed fraction of the Kappa number is very useful; when this is done, residual chlorine may be disregarded.

Concentration of the reagent in the system. This is a function of stock density and chlorine dosage on pulp. For purely practical reasons, particularly with regard to pumping, all chlorinations are performed at low stock consistency, generally between 3 and 4%. Even at such low consistency we approach in the case of some sulphate pulps in the warmer regions of the United States the limits of water ability to dissolve chlorine.

The equilibrium saturation value for 760 mm partial pressure is very close to 10 g/1,000 g at 10°C. (At lower temperatures chlorine hydrate crystals $Cl_2 \cdot 8H_2O$ are formed.) Practical solubility is about one-half of the theoretical, and at 30°C, which is not at all uncommon, we can expect approximately 2.8 g/1,000 g as saturation limit. This strength corresponds to 6.7% chlorine on stock at 4% o.d. consistency.

It is therefore obvious that intimate mixing of chlorine with water and then with pulp is essential for good results. Only complete dispersion of chlorine in water and homogeneous blending of this dispersion with pulp give a reliable basis for the start of the reaction. If this chlorine gas is not completely dispersed,

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TABLE 5-2 WATER STABILITY ANALYSIS: PEROXIDE BLEACH LIQUOR

Components of bleaching solution	*Water*	*Stability, % of original H_2O_2 remaining after days of storage*	
		2 days	*3 days*
$H_2O_2 + NaOH + Na_2SiO_3 + MgSO_4$	River[a]	100	98.5
	Distilled	100	96.5
$Na_2O_2 + NaOH + Na_3SiO_3 + MgSO_4$	River	93.7	93.0
	Distilled	—	—
$Na_2O_2 + H_2O_2 + NaOH + Na_2SiO_3 + MgSO_4$	River	100	93.7
	Distilled	93.7	93.7

[a]River water analysis: Fe, 2.7 ppm; Cu, 0.03 ppm; Mn, negligible; hardness, 34 ppm; pH, 7.2.
Source: St. Regis Paper Company, unpublished data.

COMPONENTS OF PEROXIDE BLEACHING SOLUTIONS

5-14 WATER

The purity of water used as makeup in peroxide solutions affects the stability of the solution during storage. The use of impure water can result in a waste of significant amounts of peroxide. It can also constitute a hazard when used in conjunction with concentrated (50 to 70% by weight) peroxide solutions.

The purity of water from a given source seldom remains constant. It will vary with the season and perhaps with the operation of the local water treatment plant. It is difficult to specify the requirements for water purity, but the water should be low in organic matter, dirt, and heavy-metal ions. Distilled water is neither required nor desirable, since the presence of hardness ions has been shown to improve peroxide stability.[31] It is best to check water intended for peroxide solution makeup by taking samples for makeup of standard bleaching solutions and testing these solutions for peroxide content after various periods of storage. The results of such an analysis are shown in Table 5-2. In this particular study, the suitability of river water was compared with that of distilled water for bleach solutions made up from hydrogen peroxide, sodium peroxide, or a mixture of both. The stability of the solutions was checked after storage for 2- and 3-day periods by analyzing for residual peroxide.

5-15 MAGNESIUM SULPHATE

Magnesium sulphate is available in 100-lb bags as hydrated crystalline epsom salts ($MgSO_4 \cdot 7H_2O$). It reacts with sodium silicate to form magnesium silicate, which seems to inhibit the catalytic effect of metal ions on the decomposition of peroxide. Some peroxide solutions exhibit sufficient stability without the addition of epsom salts. This anomaly may be due to the contribution of sufficient calcium or magnesium ions from the natural hardness of some waters. The normal requirement of epsom salts is about 1 to 2 lb per 1,000 gal of water.[26]

5-16 SODIUM SILICATE

Silicate of low iron content should normally be used. It may be obtained in steel drums or steel tank cars. A solution of 41.6° Bé, containing 29% SiO_2 and 11.5% equivalent NaOH, has been commonly employed. Silicate glass may also be used, but special pressurized equipment is required to dissolve the glass.

5-17 PEROXIDES—HYDROGEN VS. SODIUM PEROXIDE

Hydrogen peroxide (H_2O_2) and sodium peroxide (Na_2O_2) are interchangeable if applied on the basis of equivalent active oxygen content.

$$\underset{156}{2Na_2O_2} + 2H_2O = \underset{160}{4NaOH} + \underset{68}{2H_2O_2} \quad (5\text{-}3)$$

nd to enable the hypochlorite
job at the low consistency
perature should be near 30°C,
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reasons milk of lime is the pre-
ing agent, and it is important
screened (<150 mesh) so that
ckly and no dirty pulp results.
enerally exclude the C/H com-
from the first place in a bleach
sequence CEC/H has some

ture reports that the presence of
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is beneficial with regard to
strength retention when excess
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These findings should be con-
each plant design, but such a
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id (NH_2SO_2OH), as well as cer-
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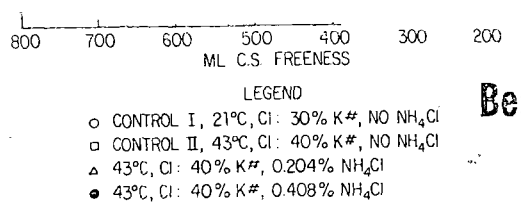


Fig. 11-8 Southern pine pulp. Effect of ammonium chloride addition to the chlorination stage in a CEHDP sequence. Mullen values of bleached pulp.

of these actions is still being debated. Under certain conditions of excessive temperature the protection can be quite appreciable, as shown in Figure 11-8 for bursting strength and in Figure 11-9 for tear resistance of a southern pine pulp bleached in the laboratory in a CEHDP sequence.

ALKALINE EXTRACTION

For the attainment of brightness with strength preservation, for brightness stability, and bleaching economy, it would be helpful if the reaction products resulting from chlorination and oxidative bleaching were removed as they were formed in those operations. The restricted solubility of most of these products in the aqueous phase under the prevailing reaction conditions makes such an undertaking difficult, and at present we also lack suitable equipment. Drainage and washing eliminates generally only about half of this material. The solution of the remainder can be accomplished

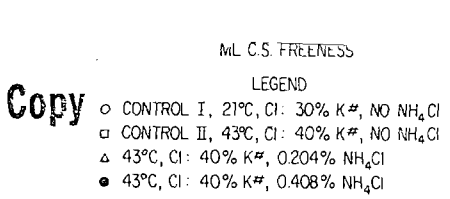


Fig. 11-9 Southern pine pulp. Effect of ammonium chloride addition to the chlorination stage in a CEHDP sequence. Tear values of bleached pulp.

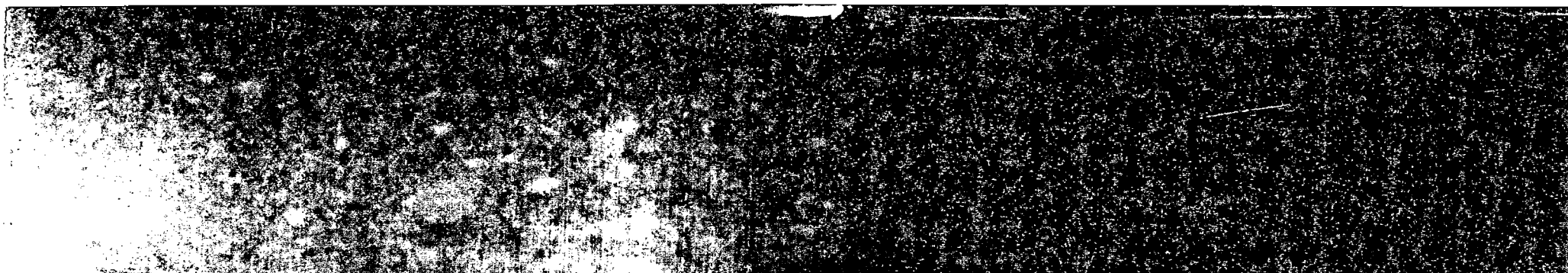
with strong bases such as the hydroxides and sulphides of the alkali metals, calcium hydroxide, and similar substances. This work is performed in a separate treatment known as alkali extraction. Such an extraction should, therefore, follow each oxidative step (except the final bleaching stage), and we thus find as a rule two or more extraction stages in the more sophisticated installations.

Most of the chemicals applied also dissolve resinous material, pentosans, and other low-molecular carbohydrates and are therefore useful in pulp purification. It was, in fact, for this very purpose that the alkaline extraction was originally introduced into pulp bleaching by the manufacturers of dissolving pulp. Application in paper pulp bleaching followed later, essentially coinciding with the acceptance of pulp chlorination.

The alkaline extraction is very important as a final major step in the pulp preparation for brightness development, and it is perhaps not always given the attention it deserves. Because of its basic simplicity it is much more

caustic reduces, as a rule,
of the more expensive
agent on a pound of NaOH
chlorine basis. This operati
peratures below 50°C, for
at low consistency, requi
to 0.5% NaOH on pulp. T
wash between two chlori
phate pulp bleaching is q
case, there is also the inte
areas for the topochemica
rine. Depending on co
more caustic may be requ

In the manufacture o
grade pulps reaction co
severe, particularly with su
lignin degradation produc
more substantial nature, a
deal with some dyelike p
bilization is a matter of
considerable time and acc
temperatures. The amoun
depends on the Kappa
bleached pulp and the ext
there are also definite rel
caustic consumption and
and stock concentration.
ables must be well coordin
ficiency in any one of th
whereas too drastic cond
the shrinkage of the pulp.
ditions must be determined
according to its objective



g cost;[40] and the
ickly and easily to
mand. Such a sys-
or a mixed peroxide

are metered to the
silicate to the sec-
lrogen peroxide to
cascade-type mix-
should be predis-
h of 1 lb/gal. The
partment flows by
of a loss-in-weight
dium peroxide. Hy-
ay be metered into
ther than added to
The system may be
atically by various
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of each metering
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micals. This system
both hydrogen and
the sodium or the
is preferred, the un-
e may be replaced
or a solution of caus-
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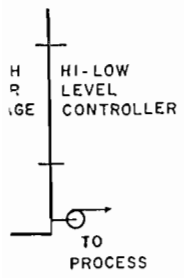

TABLE 5-2 WATER STABILITY ANALYSIS: PEROXIDE BLEACH LIQUOR

Components of bleaching solution	*Water*	*Stability, % of original H_2O_2 remaining after days of storage*	
		2 days	*3 days*
$H_2O_2 + NaOH + Na_2SiO_3 + MgSO_4$	River[a]	100	98.5
	Distilled	100	96.5
$Na_2O_2 + NaOH + Na_2SiO_3 + MgSO_4$	River	93.7	93.0
	Distilled	—	—
$Na_2O_2 + H_2O_2 + NaOH + Na_2SiO_3 + MgSO_4$	River	100	93.7
	Distilled	93.7	93.7

[a]River water analysis: Fe, 2.7 ppm; Cu, 0.03 ppm; Mn, negligible; hardness, 34 ppm; pH, 7.2.
Source: St. Regis Paper Company, unpublished data.

COMPONENTS OF PEROXIDE BLEACHING SOLUTIONS

5-14 WATER

The purity of water used as makeup in peroxide solutions affects the stability of the solution during storage. The use of impure water can result in a waste of significant amounts of peroxide. It can also constitute a hazard when used in conjunction with concentrated (50 to 70% by weight) peroxide solutions.

The purity of water from a given source seldom remains constant. It will vary with the season and perhaps with the operation of the local water treatment plant. It is difficult to specify the requirements for water purity, but the water should be low in organic matter, dirt, and heavy-metal ions. Distilled water is neither required nor desirable, since the presence of hardness ions has been shown to improve peroxide stability.[31] It is best to check water intended for peroxide solution makeup by taking samples for makeup of standard bleaching solutions and testing these solutions for peroxide content after various periods of storage. The results of such an analysis are shown in Table 5-2. In this particular study, the suitability of river water was compared with that of distilled water for bleach solutions made up from hydrogen peroxide, sodium peroxide, or a mixture of both. The stability of the solutions was checked after storage for 2- and 3-day periods by analyzing for residual peroxide.

5-15 MAGNESIUM SULPHATE

Magnesium sulphate is available in 100-lb bags as hydrated crystalline epsom salts ($MgSO_4 \cdot 7H_2O$). It reacts with sodium silicate to form magnesium silicate, which seems to inhibit the catalytic effect of metal ions on the decomposition of peroxide. Some peroxide solutions exhibit sufficient stability without the addition of epsom salts. This anomaly may be due to the contribution of sufficient calcium or magnesium ions from the natural hardness of some waters. The normal requirement of epsom salts is about 1 to 2 lb per 1,000 gal of water.[26]

5-16 SODIUM SILICATE

Silicate of low iron content should normally be used. It may be obtained in steel drums or steel tank cars. A solution of 41.6° Bé, containing 29% SiO_2 and 11.5% equivalent NaOH, has been commonly employed. Silicate glass may also be used, but special pressurized equipment is required to dissolve the glass.

5-17 PEROXIDES—HYDROGEN VS. SODIUM PEROXIDE

Hydrogen peroxide (H_2O_2) and sodium peroxide (Na_2O_2) are interchangeable if applied on the basis of equivalent active oxygen content.

$$\underset{156}{2Na_2O_2} + 2H_2O = \underset{160}{4NaOH} + \underset{68}{2H_2O_2} \quad (5\text{-}3)$$

TABLE 5-3 INTERCHANGEABLE FORMULAS FOR HYDROGEN AND SODIUM PEROXIDE

(For 1% application of H_2O_2 (100%) on ovendry pulp)

Component	*Percent chemical on o.d. pulp*		
	H_2O_2 *system*	Na_2O_2 *system*	*Mixed system*
Epsom salts	0.05	0.05	0.05
Sodium silicate, 41.6°Bé	5.00	5.00	5.00
Sulphuric acid, 100%		1.69	
Hydrogen peroxide, 100%	1.00		0.59
Sodium peroxide		2.38	0.97
Sodium hydroxide	1.00		
Total peroxide, 100% H_2O_2	1.00	1.00	1.00
Total alkali	1.58	1.58	1.58

$$2H_2O_2 = 2H_2O + O_2 \qquad (5\text{-}4)$$
$$68 \qquad\quad 32$$

Purchased Na_2O_2 is normally 96% pure as a minimum. Thus, 1 lb Na_2O_2 (96%) is the equivalent of 0.42 lb H_2O_2 (100%), 0.84 lb H_2O (50%), 19.7% active oxygen, and 1.0% NaOH. The "mixed peroxide" makeup system has been employed by many mills because, at one time, the cost of both hydrogen and sodium peroxide was based upon the H_2O_2 content. Under those conditions the caustic soda contained in sodium peroxide was obtained free of charge. The sodium peroxide was utilized for the NaOH requirement of the bleach solution. The remaining peroxide requirement was then made up with hydrogen peroxide. Offsetting this gain, however, is the requirement of storing, handling, dissolving, and metering a solid chemical such as sodium peroxide. Certainly the hydrogen peroxide makeup system has advantages which may be attributed to the use of chemicals which are purchased as aqueous solutions (with the exception of epsom salts), they should be considered. The intercha ability of sodium and hydrogen peroxide their use together in a mixed system are d onstrated in Table 5-3.

5–18 HYDROGEN PEROXIDE

Hydrogen peroxide may be obtaine aqueous solutions of 35, 50, and 70% by we active material. Some useful physical pro ties are listed in Table 5-4.[41] A cost saving be realized by purchasing 70% solution bec less water must be shipped per pound of drogen peroxide. Equipment costs and dling hazards are increased, however, as tion strength increases. The requiremen technical competence and experience is als creased. On the other hand, concentr hydrogen peroxide has been used for yea the chemical and defense industries; the re established indicates that it can be han safely by adhering to procedures develope

TABLE 5-4 PHYSICAL PROPERTIES OF HYDROGEN PEROXIDE SOLUTIONS

Property	*Hydrogen peroxide, H_2O_2, % by weight*		
	35	50	70
Active oxygen, % by weight, approx.	16.5	23.5	32.9
Grams H_2O_2 (100%) per liter	396	598	902
Volume strength	130	197	278
Specific gravity, 20°C/4°C	1.132	1.196	1.289
Boiling point, °C (1 atm)	108	114	125
Freezing point, °C	−33	−52.2	−40.3
Partial vapor pressure at 30°C (mm Hg)	0.36	0.74	1.5
Heat of dilution, cal/g mole of H_2O_2	−87	−178	−381

Source: FMC Corp., BECCO Chemical Div., 161 East 42 St., New York, Bulletin 67.

the peroxide manufacturers. Contrary to popular belief, concentrated hydrogen peroxide is reported to be more stable than weaker solutions. The hazard develops when concentrated solutions are diluted or transferred to other containers where contamination can occur.

Concentrated 70% hydrogen peroxide is commonly diluted upon delivery and stored at either 35 or 50% solution. Advice on dilution systems can be readily obtained from peroxide manufacturers. The system generally requires that a measured amount of pure water be added to the storage tank followed by a measured amount of 70% peroxide. The contents of the tank can then be agitated with oil-free air or nitrogen. Another system utilizes a jet nozzle through which 70% H_2O_2 and water are intimately mixed enroute to the storage tank. The mixing is reported to be sufficiently accurate to eliminate the need for further agitation in the storage tank.

The water intended for use for dilution must be subjected to stability analysis when mixed with 70% peroxide from the intended supplier or suppliers. Because of the use of different stabilizing systems, variations in dilute peroxide solution stability may result when a given water supply is used to dilute concentrated peroxide solutions from various suppliers. A deionizing system will be required if the water does not prove to be acceptable at *all* times.

It is also possible to store 70% peroxide without dilution provided the storage tank has special safety vents and a temperature-rise alarm system.

5–19 SODIUM PEROXIDE

Sodium peroxide (Na_2O_2) is a pale yellow powder which behaves both as a vigorous oxidizing agent and as a strong alkali. It should be handled with extreme caution, since combustible material brought into contact with sodium peroxide will cause a most vigorous fire. The material is shipped in nonreturnable steel pails containing 75 or 400 lb, net. Storage of one carload (100 to 140 drums) without double-tiering requires an area of about 370 ft^2. The drums may be transferred by means of a hand truck to the makeup site. A special 400-lb sling, tilter, and hopper should be used for emptying the contents of the drums into batch makeup tanks or the hoppers of continuous feeders.

Sodium peroxide is capable of generating considerable heat when it is dissolved in water. Local overheating caused by the addition of peroxide to water too quickly can cause the solution to splash upon the operator. High temperature and alkalinity also promote the decomposition of peroxide. Therefore, it is advisable to add all of the dilution water before adding the peroxide. Also, the water should be as cold as possible.

SAFETY

5–20 MATERIALS OF CONSTRUCTION

Magnesium sulphate should be dissolved, stored, and handled in stainless-steel equipment.

Sodium silicate may be stored in and handled by steel tanks and pumps.

Concentrated hydrogen peroxide is shipped in glass containers in quantities of less than a pound. Between 37 and 52% solution strength, a glass container must not exceed one gallon in capacity. In larger quantities hydrogen peroxide in excess of 35% by weight is shipped in passivated aluminum containers of high purity. Storage tanks and piping should also be of high-purity aluminum. Pumps may be of type 304 stainless steel. Packing materials may be of Teflon or Teflon asbestos lubricated with a silicone. Gaskets should be polyethylene or Koroseal. Dilute peroxide solutions containing caustic soda require type 304 stainless steel, polyethylene, or pyrex glass. Tile-lined tanks with alkaline-resistant cement have proved satisfactory.

5–21 HANDLING PEROXIDE SOLUTIONS

Hydrogen peroxide solution of about 50% by weight concentration or less generally does not start fire immediately when spilled upon combustible materials such as clothing, but when allowed to dry, the water evaporates preferentially and the concentration will in-

PLANT 0042 CHAMPION INTERNATIONAL CORP CANTONMENT PRIVATE FILE STATUS NEW ADD
US 29 AT SR 184 PAPER PLANT
CANTONMENT FL.
R T HUDSON AQCR=005 SIC=2611
P O BOX 87 LAT=30:36:20N LON=87:19:26W
CANTONMENT FL. 32533 UTM ZONE 16 469.0EAST 3385.8NORTH

POINT 28 CONST PATS# AC -509 OPER PATS# A017-30111
ISS=11/14/72 EXP=12/30/75 ISS=09/08/80 EXP=09/01/85
LIME KILN REPLACED 3 OLD KILNS
SOURCE= IPP=03 COMM.PNTS.00-01
STACK HT= 136FT DIAM= 6.5FT TEMP= 176F FLOW= 50662CFM PLUME= OFT
BOILER CAP= OMBTU/HR FUEL FOR SPACE HEAT= 0.0%
OPERATING PROCESS RATES YOR=80 RAW MATERIAL= 44340 OTHER
PRODUCT 26667 LB/PRD FUEL 124 MBTU/BN
NORMAL COND. DEC-FEB=25% MAR-MAY=25% JUN-AUG=25% SEP-NOV=25%
PERMIT SCHEDULE 24HRS/DAY 7DAYS/WK 50WKS/YR
AOR FOR 12/31/81 24HRS/DAY 7DAYS/WK 50WKS/YR

COMPLIANCE NEDS=1 QRC=2 UPDATE= / SCHED= / UPDATED= / /
PERMIT= YOR=80 INSPECTED=08/10/84 NEXT DUE= 04/01/85

/

SCC'S

1-02-006-01 YOR=84 SOURCE=B RATE= 553 MAX= 0.089 M*3/BRN
FUEL CONT SO2=0.00% ASH=00.0% 1150MBTU YOR=80 CONFID=2
NATURAL GAS, MILLION CUBIC FEET BURNED

3-07-001-06 YOR=84 SOURCE=P RATE= 465458 (48,857 lime mud ($CaCO_3$ + inerts)) MAX= 66.667 TN/PRD
FUEL CONT SO2= . % ASH= . % MBTU YOR= CONFID=2
DRY PULP, TONS (=2.729 X LIME MUD)

POLLUTANTS MONITORED

TSP 11101 NORM. 25.70 EST/METH. 54/1 MAX.ALW. 111 TNS/YR.
CTLS. PRI=001 SEC=000 EFF=99.8% NEXT DUE 04/01/85 TEST/FREQ=1
TESTED 04/27/84 AGENCY=3 REG=PR.WT. COMPLIANCE=1
EMITTED 10.80 ALLOWED= 25.92LBS/HR OP-RATE= 48520LB/PRC

Champion
Champion International Corporation
PULP-PAPER MANUFACTURING

66-35
531

Knightsbridge Hamilton, Ohio 45020

No. 318299

Pay to the Order of

STATE OF FLORIDA
DEPT OF ENVIRON REGULAT
160 GOVERNMENTAL CENTER
PENSACOLA FL 32501

Date: 09-25-85 Check No. 318299

Pay the amount of $******1,000.00

Wachovia Bank & Trust, N.A.
Asheville, North Carolina

$ONE THOUSAND.00/100

[redacted]

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

No. 76093

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from Champion International Corp. Date October 10, 1985

Address Hamilton, Ohio 45020 Dollars $ 1,000.00

Applicant Name & Address Same as above

Source of Revenue

Revenue Code 001031 Application Number AC 17-111195

By Patricia G. Adams

Champion

Champion International Corporation

Application To Construct Air Pollution Sources

Prepared For
Pensacola Conversion Project
Pensacola Facility, Cantonment, Florida

Submitted To
Florida Department Of Environmental Regulation

October 1985

Charles H. Ayer
Manager—Air Programs
Environmental Affairs

Champion
Champion International Corporation

One Champion Plaza
Stamford, Connecticut 06921
203 358-7117

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AC 17-111195

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHWEST DISTRICT
160 GOVERNMENTAL CENTER
PENSACOLA, FLORIDA 32501

BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY
ROBERT V. KRIEGEL
DISTRICT MANAGER

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Major [ ] New[1] [X] Existing[1]

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

COMPANY NAME: Champion International Corporation **COUNTY:** Escambia

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) See Attached Permit Supplement - Appendix B-I Table B-1

SOURCE LOCATION: **Street** State Road 184 at U.S. 29 **City** Cantonment

State Plane: **East** 1,111,700 ~~469.0~~ 468.85 **North** 596,100 ~~3385.8~~ 3386.06

Latitude 30 ° 36 ' ~~20~~ 30 "N **Longitude** 87 ° 19 ' ~~26~~ 30 "W

APPLICANT NAME AND TITLE: Champion International Corporation

APPLICANT ADDRESS: P.O. Box 87, Cantonment, Florida 32533

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Champion

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

*Attach letter of authorization

Signed: R. E. Olson

Richard E. Olson
V.P. Manufacturing Printing & Writing Papers
Name and Title (Please Type)

Date: 10/8/85 **Telephone No.** (203) 358-6456

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 ha been designed/examined by me and found to be in conformity with modern engineer principles applicable to the treatment and disposal of pollutants characterized in t permit application. There is reasonable assurance, in my professional judgment, th

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

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

For and on the Behalf of Champion

Signed Willard John Davis

Willard John Davis
Name (Please Type)

Brown & Root U.S.A., Inc.
Company Name (Please Type)

10200 Bellaire Blvd., Houston, TX 77072
Mailing Address (Please Type)

Florida Registration No. 24531 Date: Oct 9 1985 Telephone No. 713-575-5208

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.

Installation of additional bleaching facilities, woodyard chip handling facilities, conversion of No. 5 Paper Machine and addition of a Lime Slaker. See Attached Permit Supplement

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

Start of Construction January '86 Completion of Construction December '86

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

Total installed Air Pollution Control Equipment Cost - $600,000

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

See Section I - Table I of Permit Supplement

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 50 ;

if power plant, hrs/yr N/A ; if seasonal, describe: N/A

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?

   b. If yes, has "Lowest Achievable Emission Rate" been applied?

   c. If yes, list non-attainment pollutants.

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?

   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.

See Permit Supplement

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

A. Raw Materials and Chemicals Used in your Process, if applicable: - See Attached Permit Supplement Section III - Tables II, III & IV

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

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

1. Total Process Input Rate (lbs/hr): Section III

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 Attached Permit Supplement Appendix B

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

[1]See Section V, Item 2.

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

[3]Calculated from operating rate and applicable standard.

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

D. Control Devices: (See Section V, Item 4) See Attached Permit Supplement- Appendix B

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)

E. Fuels - Not Applicable

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. N/A

Annual Average _____ Maximum _____

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

All liquid and solids generated will be returned to the process or treated in the mill's treatment plant before discharge to Eleven-Mile Creek.

See Attached Permit Supplement - Appendix B-III & B-IV

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

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

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

Water Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION - Not Applicable

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

Description of Waste _____

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

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

Manufacturer _____

Date Constructed _____ Model No. _____

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

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

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

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

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

[ ] Other (specify) _____

Brief description of operating characteristics of control devices: _____

_____

_____

_____

_____

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

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

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

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

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

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

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

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

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

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY Not Applicable

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

[ ] Yes [ ] No

Contaminant	Rate or Concentration

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. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

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

j. Applicability to manufacturing processes:

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

3.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

4.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Costs:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

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

F. Describe the control technology selected:

1. Control Device:

2. Efficiency:[1]

3. Capital Cost:

4. Useful Life:

5. Operating Cost:

6. Energy:[2]

7. Maintenance Cost:

8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City:

(4) State:

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

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

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

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION - Not Applicable

A. Company Monitored Data

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.

CHAMPION INTERNATIONAL CORPORATION
PENSACOLA, FLORIDA FACILITY
SUPPLEMENT TO
AIR QUALITY PERMIT APPLICATION

Need - sale from old lime slaker
No increase in steam production
No TRS

PART I
INTRODUCTION

Champion International Corporation is proposing a conversion of its Pensacola, Florida facility, located near the town of Cantonment, Escambia County Florida, (Figure I). The conversion of this facility to a bleached kraft fine paper mill will affect the following existing facilities (Figure II illustrates location of affected facilities):

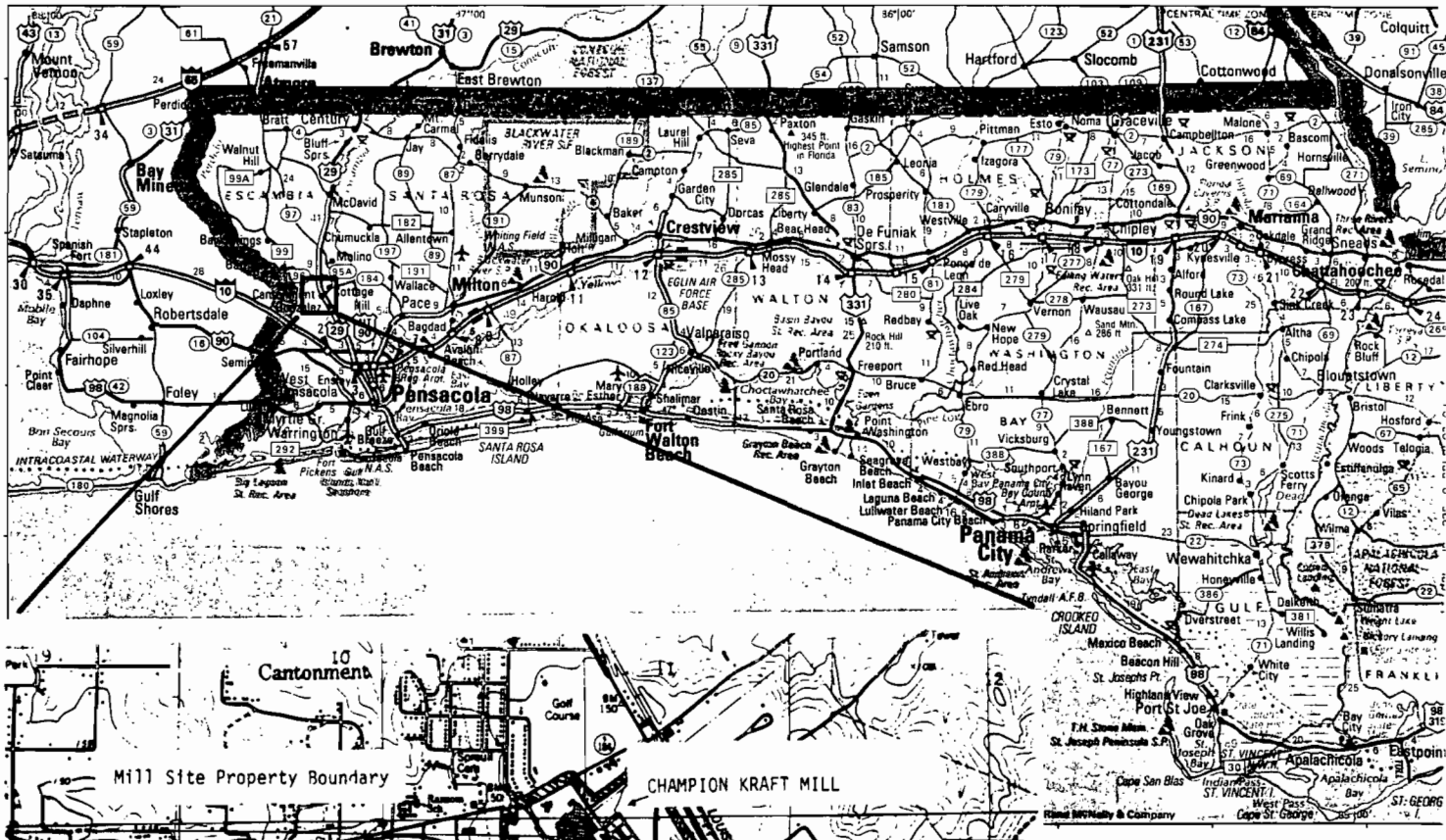
P-5 Paper Machine
Bleach Plant
Lime Slaking
Woodyard

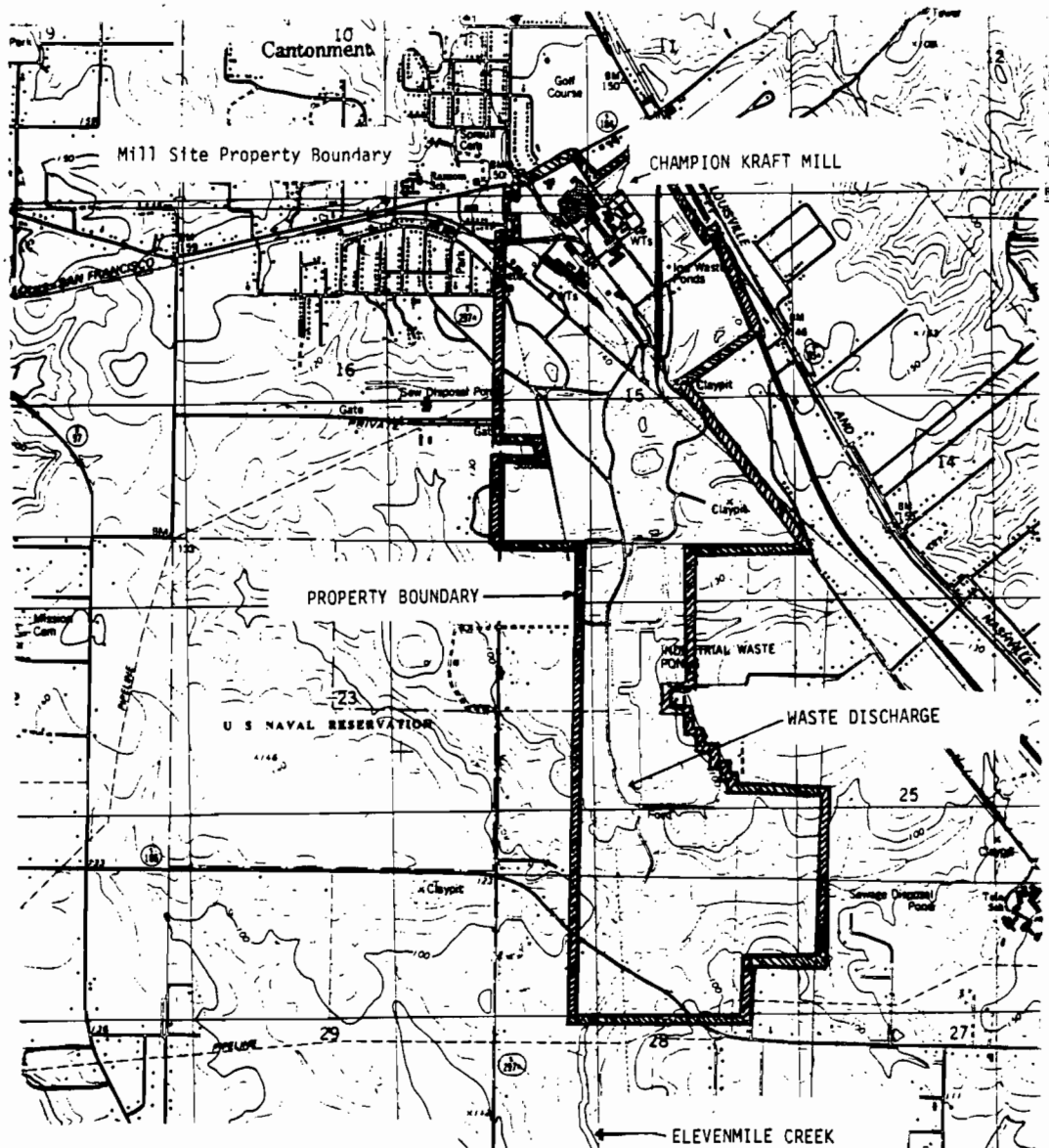
All other existing facilities permitted by the Florida Department of Environmental Regulation will remain unchanged (Table I). These facilities include twelve batch digesters and one Kamyr continuous digester with associated blow tanks, condensers and brown stock washing, two sets of black liquor evaporators, two recovery boilers and dissolving tanks, one lime kiln and calciner, recausticizing, tall oil and turpentine byproducts facilities.

PART II
AIR QUALITY EMISSION SUMMARY

Champion's Pensacola facility located near Cantonment, in Escambia County, Florida is in an area designated as attainment or unclassificable for all ambient air quality standards.

FIGURE I LOCATION OF CHAMPION FACILITY





REPRODUCED FROM 7.5 MINUTE
U.S.G.S. CANTONMENT, FL.
QUADRANGLE MAP
SCALE 1:24,000

SK-160-5-002-A

Figure II Mill Plot Plan
Location of Affected Facilities

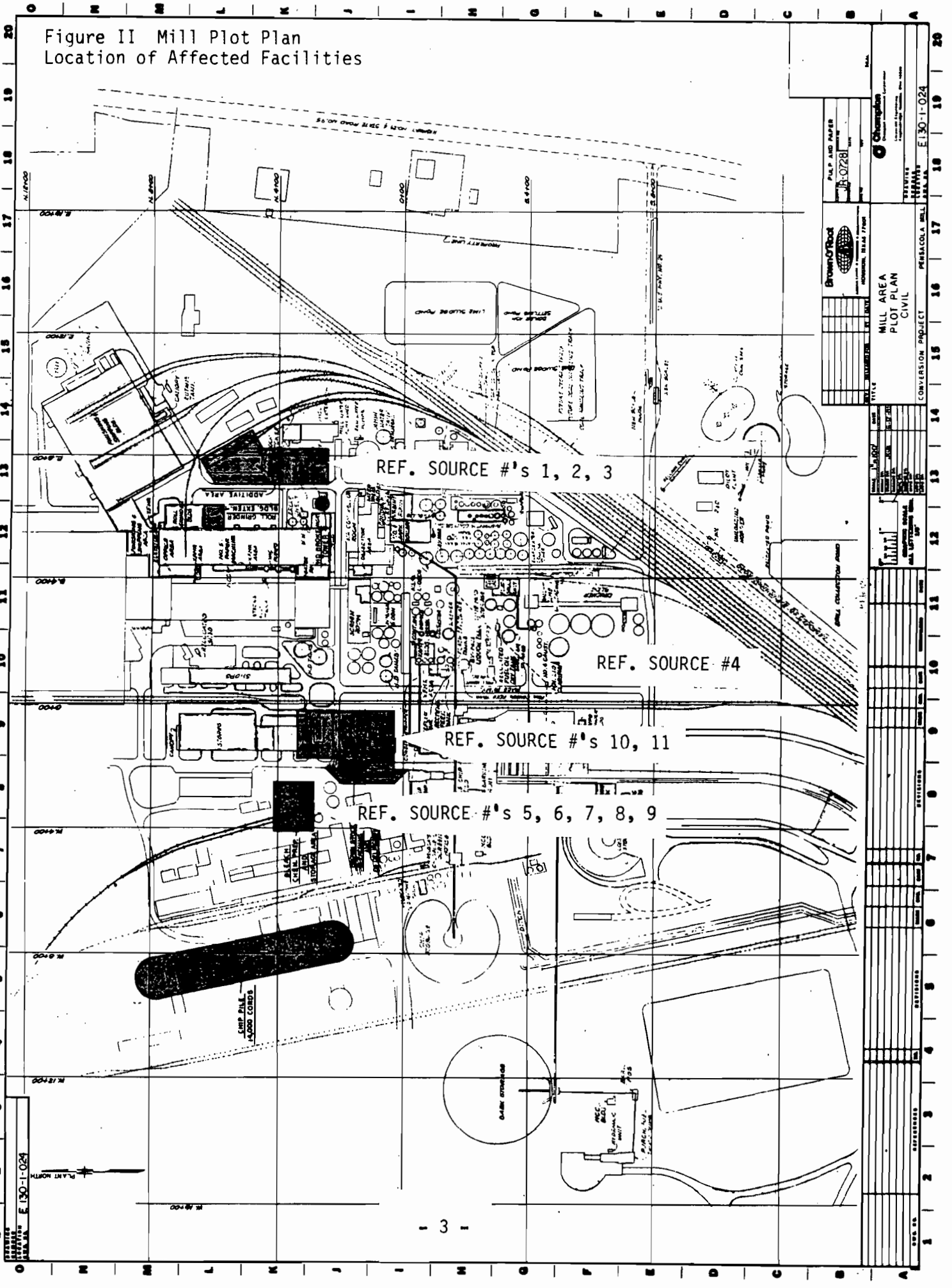


TABLE I

CURRENT POINT SOURCES

SOURCE	FDER PERMIT	ISSUED	EXPIRES
Tall Oil Plant	A017-105858	09/11/85	07/01/90
No. 1 Power Boiler	A017-104901	08/09/85	08/01/90
No. 2 Power Boiler	A017-104902	08/09/85	08/01/90
No. 3 Power Boiler	A017-65482	06/30/83	06/01/88
No. 4 Power Boiler	A017-65490	06/30/83	06/01/88
Package Boiler	A017-30110	08/14/80	08/01/85*
Lime Kiln	A017-105854	09/11/85	08/01/90
Lime Slaker (to be replaced)	A017-105855	09/11/85	08/01/90
Lime Calciner	A017-65491	10/18/83	10/01/88
Coal Crushing Conveying	A017-65485	04/07/83	04/01/88
No. 1 Recovery Boiler	A017-104903	08/09/85	08/01/90
No. 1 Dissolving Tank	A017-104906	08/09/85	08/01/90
No. 2 Recovery Boiler	A017-104905	08/09/85	08/01/90
No. 2 Dissolving Tank	A017-104907	08/09/85	08/01/90
Chlorine Dioxide Generator			
Chlorine Tower/Washer			
Chlorine Dioxide Tower/Washer			

*Shutdown - Not Being Renewed

The regulated pollutants affected by the mill conversion project are particulates for which the area has been designated as attainment of the NAAQS. A summary of the net emissions for the proposed mill conversion are as follows:

A. Particulate

1. Fugitive Particulate Emissions	Net Emissions (Tons/Yr)	Reference Calculations Pages
Woodyard	+2.1	12,14,15
Road Traffic	+5.1	16
Subtotal	+7.2	
2. Point Source Emissions		
Starch Silo Vent Collector	+0.1	17
Starch Receiver Vent Collector	+0.1	17
Rotoclone Collector	+3.5	17
Lime Slaker (New)	+6.7 TRS?	23
Old Lime Slaker (Shutdown)[1]	-16.0	--
Salt Unloading	+0.6	23
Subtotal	-5.0	--
TOTAL NET EMISSIONS INCREASE	+2.2	

B. Unregulated Pollutants

1. Bleach Plant	Net Emissions (Tons/Yr)	Reference Calculations Pages
Chlorine	-12	--
Chlorine Dioxide	-11	--
Total	-23	9,18-22

The proposed conversion of the Pensacola facility does not represent a major modification as defined by the Florida DER regulation 17-2.500.

1) Reported Emission in 1984.

PART III

DESCRIPTION OF AFFECTED FACILITIES

The existing Pensacola facility produces 1275 tons per day of unbleached kraft pulp and 285 tons per day of bleached kraft pulp for a total capacity of 1560 tons per day of pulp. The conversion project will not result in an increase in pulping capacity but will convert all pulp production to bleached kraft pulp. With the conversion to bleached kraft pulp, No. 5 paper machine will be converted to produce bleached kraft fine papers. The following is a description of each area affected by the conversion.

A. P-5 Paper Machine

Converting this machine to produce bleached kraft fine papers will require the following additions:

- o disc saveall
- o broke thickening and storage
- o deaerator - cleaner (stock cleaners)
- o wet chemical additive system
- o headbox fan pump
- o Bel-form top wire former
- o press section
- o 13 steam drum dryers
- o size press
- o broke pulpers
- o roll wrapping, rewinding and sheeting facilities
- o dry additive system

The only air emissions associated with the proposed changes to the paper machine will be a total of 3.7 tons per year of particulate from the dry additives system. All other additives listed in Table II will be in slurry form.

TABLE II
PAPER MACHINE ADDITIVES

ADDITIVE	ANNUAL USAGE (Tons)	STORAGE CPACITY (Gallons)	FORM RECIEVED
Alum	6,000	56,000	Water Solution-Bulk
Retention Aid	330	8,200	Water Solution-Bulk
Pearl Starch	10,000	400(tons)	Dry - Bulk
Cationic Starch	2,300	--	Dry - Bags
Filler Clay	22,000	178,000	Water Slurry-Bulk
Ammonium Persulfate	4	--	Dry - Bags
Rosin Size	1,300	24,000	Paste-Bulk
Slimicide	44	--	Liquid-Drums
Titanium Dioxide	6,000	40,000	Water Slurry-Bulk
Extender	6,000	105,000	Water Slurry-Bulk
Fluorescent Dye	1,200	9,700	Liquid-Drums
Sodium Bicarbonate	800	--	Dry - Bags
Wet End Dyes	30	--	Liquid-Drums
Sodium Hydroxide	(1)	450	Water Solution-Bulk
Sulfamic Acid	(1)	--	Dry - Bags
Feltmaster FS	(1)	--	Liquid-Drums
Defoamer	(1)	--	Solution-Drums

(1) Materials used on an as need basis.

A-1 Dry Additives

Dry additives for the paper machine will consist of a bulk unloading system for pearl starch and a bag handling system for cationic starch, titanium dioxide extender, ammonium persulfate, sodium bicarbonate and sulfamic acid. The bulk system for pearl starch will unload pneumatically into a starch silo. The starch silo and starch receiver vents are equipped with bag filters. Process flow diagram and specifications for these bag filters are provided in Attachment A. Total particulate emissions from the pearl starch unloading system is 0.2 tons per year.

The bag handling system for those additives identified will consist of separate batch make down systems. All make down systems are hooded and exhausted to a single wet scrubber. Attachment B provides a typical flow diagram and design specifications for the rotoclone scrubber. Total particulate emissions from the dry batch handling system is 3.5 tons per year.

B. Bleach Plant

The existing 285 tons per day bleached pulp facility will be replaced with two new oxygen delignification facilities followed by two 3-stage bleaching facilities. The new bleaching facilities (see Attachment C) will consist of C_DE_OD bleaching sequence. The new lines will be designed for 800 tons per day and 600 tons per day air dried bleached pulp. In addition to these facilities, a new chlorine dioxide generator designed for 16 tons per day ClO_2 (R-3H Unit) will replace the existing R-2 chlorine dioxide generator.

Emissions from the chlorine-chlorine dioxide (C_D) and chlorine dioxide (D) washing stages will be hooded and vented to a scrubber. The scrubber will be designed for less than 17 ppm chlorine and chlorine dioxide emissions. In addition, the chlorine dioxide generator will have a separate scrubbing system. (See Attachment C). Table III provides a summary of net emissions

TABLE III

PENSACOLA BLEACH PLANT FACILITIES

SUMMARY OF EMISSIONS

TONS/YEAR

	BEFORE CONVERSION	AFTER CONVERSION
Chlorine Dioxide Generator		
Cl_2	21	32
ClO_2	18	18
Bleach Plant		
Cl_2	35	12
ClO_2	22	11
Total		
Cl_2	56	44
ClO_2	40	29

TOTAL NET CHLORINE EMISSIONS -12

TOTAL NET CHLORINE DIOXIDE EMISSIONS -11

BLEACH PLANT

CHEMICAL USAGE

PURCHASED

CHEMICAL	UNIT	DESIGN	FORM RECEIVED
Cl_2	TPD	60	Liquid
NaOH	TPD	68	Solution
$NaClO_3$	TPD	27	Solution
NaCl	TPD	17	Dry
HCl	---	As Needed	Solution
O_2	TPD	28	Liquid
H_2SO_4	TPD	26	Solution
SO_2	TPD	9	Liquid
$MgSO_4$	TPD	7	Dry
CHLORINE DIOXIDE GENERATOR PRODUCTION			
CLO_2	TPD	16	Solution
Cl_2	TPD	10	Solution
Na_2SO_4	TPD	35	Slurry

of Cl_2 and ClO_2 from the bleach plant modification, with a summary of bleach plant chemical usage. The addition of the new bleaching facilities will result in a net reduction in Cl_2 and ClO_2 emissions.

Particulate emissions associated with the installation of the new chlorine dioxide generator will occur from the dry salt (rock salt) unloading system. Salt will be delivered in trucks and unloaded pneumatically into a salt solution makedown tank. Salt is injected into the tank and water is then added to make up proper concentration. The tank vent is equipped with a spray tower scrubbing system designed for less than 2.0 lbs./hr. residual dust load. Unloading operations occur for a total of 600 hours per year. (Appendix B - Table B-2) Total particulate emissions from this source are 0.6 T/yr.

C. Lime Slaking

The facility's existing lime slaking operations will be shutdown and a new slaker will be added as part of the conversion project. The new slaker will be equipped with a wet scrubber designed at a maximum of .05 gr/SDCF representing an annual emission rate of 6.7 tons per year of particulates. Net emissions decrease from the slaker operations will be - 9.3 T/yr. (See Attachment D.)

D. Woodyard

The proposed conversion of the Pensacola facility to a bleached kraft fine paper mill will result in the addition of a truck dumper (chips), new chip storage, stacker, reclaimer and chip screening in order to handle the increased usage of hardwood (Table IV - Wood Supply).

Emissions associated with the woodyard operations are fugitive particulate emissions. The net increase in particulate emissions due to the proposed changes are 2.1 tons per year (Table IVA). (See Attachment E and Appendix A)

Excessive fugitive emissions from the chip unloading, conveying and storage system is controlled to a minimum by the following features:

- o All conveyors are covered.
- o Chips manufactured on site will be screened prior to storage, thus reducing the potential for fugitive emissions. (Emission calculations in Appendix A assumes no screening).
- o Chips are screened once removed from storage prior to conveying to the digesters.
- o Drop distance for chip storage stacker are maintained to a minimum. Chips are conveyed to stacker and are distributed on the storage pile by mechanical conveyors which are covered.

E. Road Traffic

The additional hardwood usage will increase mill traffic. Total fugitive emissions increase will be 5.1 tons/year (see Appendix A). Excessive fugitive emissions will be controlled by having all new roads paved along with the existing paved roads.

TABLE IV
PENSACOLA WOOD SUPPLY
WOODYARD FACILITIES

	BEFORE CONVERION 1000 cords/yr		AFTER CONVERSION 1000 cords/yr	
	Softwood	Hardwood	Softwood	Hardwood
Roundwood	362	27	325	74
Purchased Chips	278	32	170	288
TOTAL	640	59	495	362

395,000 TPY ↑

TABLE IVA
WOODYARD - FUGITIVE PARTICULTE EMISSIONS SUMMARY

	BEFORE CONVERSION tons/yr		AFTER CONVERSION tons/yr	
	Softwood	Hardwood	Softwood	Hardwood
Debarking	11.7	0.9	10.5	2.4
Purchased Chips (unloading, storage & conveying)	3.5	0.4	2.1	3.6
Subtotal	15.2	1.3	12.6	6.0
TOTAL	16.5		18.6	
Net Increase	+2.1			

APPENDIX A

COMPUTATION OF EMISSIONS

FOR

PENSACOLA FACILITY CONVERSION

FUGITIVE EMISSIONS CALCULATIONS
FOR
WOODYARD FACILITIES

DEFINITION AND COMPUTATION OF FUGITIVE EMISSIONS
WOODYARD CHANGES

A. Fugitive Emissions for Debarking Operations

A value of 0.024 lbs./ton of logs debarked for fugitive emissions was reported by PEDCo Environmental Inc. at the Second Symposium on Fugitive Emissions. Work conducted by PEDCo was prepared under EPA Contract No. 68-02-1375, Task Order No. 33, publication no. EPA 450/3-77-010.

This value for fugitive emissions from debarking operations was applied as follows:

Present and Future Conditions

(Cords of Roundwood Debarked/Yr.) x (5,400 Lbs. (Wet Weight of Cord)) - (2,000 Lbs./Ton) x (.024 Lbs. Fugitive Emissions/Ton Wet Wood) - (Wt/Ton) = Tons/Yr. Fugitive Emissions

a. Calculations for Existing Conditions

389×10^3 Cords/Yr. x 5,400 Lbs./Cord - 2,000 x .024 Lbs./Ton - 2,000 Lbs./Ton = 12.6 Tons/Yr.

b. Calculations for Future Conditions

399×10^3 Cords/Yr. x 5,400 Lbs./Cord - 2,000 x .024 Lbs./Ton - 2,000 Lbs./Ton = 12.9 Tons/Yr.

B. Fugitive Emissions for Unloading, Storing, and Handling Chips

A value of 1.0 lbs./ton of sawdust was reported by PEDCo Environmental Inc. at the Second Symposium on Fugitive Emissions. Work conducted by PEDCo was prepared under EPA Contract No. 68-02-1375, Task Order No. 33, publication no. EPA 450/3-77-010. The value reported was for 100% sawdust operations.

The application of this value to a chip facility can only be applied to that portion of chips which is actually equivalent to sawdust. In the paper industry, we refer to this portion as chip fines, which is wood fines less than 3/16 inch. The percentage of chip fines contained in purchased chips received at the Pensacola Mill will range from 1% to 2% by wet weight with a maximum of 2%. Additionally, since the total weight of chips contains less than 2% fines (sawdust), the physical exposure to dusting as compared to 100% sawdust will substantially be reduced. Therefore, we have applied a fugitive emission value of 0.5 lbs./ton of fines. Calculations are as follows:

(Cords/Yr. as Chips) x (Wet Weight/Cord) - (Wt./Ton) x (Percent Fines) x (0.5 Lbs. Fugitive Emissions/Ton of Fines) - (Wt./Ton) = Tons/Yr. Fugitive

a. Calculations of Existing Conditions

310×10^3 Cords/Yr. x 5,000 Lbs./Cord - 2,000 x .02 x 0.5 Lbs./Ton Fines - 2,000 Lbs./Ton = 3.9 Tons/Yr.

b. Calculations of Future Conditions

458×10^3 Cords/Yr. x 5,000 Lbs./Cord - 2,000 x .02 x 0.5 Lbs./Ton Fines - 2,000 Lbs./Ton = 5.7 Tons/Yr.

NOTE: EPA has not developed fugitive emissions factors for chip unloading, conveying and storage. These sources of emissions have been considered minor. Champion has estimated fugitive emissions for purpose of demonstrations that chip systems are insignificant fugitive emissions. This method of calculation has been employed in the State of Texas and was accepted. This method is, in our opinion, ultra conservative and predicts emissions in excess of what actually occurs.

TRAFFIC FUGITIVE EMISSIONS CALCULATIONS

DATA AND ASSUMPTIONS

Total Trucks Annually Existing = 77,500

Total Trucks Annually Projected = 113,000

Average In-Mill Round Trip = 2 miles

Emission Factor (18 Wheel Trucks on Paved Roads) = 0.144 lb./VMT

Calculations

10/21/85

0.05

Total Existing Emissions = (77,500) x (2) x (0.14) - 2,000

= 11.2 tons/year 3.875 => 3.9

Total Projected Emissions = (113,000) x (2) x (0.144) - 2,000

0.05

= 16.3 tons/year 5.165 => 5.7

Net TSP Emissions Increase = 5.1 Tons/Year

Truck Travel On Paved Roads

Emission Factor (EF):

10/21/85

0.2 5.07

$EF = 0.90 ((E) + 0.6 (T/4) + 15.21 (T/4))^{(1)}$

Where: EF = Emission Factor (g/VMT)

E = Particulate emissions originating from vehicle exhaust

T = Number of tire per vehicle

Data: E = 1.30(1)

T = 18

0.105

EF = 65.2 g/VMT (~~0.144~~ lb./VMT)

(1) Reasonable Available Control Measures for Fugitive Dust Sources, Ohio Environmental Protection Agency, Columbus, Ohio

EMISSION CALCULATIONS

FOR

BULK STARCH & BATCH DRY HANDLING SYSTEM

A. 1. Starch Receiver Collector

Data Base:

Air Flow	940 ACFM
Residual Dust	0.02 gr/ACFM
Operating Hrs.	1334

Calculations

$$\frac{(ACFM) \times gr/SCF \times \frac{min}{hr.} \times \frac{hrs.}{yr.} - 2{,}000}{7{,}000\ gr/lb}$$

$$\frac{(940) \times (.02) \times (60) \times (1334)}{7{,}000} - 2000 = 0.1\ T/yr.$$

2. Bulk Starch Unloading - Silo Collector

Data Base:

Air Flow -	794 ACFM
Residual Dust from Collector	.02 gr/ACFM
Operating hrs.	1334

Calculations

$$\frac{Flow\ (SCFM) \times gr./ACFM \times min/hr \times \frac{hrs.}{yr.} - 2{,}000\ \frac{lbs.}{ton} = \frac{Tons}{Yr.}}{7{,}000\ gr./lb.}$$

$$\frac{(794) \times (.02) \times (60) \times (1334)}{7{,}000} - 2{,}000 = 0.1\ Tons/Yr.$$

3. Batch Dry Handling System

Data Base:

Wt. of material handled in bags	3,500 tons/yr.
Loss from Batch Handling (1%)	35 tons/yr.
Rotoclone Efficiency	90% minimum

Calculations

Tons/Yr. of Material x Handling Loss x Loss from Scrubber = Tons/Yr. Emissions

3,500 Tons/Yr. x .01 x .10 = 3.5 Tons/Yr.

Material Received in Bags	Tons/Yr.
Wet End Starch	2,230
Ammonium Persulfate	4
TiO_2 Emergency Supply	80
TiO_2 Extender(Emergency Supply)	80
Sodium Bicarbonate	740
Sulfamic Acid	200
Misc. Bags	166

EMISSIONS CALCULATIONS

FOR

NEW BLEACH PLANT FACILITIES

Data Base 800 Ton/Day Plant:

ACFM	10,200
SDCFM	9,000
Temp	100°F
Residual Cl_2 (ppm)	17
Residual ClO_2 (ppm)	17
Operating Hrs./Yr.	8,400

Data Base 600 Ton/Day Plant:

ACFM	7,350
SDCFM	6,500
Temp	100°F
Residual Cl_2 (ppm)	17
Residual ClO_2 (ppm)	17
Operating Hrs./Yr.	8,400

Calculations:
Flow (SDCFM) x Conc (ppm) x F = Emissions (Lbs./Hr.)
Emissions (Lbs./Hr.) x Operating h - Lb./T = Tons/Yr.

$$F(Gas) = \text{Molecular Weight (Gas)} \left(\frac{\text{grams}}{\text{mole}}\right) - 0.865 \text{ ft.}^3\text{/mole}$$

$$- 454 \frac{\text{grams}}{\text{lbs.}} \times 60 \frac{\text{min.}}{\text{hr.}} \times 10^{-6} \text{ (ppm)}$$

$$F(Cl_2) = 1.08 \times 10^{-5}; \; F(ClO_2) = 1.03 \times 10^{-5}$$

$(9000) \times (17) \times 1.08 \times 10^{-5}$ = 1.7 Lbs./Hr. Cl_2 x 8400 - 2000 = 7.1 T/yr.

$(9000) \times (17) \times 1.03 \times 10^{-5}$ = 1.6 Lbs./Hr. ClO_2 x 8400 - 2000 = 6.7 T/yr.

$(6500) \times (17) \times 1.08 \times 10^{-5}$ = 1.2 Lbs./Hr. Cl_2 x 8400 - 2000 = 5.0 T/yr.

$(6500) \times (17) \times 1.03 \times 10^{-5}$ = 1.1 Lbs./Hr. ClO_2 x 8400 - 2000 = 4.6 T/yr.

Summary New Bleach Facility Emissions:

Cl_2 = 7.1 T/Yr. + 5.0 T/Yr. = 12 T/Yr.

ClO_2 = 6.7 T/Yr. + 4.6 T/Yr. = 11 T/Yr.

EMISSION CALCULATIONS
FOR
EXISTING BLEACH PLANT

Bleach Sequence - CEHDH

Data Base:

- Existing bleaching stages are uncontrolled.
- Emissions of Cl_2 are based on Cl_2 loadings to the new bleach plant scrubbers, ratioed to existing bleach plant production levels.
- Emissions of ClO_2 are based on ClO_2 loadings to the new bleach plant scrubbers, ratioed to existing bleach plant production levels.

Calculations:

A. Existing Cl_2 Stage

(emissions from New Plant) - (1 - New Scrubber Eff.)
x Existing Bleach Production / New Bleach Production = Existing Bleach Plant Cl_2 Emissions

$$(12\ T/Yr.) - (1 - .93) \times \frac{285}{1400} = 35\ Tons/Yr.\ Cl_2\ from\ existing\ bleach\ plant.$$

B. Existing ClO_2 Stage

Formula same as A - substitute ClO_2 data for new bleach plant scrubbers.

- New Bleach Plant ClO_2 emissions = 11 T/Yr.
- New Bleach Plant ClO_2 scrubber eff. = 90% (minimum)

$$(11\ T/Yr.) - (1 - .90) \times \frac{285}{1400} = 22\ T/Yr.\ ClO_2\ emissions\ from\ existing\ bleach\ plant.$$

EMISSIONS CALCULATIONS
FOR
NEW CHLORINE DIOXIDE GENERATOR

A. STORAGE TANK VENT SCRUBBER

Data Base:

Air Flow	150 SDCFM
Residual Chlorine	5 mg/l
Residual Chlorine Dioxide	0.5 mg/l
Operating Hours	8400

Factors: F_1 = 454,000 mg/lb
F_2 = 28.3 l/ft.^{3}
F_3 = 60 min/hr

Calculations:

(Flow) x (Residual) x F_2 x F_3 - F_1 = #/Hour
(#/Hour) x (Operating Hours) - 2000 = Tons/Year

Cl_2 : (150) x (5) x (28.3) x (60) - (454,000) = 2.8 #/Hour
(2.8) x (8400) - 2000 = 12 Tons/Year

ClO_2: (150) x (0.5) x (28.3) x (60) - (454,000) = 0.28 #/Hour
(0.28) x (8400) - 2000 = 1.2 Tons/Year

B. TAIL GAS SCRUBBER VENT

Data Base:

Air Flow	1000 SDCFM
Residual Chlorine	0.5 mg/l
Residual Chlorine Dioxide	1.0 mg/l
Operating Hours	8400

Factors: F_1 = 454,000 mg/lb
F_2 = 28.3 l/ft.^{3}
F_3 = 60 min/hr

Calculations:

(Flow) x (Residual) x F_2 x F_3 - F_1 = #/Hour
(#/Hour) x (Operating Hours) - 2000 = Tons/Year

Cl_2 : (1000) x (0.5) x (28.3) x (60) - 454,000 = 1.9 #/Hour
(1.9) x (8400) - 2000 = 8 Tons/Year

ClO_2: (1000) x (1.0) x (28.3) x (60) - (454,000) = 3.7 #/Hour
(3.7) x (8400) - 2000 = 16 Tons/Year

C. TOTAL EMISSIONS

2 (Storage vents) + (Tail Gas)

Cl_2 : 2 (12) + (8) = 32 Tons/Year
ClO_2 : 2 (1.2) + (16) = 18 Tons/Year

NOTE: The emission rates are based on worst case operation.
Final design bases will be provided prior to construction.

EMISSION CALCULATIONS

FOR

EXISTING CHLORINE DIOXIDE GENERATOR

Data Base:

- Existing ClO_2 generator is an R-2 rated at 6 tons/day.
- The existing generator has a tail gas scrubber but no storage tank vent scrubbers.
- Emissions of Cl_2 and ClO_2 from the tail gas scrubber are based on loadings to the new tail gas scrubber ratioed to existing rated generator production.
- Emissions of Cl_2 and ClO_2 from the storage vents are based on loadings to the new ClO_2 storage vent scrubbers ratioed to existing rated generator production. The new scrubbers have a 50% efficiency for Cl_2 and 92% for ClO_2.

Calculations:

A. Existing tail gas scrubber

(Emissions from new tail gas scrubber) x $\frac{\text{Existing } ClO_2 \text{ Generator Production}}{\text{New } ClO_2 \text{ Generator Production}}$

Cl_2 : (8) * 6 - 16 = 3 T/Yr.

ClO_2: (16) * 6 - 16 = 6 T/Yr.

B. Existing ClO_2 storage tank vents

(Emissions from new vent scrubbers) - (1 - efficiency)

* Existing ClO_2 Generator Production - New ClO_2 Generator Producion

Cl_2: (24) - (1 - .5) * (6) - (16) = 18 Tons/Year

ClO_2: (2.4) - (1 - .92) * (6) - (16) = 12 Tons/Year

C. Total Existing Emissions

Cl_2 : 3 + 18 = 21 tons/year

ClO_2: 6 + 12 = 18 tons/year

EMISSION COMPUTATIONS
FOR
LIME SLAKER SCRUBBER

Data Base:

ACFM	12,500
SDCFM	3,700
Temperature	190°F
Gr/SDCFM Residual(max)	.05
Operating hrs./Yr.	8,400

Calculations

$$\frac{\text{Flow (SNCFM)} \times \text{Gr. Residual/SDCF} \times \text{Min/Yr.}}{\text{Gr. per Lb.}} \times \text{Operating Hrs.} - 2{,}000 = \text{Tons/Yr. Emission}$$

$$\frac{3{,}700 \times .05 \times 60}{7{,}000} \times 8{,}400 - 2{,}000 = 6.7 \text{ Tons/Yr.}$$

NOTE: Data Base is a preliminary estimate. Final design data will be provided prior to construction.

The existing Lime Slaker will be shutdown.

EMISSION COMPUTATIONS
FOR
SALT UNLOADING

Data Base:

Usage	17 Tons/Day
Dusting	1%
Scrubber Efficiency	99%
Truck Capacity	20 Tons/Truck
Unloading Rate	10 Tons/Hour
Operating Days/Yr.	350

Calculations

(Unloading Rate) x (Dusting) x (1-Scrubber Efficiency) x 2000 #/ton = #/hour

(#/Hour) x (Usage) - (Unloading Rate) x (Operating Day) - 2000 #/ton = Tons/Year

(10) x (0.01) x (1-.99) x 2000 = 2 #/Hour
(2) x (17) - (10) x (350) - 2000 = 0.6 Tons/Year

APPENDIX B

POINT SOURCE EMISSION

DATA SUMMARY

TABLE B-I
SPECIFIC POINT SOURCE LISTING

LIST OF POINT SOURCES

REFERENCE	PROCESS	SOURCE
1	Paper Mill Additives	Starch Filter-Receiver Vent
2	Paper Mill Additives	Starch Silo Vent Filter
3	Paper Mill Additives	Make Down Area Vent (Bag Handling)
4	Lime Slaking	Slaker Vent
5	Chlorine Dioxide Generator	Storage Tank Scrubber Vent #1
6	Chlorine Dioxide Generator	Storage Tank Scrubber Vent #2
7	Chlorine Dioxide Generator	Tail Gas Scrubber Vent
8	Chlorine Dioxide Generator	Sodium Chloride #1 Unloading/Storage Vent
9	Chlorine Dioxide Generator	Sodium Chloride #2 Unloading/Storage Vent
10	Bleach Plant	Line 1 Scrubber
11	Bleach Plant	Line 2 Scrubber

TABLE B-II
SECTION III ITEM C OF PERMIT APPLICATION
RULE 17-2

Source	Name Of Containment	Emission Maximum lbs/hr.	Emission Actual T/yr.	Rule 17-2 Allowable Emission lbs/hr.	Potential Emission(1) lbs/hr.	Potential Emission(1) T/yr	Relate To Flow Diagram
1	Starch (Particulate)	0.16	0.1	10	161	54	Attachment A
2	Starch (Particulate)	0.14	0.1	9	136	45	Attachment A
3	Particulate	1.2	3.5	2	8	35	Attachment B
4	Lime (Particulate)	1.6	6.7	22	159	668	Attachment D
5	Chlorine	2.8	12	--	5.6	24	Attachment C
	Chlorine Dioxide	0.28	1.2	--	3.9	16	
6	Chlorine	2.8	12	--	5.6	24	Attachment C
	Chlorine Dioxide	0.28	1.2	--	3.9	16	
7	Chlorine	1.9	8	--	19	80	Attachment C
	Chlorine Dioxide	3.7	16	--	7.4	31	
8	Sodium (#1) Chloride (Particulate)	2	0.3	15	200	30	Not available
9	Sodium (#2) Chloride (Particulate)	2	0.3	15	200	30	Not available
10	Chlorine	1.2	5.0	--	60	252	Attachment C
	Chlorine Dioxide Line #1	1.1	4.6	--	55	231	
11	Chlorine	1.7	7.1	--	85	357	Attachment C
	Chlorine Dioxide Line #2	1.6	6.7	--	80	336	

(1) Uncontrolled emissions.

TABLE B-III

CONTROL DEVICE SPECIFICATIONS

Reference	Source	Type Device	Type Material	Type Liquid	Design
1	Starch Filter - Receiver Vent	Bag Filter	Polyester (265 ft.^{2})	Automatic Air Blow-Back	3.7 to Air-To-Cloth
2	Starch Silo Vent Filter	Bag Filter	Polyester (170 ft.^{2})	Automatic Air Blow-Back	5.3 to Air-To-Cloth
3	Make-Down Area Vent	Wet Centrifugal Collector (Roto-Clone)	--	Water	3" W.G. @ 1500 RPM
4	Lime Slaker	Centrifugal Wet Scrubber	--	Water	*
5 & 6	Chlorine Dioxide Storage Vents	Packed Column	Ceramic	Chilled Water (40-45^o)	*
7	Chlorine Dioxide Generator Tail-Gas	Packed Column	Kynar	Weak Caustic	*
8&9	Sodium Chloride Unloading Tanks	Spray Nozzle	--	Water	*
10&11	Bleach Plants	Packed Columns	Kynar And/or PVC	SO_2 Water Caustic	*

* Design data (pressure drop) not yet established. Specific engineering design will be submitted prior to construction.

TABLE B-IV

STACK CHARACTERISTICS

SOURCE #	ST. Height FEET	ST. DIAMETER FEET	GAS FLOW RATE ACFM	GAS FLOW RATE SDCFM	EXIT TEMP °F	WATER VAPOR Volume %	VELOCITY FPS
1	35	0.66	940	930	Average Ambient	--	45
2	80	0.66	794	790	Average Ambient	--	38
3	35	1.0	2700	2390	1000 (Sat.)	6	53
4	90	2.33	12500	3700	190 (Sat.)	63	50
5 & 6	60	0.25	146	150	50 (Sat.)	1	51
7	60	0.7	1130	1000	100 (Sat.)	6	35
8&9	40	0.5	640	620	Average Ambient	3	54
10	120	1.75	7350	6500	100 (Sat.)	6	51
11	120	2.0	10200	9000	100. (Sat.)	6	54

NOTE: All stack information is preliminary ad based on available vendor information, recent Champion installations and good engineering practice. Actual detail design data will be submitted after vendor selection and before construction.

ATTACHMENT A

DRY ADDITIVES-STARCH UNLOADING

DESCRIPTION OF OPERATION

BULK STARCH UNLOADING

This pneumatic conveying system is designed to handle common "pearl" starch having a bulk density of 40 to 45 lbs per cubic foot.

The starch will be unloaded from either of two airslide railcars positioned on a rail siding adjacent to the storage silo. The unloading rate will be approximately 500 lbs per minute, over a horizontal and vertical distance of 100 ft. on the vacuum leg and 150 ft. on the pressure leg of the conveying system. Normal starch usage will require unloading one car per day and maximum usage would require unloading two cars per day at the rate of approximately 6 hours per car.

The product will be fluidized with air and then withdrawn by vacuum from the airslide railcar into a vacuum filter receiver. The vacuum filter receiver will separate the starch from the conveying air and discharge the product through a rotary airlock valve into a pressure conveying system. The starch will then be conveyed to the starch storage silo.

To unload a railcar, an operator is required to open up the latch vent on the top of the car and place a filter media over the vent. A flexible hose is then connected from the bottom of the railcar to the manifold paralleling the railroad track to transport the starch. A second hose must be connected from the airslide blower to the railcar.

The operator is then required to depress the unload start pushbutton which would start the pressure blower, the rotary valve of the vacuum filter receiver, the dust collector fan and the rotary valve beneath the dust collector.

After these devices have started, the vacuum blower would start and the vacuum relief valve would close allowing starch to be withdrawn from the railcar into the vacuum filter receiver and to be deposited through the rotary valve into the presssure conveying line to the storage silo.

Conveying would continue until the storage silo indicated full level at which time the vacuum relief valve would open, the contents of the vacuum filter receiver and the dust collector would discharge; and, upon indication of low pressure in the conveying line, the system would shut down.

In the event of a line blockage, which occurs in the vacuum line to the vacuum filter receiver, the level control of the vacuum filter receiver becomes actuated, and the vacuum relief valve would open, starch flow would cease from the railcar into the filter while continuing to discharge from the vacuum filter receiver until the line had cleared and the level had receeded, at which time the vacuum conveying of starch from the railcar would once again take place.

In the event of a sudden loss of pressure differential in the dust collector, the entire unloading system would shutdown.

The unload panel will be of NEMA 4 construction and will include the necessary devices for starting and stopping of the system, as well as a graphic display indicating the status of the storage silo, the indication of the level of the vacuum filter receiver and dust collector, the devices running, high and low pressure lights, as well as necessary pressure and vacuum indicating gauges, switches and alarms.

BILL OF MATERIALS

1. Airslide blower
2. Air piping to connect the discharge of the airslide blower to flexible hoses serving railcar positions.
3. Rubber suction hose with quick coupling, dust plug and dust cap.
4. Airslide railroad car hatch vents. Vents are equipped with breather bag constructed of neoprene coated nylon.
5. Impactor.
6. Airslide railroad car adaptor.
7. Vacuum conveying line, hose and mainfold.
8. Vacuum filter receiver. The filter will be equipped with the following:
   a) 265 square feet of filter media.
   b) Automatic backflow cleaning mechanism.
   c) Full length access door.
   d) Air manifold with pressure gauge.
   e) Manual drain filter.
   f) Backflow sequence timer.
   g) Purge tank.
   h) Automatic vacuum breaker.
   i) Filter regulator.
   j) 25 filter bags.
9. Rotary airlock valve.

10V. Vacuum blower unit.

10P. Pressure blower unit.

11. Air piping to connect vacuum filter receiver to the vacuum blower unit and to pipe the pressure blower to the conveying line attachment under the vacuum filter receiver.
12. Piping to connect the vacuum filter receiver to the top of the storage silo.

13. Bin vent collector, to have the following features:
    a) 170 square feet of filter media.
    b) Automatic backflow cleaning mechanism.
    c) Full length access door.
    d) Air manifold with pressure gauge.
    e) Manual drain filter.
    f) Backflow sequence timer.
    g) Purge air tank.
    h) Automatic vacuum breaker.
    i) Filter regulator.
    j) Filter bag.
14. Rotary airlock valve.
15. Level controls.
16. Slidegate valve.
17. Rotary airlock valve on silo discharge.
18. Airslide blower unit for fluidizing silo.
19. Screw conveyor.
20. Bulk storage vessel of bolted steel construction, 26' diameter and 80' overall height.
21. Electrical controls.

DRAWING NUMBER

LOCATION DWG. NO. 580-5-001-C

NOTES:
1. ALL WIRING, MOTORS & CONTROLS INSIDE SILO SKIRT & ADJACENT TO SILO TO BE CLASS II, GROUP G (EXPLOSION PROOF).
2. DRAIN IN TO U-DRAIN.
3. ALL TEES IN PIPE LINES CONTAINING STARCH INSTALL HORIZONTAL TO PREVENT PLUGGING.

LEGEND:
TPD / TSOL / GPM = NORMAL FLOW
TPD / TSOL / GPM = DESIGN FLOW
* VENDOR SUPPLIED PACKAGE OR ITEM.
EXISTING
LINE SHOWN FOR REFERENCE ONLY
MEA
TIE-IN
(E) DENOTES EXISTING EQUIPMENT IN PLACE.
(R) DENOTES EXISTING EQUIPMENT RELOCATED.
FOR EQUIPMENT DESIGNATED AS (E) OR (R) REFER TO EQUIPMENT LIST FOR EXISTING EQUIPMENT NUMBER.
DENOTES LINE FROM UTILITY FLOW DIAGRAM

DESIGN BASIS:

PRODUCTION RATE AT REEL:		AT COUCH
NORMAL	MDTPD	849 BDTPD
DESIGN	MDTPD	928 BDTPD

ADDITIVES USAGE-#/BDTO — AT COUCH (EXCEPTION IS S.P. STARCH BASED ON REEL)

	NORMAL	DESIGN
ALUM	25	117
RETENTION AID	2.2	3.0
STARCH	58	120
STARCH (WET END)	15	30
FILLER CLAY	74	250
ROSIN SIZE	10.2	15
SLIMICIDE	0.30	0.50
TITANIUM DIOXIDE	35	140
EXTENDER	55	140
FLUORESCENT	2.3	8.6
SODIUM BICARBONATE + SALT	1.4	10
CAUSTIC(50%)PH CONTROL	0.8	0.9
CAUSTIC(50%)BOIL OUT(SCAL)	1000	1500
WET END DYES: (#/DAY)		
(A) BLUE DYE	76	102
(B) RED DYE	13	18
(C) YELLOW DYE	59	78
(D) BLACK DYE	20	27
AMMONIUM PERSULFATE (#/DAY)	33	93
DEFOAMER (GPH)	0	1.5
FELT ACID (GPH)	0	1.7

ESTIMATE ESTIMATING JOB #JR07L
PENSACOLA MILL CONVERSION PROJECT

NO.	RELEASED FOR	BY	DATE
C	ESTIMATE REPORT	EJS	06-15-85
B	CLIENT APPROVAL	EJS	06-15-85
A	OFFICE CHECK	EJS	07-17-85

Brown & Root U.S.A., Inc.
ENGINEERS • CONSTRUCTORS
HOUSTON, TEXAS

CONTRACT NO. JR-0728
OWNER NO.
APPROVED BY
DATE

BIN VENT FILTER 580-1170-32
BIN VENT BLOWER 580-1180-33, 3 HP 1800 RPM
MILL AIR
ATMOS
1"-580-AP- -404
KC
LI
LOCATED @ RAILCAR
LA
LSH
LA
500#/MIN UNLOADING RATE
SIZE PRESS STARCH STORAGE SILO 580-1250-14
CAP. 400 TONS
28' DIA X 80' HIGH
RET. 14 DAYS
BOLTED CARBON STEEL
MILL WATER
4"-580-HWC- -504
4"-580-STS- -500
FROM STARCH SUPPLY TANK
TO STARCH SUPPLY TANK
FROM SLIMICIDE PORTA FEEDER 580-5-012
1½"-580-SLM- -500
FROM DWG. 580-5-002 S.P. STARCH SUPPLY TANK LEVEL
1.1 GPM
3.1 GPM
LSL
LAL
NOTE 1
FIC
(INTERMITTENT)
200 GPM
LOOP LINE
432/31.6/200
485/35/200
STARCH SLURRY MAKE DOWN CONTROL SYSTEM BY BAR 580-1610-60
FLUID BED BIN DISCHARGER 580-1260-65
ROTARY AIRLOCK 580-1270-65, 2 HP 1800 RPM
SCREW CONVEYOR 580-1280-65, 3 HP 1800 RPM
FLUID BED BLOWER FILTER 580-1290-32
SILENCER BLOWER INTAKE
SILENCER BLOWER OUTLET
580-1300-33
580-1310-33
360#/MIN
DA
DR
CLEAN-OUT
½" -580-STS- -500
LI
LA
LSH
BAFFLES (4)
432/31.6/200
485/35/200
TSH
S.P. STARCH SLURRY MAKEDOWN TANK AGITATOR
580-1360-70
7.5 HP 1800/1200 RPM
TWO SPEED
6"-580-STS- -500
NOTE 3
NOTE 2
6"-580-DF- -401
4"-580-STS- -500
3"-ALUMINUM DUCT #
4" # ALUMINUM DUCT #
5"# ALUMINUM DUCT #
STARCH UNLOADING AND STORAGE SYSTEM 580-1001-92
CONTROL PANEL BULK STARCH UNLOADING # 580-1200-60
VENTED IN OUTSIDE RAIL SHED
1"-580-AP- -404
20 SCFM
MILL AIR
RAILCAR HATCH VENT #1 580-1050-35
RAILCAR HATCH VENT #2 580-1060-35
VENTED IN RAIL SHED
CLOTH FILTER (TYP.)
PI
PV
VAC BLEED
KC
BULK STARCH RAIL CAR 90 TONS CAP.
VIBRATOR
PDS
TSH
3"DIA. ALUMINUM DUCT #
6"DIA. ALUMINUM #
LS
SIGHT GLASS
ZS
ZSH
NITROGEN TRUCK UNLOADING
WASH DOWN AREA - PROCESS SEWER
AIR SLIDE FILTER 580-1020-32
AIRSLIDE BLOWER 580-1010-33, HP RPM
SILENCERS 580-1030-33, 580-1040-33
UNLOADING PAN 580-1070-67
SILENCERS 580-1080-33, 580-1090-33
UNLOADING BLOWER (VACUUM) 580-1100-33, 75 HP 1800 RPM
UNLOADING BLOWER FILTER 580-1110-32
UNLOADING BLOWER (PRESSURE) 580-1120-33, 75 HP 1800 RPM
SILENCER 580-1130-33, 580-1140-33
STARCH VACUUM RECEIVER 580-1150-11
ROTARY AIR LOCK 580-1160-65, 1.5 HP 1800 RPM
STARCH SILO FLUID BED BLOWER 580-1320-33, 5 HP 1800 RPM
S.P. STARCH SLURRY MAKEDOWN TANK 580-1350-11, CAP. 2000 GAL., DIA.X 8'-6" 316 SS, RET.2.6 HRS. @ 31.6%
S.P. STARCH STRAINER 580-1370-40, 40 MESH 316 SS, SINGLE BASKET
S.P. STARCH SLURRY MAKEDOWN PUMP 580-1380-20, 200 GPM 95 MD, 15 HP 1800 RPM
7'-6"

DWG. NO.	REFERENCES	NO.	REVISIONS	MADE	CKD.	DATE	NO.	REVISIONS	MADE	CKD.	DATE	MICROFILMED	DATE

GRAPHIC SCALE ALL LETTERING MIN. 1/8" (0" 1" 2")

SCALE		DATE
DESIGN BY:	RTL	06-27-85
DRAWN BY:	LA	06-27-85
CHECKED BY:		
SUPV. BY:		
SUBMITTED BY:		
APP'D BY:		
APP'D BY:		

SEAL

TITLE
ADDITIVE SYSTEMS
S.P. STARCH UNLOADING, STORAGE & MAKEDOWN PROCESS FLOW DIAGRAM
CONVERSION PROJECT PENSACOLA MILL

Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020

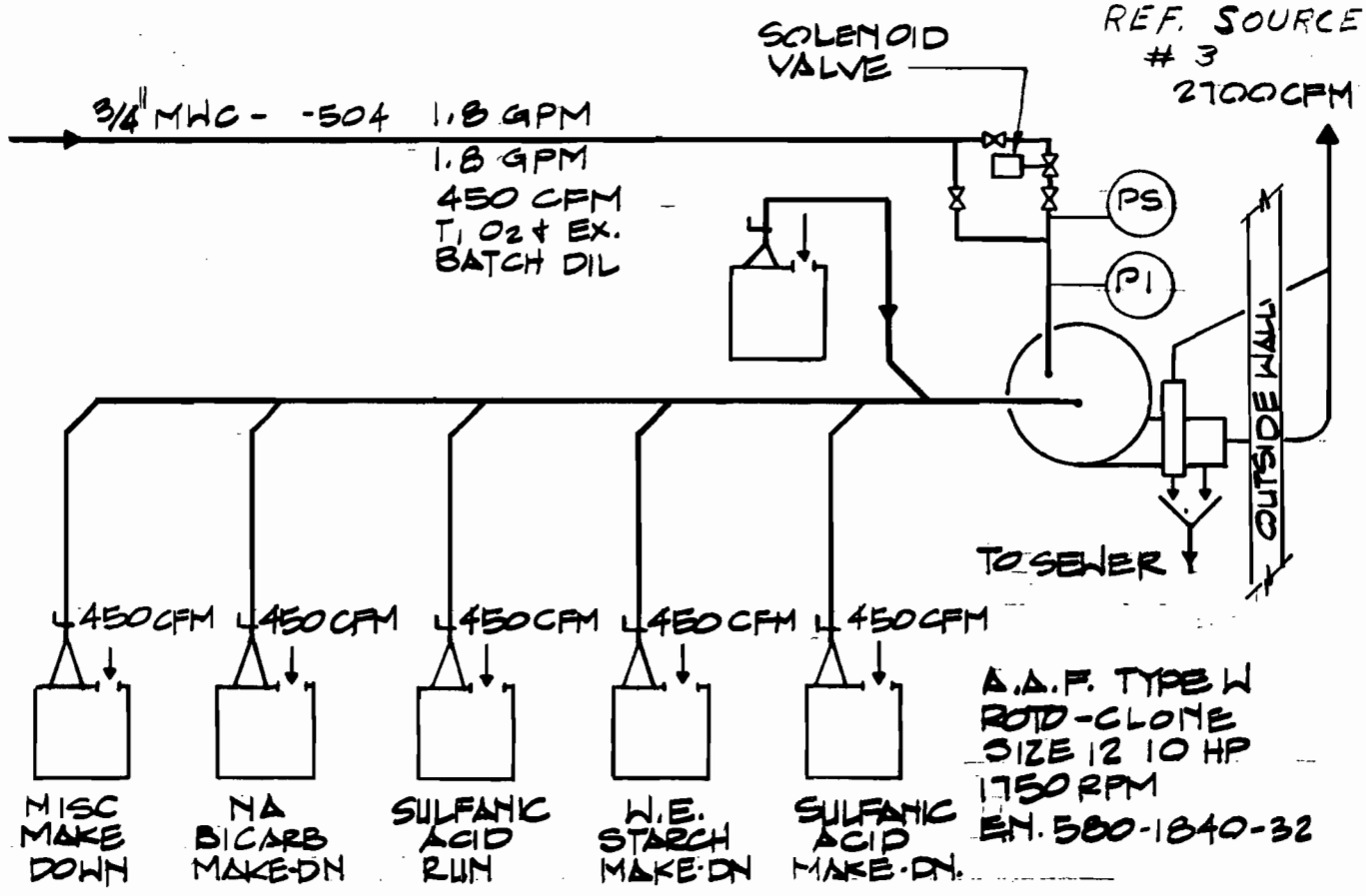
DRAWING NUMBER
LOCATION DWG. NO. 580-5-001-C

FM1002 9-9-85

ATTACHMENT B

DRY ADDITIVES - BAG HANDLING SYSTEM FLOW DIAGRAM

Brown & Root U.S.A., Inc.	CONTRACT NO. JR-0728
ADDITIVE BUILDING DRY BATCH COLLECTION SYSTEM	IDENTIFICATION NO. SK-503-5-001
DRAWN BY: PM | CHECKED BY: W.J.D. | APPROVAL DATE 09-20-85	PAGE 1 OF 1



THE ROTO-CLONE WILL OPERATE CONTINUOUSLY WITH BALANCED EXHAUST OF 450 CFM FROM EACH TANK AT ALL TIMES. WHEN ROTO-CLONE IS ENERGIZED THE SOLENOID VALVE IN THE WATER LINE WILL OPEN. IF ROTO-CLONE IS ENERGIZED AND PRESSURE SWITCH DOES NOT BREAK, AN ALARM LIGHT WILL BE ENERGIZED IN THE LABORATORY.
THE ROTO-CLONE WILL EXHAUST VERTICALLY OUTSIDE THE BUILDING.

OPERATING PRINCIPLE

The dust laden air enters the Type W Roto-Clone where it is subjected to a fine water spray. The water and dust being heavier than air impinge on the blades of the impeller and then are directed into the water cone by the special blade design and the centrifugal force of the rotating impeller. The slurry drains from the unit through the sludge chute to the expansion chamber.

The impeller imparts energy to the clean air which being lighter than the water and dust is discharged in front of the water cone and continues on to the clean air outlet.

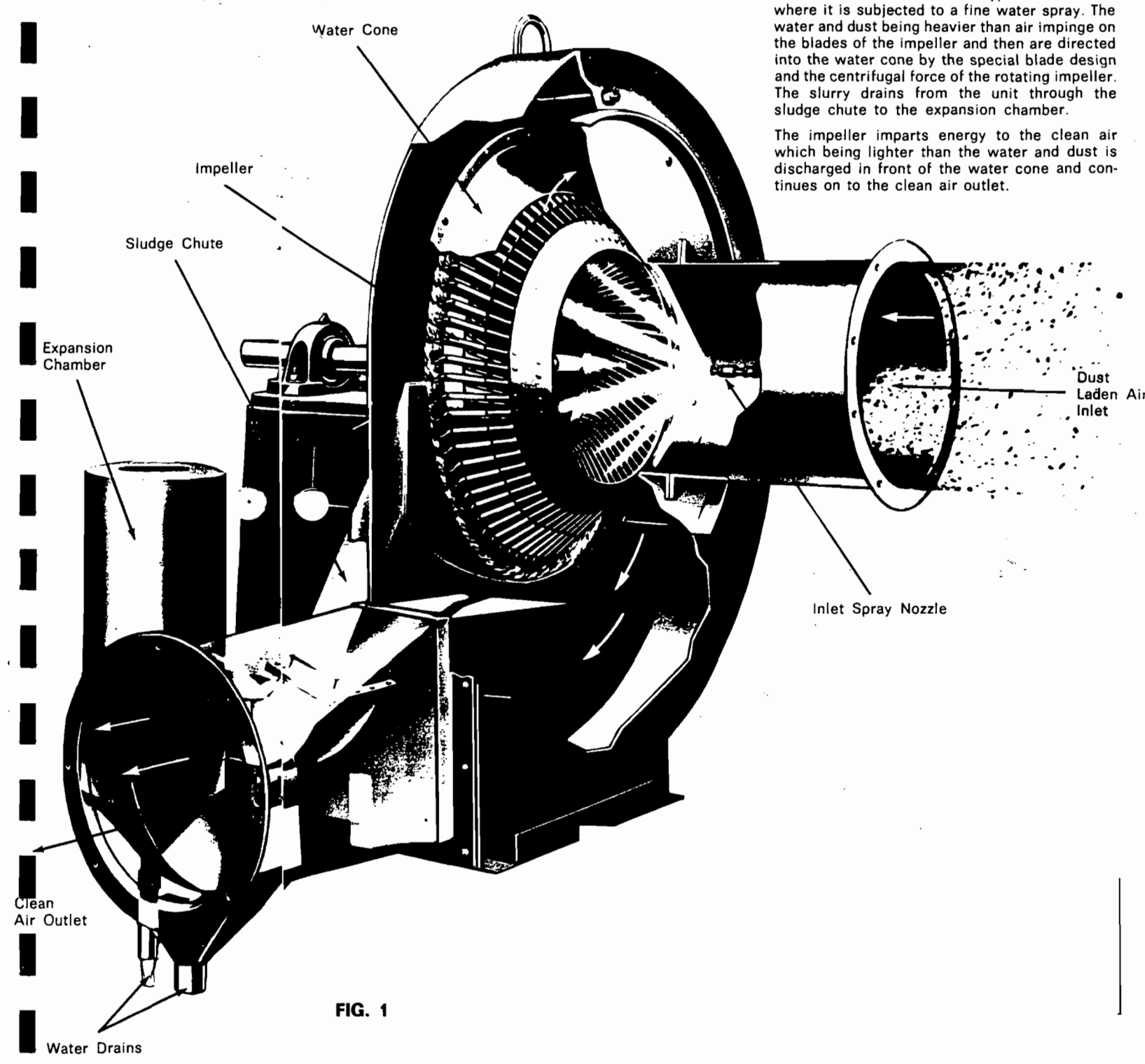
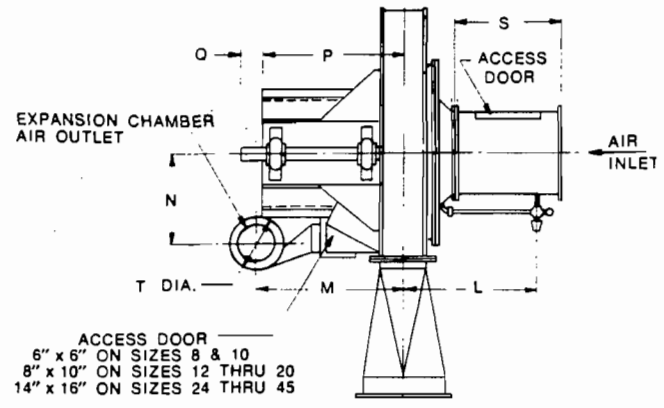
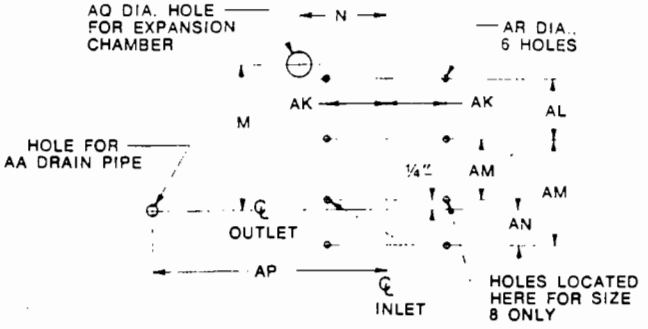


FIG. 1

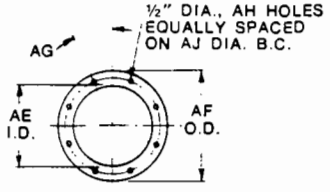
ARRANGEMENT 1



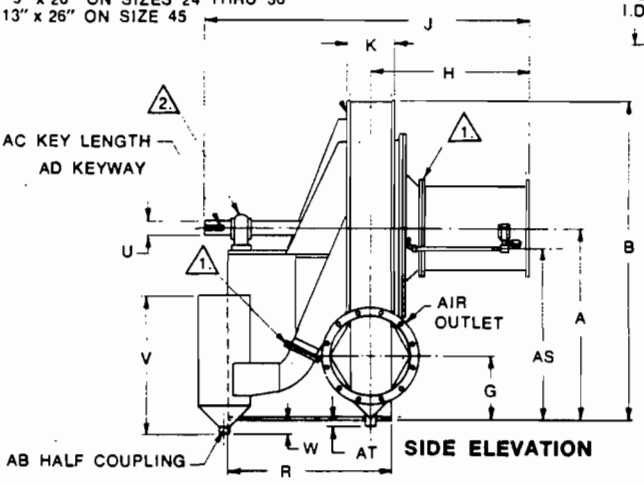
PLAN VIEW



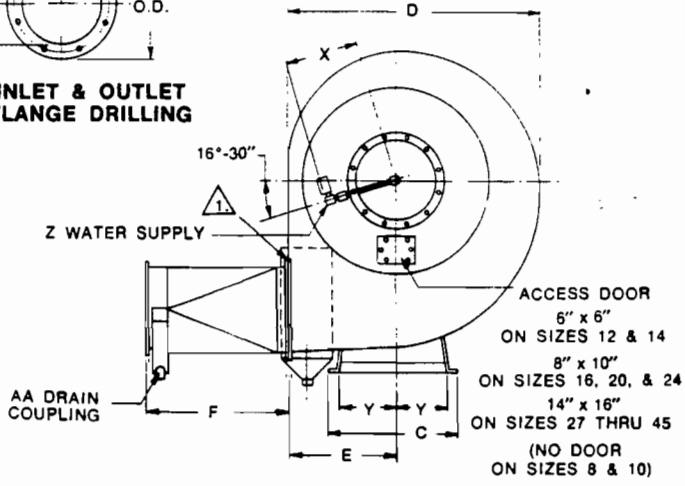
BASE DRILLING



INLET & OUTLET FLANGE DRILLING



SIDE ELEVATION



FRONT ELEVATION

1. STANDARD ROTO-CLONES SIZES 20 AND SMALLER HAVE INLET, OUTLET, AND EXPANSION CHAMBER WELDED TO HOUSING IN LIEU OF FLANGED AND BOLTED CONNECTION.

2. 5 15/16" DIA. BEARING ON SIZE 45; BEARING SIZE SAME AS "U" ON OTHERS.

SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W
8	20"	2'-8 15/16"	12¾"	2'-1⅞"	11⅛"	14"	7⅜"	18 3/16"	3'-7¼"	4 3/16"	11 9/16"	20 1/16"	10"	21 3/16"	3½"	23 1/16"	14"	7⅛"	1 1/16"	18¾"	11 1/16"
10	24"	3'-3 15/16"	15"	2'-7⅞"	13 11/16"	17½"	8¼"	21 13/16"	4'-3¾"	5 3/16"	14 13/16"	2'-1⅛"	10¾"	2'-2 1/16"	3⅞"	2'-4 9/16"	16"	8⅛"		22¼"	2 1/16"
12	2'-5"	4'-0¼"	19¾"	3'-2½"	16 5/16"	21"	10"	2'-1"	4'-10 1/16"	6 5/16"	17⅞"	2'-3⅜"	14½"	2'-4 5/16"	4½"	2'-7 9/16"	18"	10⅛"	1 1/16"	2'-3¼"	3 1/16"
14	2'-8½"	4'-6¾"	21½"	3'-8½"	19⅛"	24½"	10 5/16"	2'-4"	5'-2 15/16"	7¼"	20⅜"		16 5/16"	2'-5 1/16"	5⅞"	2'-8 9/16"	20"	11⅛"	2 1/16"	2'-5 11/16"	4⅜"
16	3'-1½"	5'-3⅛"	2'-4½"	4'-3¼"	22"	2'-4"	12 1/16"	2'-7 1/16"	5'-6½"	8¼"	22 15/16"	2'-6 1/16"	18½"	2'-5 9/16"	5¾"	2'-9 9/16"	22"	12¼"	2 1/16"	2'-8¼"	2 11/16"
20	3'-10"	6'-5 9/16"	2'-8½"	5'-3⅛"	2'-3 1/16"	2'-11"	14⅜"	2'-11½"	6'-9 1/16"	10¼"	2'-8⅛"	3'-0 1/16"	21⅜"	3'-3 1/16"	6⅜"	3'-8 1/16"	24"	13¼"		3'-0¾"	2½"
24	4'-8⅜"	7'-10 1/16"	3'-2½"	6'-3⅜"	2'-8¼"	3'-6"	18 1/16"	3'-9 1/16"	7'-10 1/16"	12⅜"	3'-2 1/16"	3'-7¾"	2'-2"	3'-6 1/16"	6 9/16"	4'-0 1/16"	2'-8"	15¼"	2 1/16"	3'-4 1/16"	3 1/16"
27	5'-2"	8'-8¼"	3'-8½"	7'-0½"	3'-0⅛"	3'-11"	20"	4'-2¼"	8'-8¼"	13⅞"	3'-6¾"	4'-1⅞"	2'-5"	3'-9 9/16"	8 1/16"	4'-4 5/16"	2'-11"	17¼"	3 1/16"	3'-9 1/16"	4"
30	5'-7¼"	9'-5¾"		7'-9"	3'-3¼"	4'-4½"	21"	4'-7 1/16"	9'-3 1/16"	15⅜"	4'-0 1/16"	4'-6 1/16"	2'-8"	3'-10 1/16"	9 1/16"	4'-5 13/16"	3'-2"	18¾"	3 1/16"	4'-2 1/16"	5¾"
33	6'-2"	10'-5 13/16"	4'-2½"	8'-7⅛"	3'-8 1/16"	4'-10"	22½"	4'-11 13/16"	10'-1 1/16"	17"	4'-4 13/16"	5'-0 1/16"	3'-1"	4'-3"	10⅝"	4'-11¼"	3'-5"	19½"	3 13/16"	4'-6⅝"	5 1/16"
36	8'-7½"	11'-3¼"		9'-3½"	3'-11⅝"	5'-3½"	24"	5'-4¼"	10'-11⅛"	18½"	4'-9¼"	5'-3 1/16"	3'-3"	4'-6¼"	12⅛"	5'-3¼"	3'-8"	20¼"		4'-10"	4¼"
45	8'-0¾"	13'-9 1/16"	5'-2½"	11'-4⅞"	4'-10 13/16"	6'-7"	2'-4½"	6'-8 1/16"	12'-1 9/16"	23"	5'-10 13/16"	6'-7¼"	4'-0"	4'-5¼"	11⅜"	5'-5"	4'-7"	23⅜"	4¼"	6'-0½"	5¾"

SIZE	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	AN	AP	AQ	AR	AS	AT
8	11½"	4⅞"				3"		8"	11⅛"	30°	6	9⅜"	5¾"	12"	7"		22 9/16"	4¾"		16¾"	1½"
10	11¾"	6"	¾"	1½"	1½"	3¼"	⅜"	10"	13⅜"			11⅜"	6⅞"		10"	¼"	2'-4⅝"	8¼"	5/16"	20¾"	2¼"
12	14"	7⅞"	Same			3¾"		12"	15⅛"			14"	9"	14"	13"	⅜"	2'-11"	7¼"		2'-1"	1⅜"
14	15 5/16"	8¾"					½"	14"	17⅛"	22½°	8	15¾"	9⅞"	14½"	13½"	1¼"	3'-4"	9⅝"		2'-3¼"	2 1/16"
16	16¾"	11¼"			2"	5¼"		16"	20⅛"			18⅜"	13"	16"	13"	1¾"	3'-10⅜"			2'-8¾"	2⅛"
20	19 5/16"	13¼"					⅝"	20"	24⅛"			22½"	15"	19½"	20"	2¾"	4'-10 7/16"	6"	1 1/16"	3'-4½"	2⅝"
24	21 1/16"	16¼"				6"		24"	2'-4⅛"	15°	12	2'-2¼"	18"	24"	20⅛"	3¾"	5'-10⅜"	8½"	1 3/16"	4'-2¼"	1 9/16"
27	23⅜"		1"	2"	2½"	7¾"	¾"	2'-3"	2'-7⅛"			2'-5⅜"		23½"		4½"	6'-7½"	9½"		4'-7¼"	2¼"
30	2'-1½"	19¼"				9"	⅞"	2'-6"	2'-10⅛"			2'-8⅜"	21"	2'-1"	24¼"	5¼"	7'-4⅝"	12½"	⅞"	5'-0"	3½"
33	2'-3⅜"					9½"		2'-9"	3'-1⅛"			2'-11¼"		2'-3"	2'-3¾"	6"	8'-2 1/16"	12"		5'-6¼"	4¼"
36	2'-5⅝"	22¼"			3"	11"	1"	3'-0"	3'-4⅛"	11¼°	16	3'-2⅜"	24"	2'-5"	2'-6¼"	6¾"	8'-11½"	11¼"	1⅛"	5'-11⅛"	4¾"
45	2'-10 13/16"	2'-4¼"		2½"	3½"	10"		3'-9"	4'-3⅛"	9°	20	4'-0⅜"	2'-6"	2'-3"	2'-9½"	9"	11'-2 9/16"	14"		7'-2¾"	7 13/16"

ATTACHMENT C

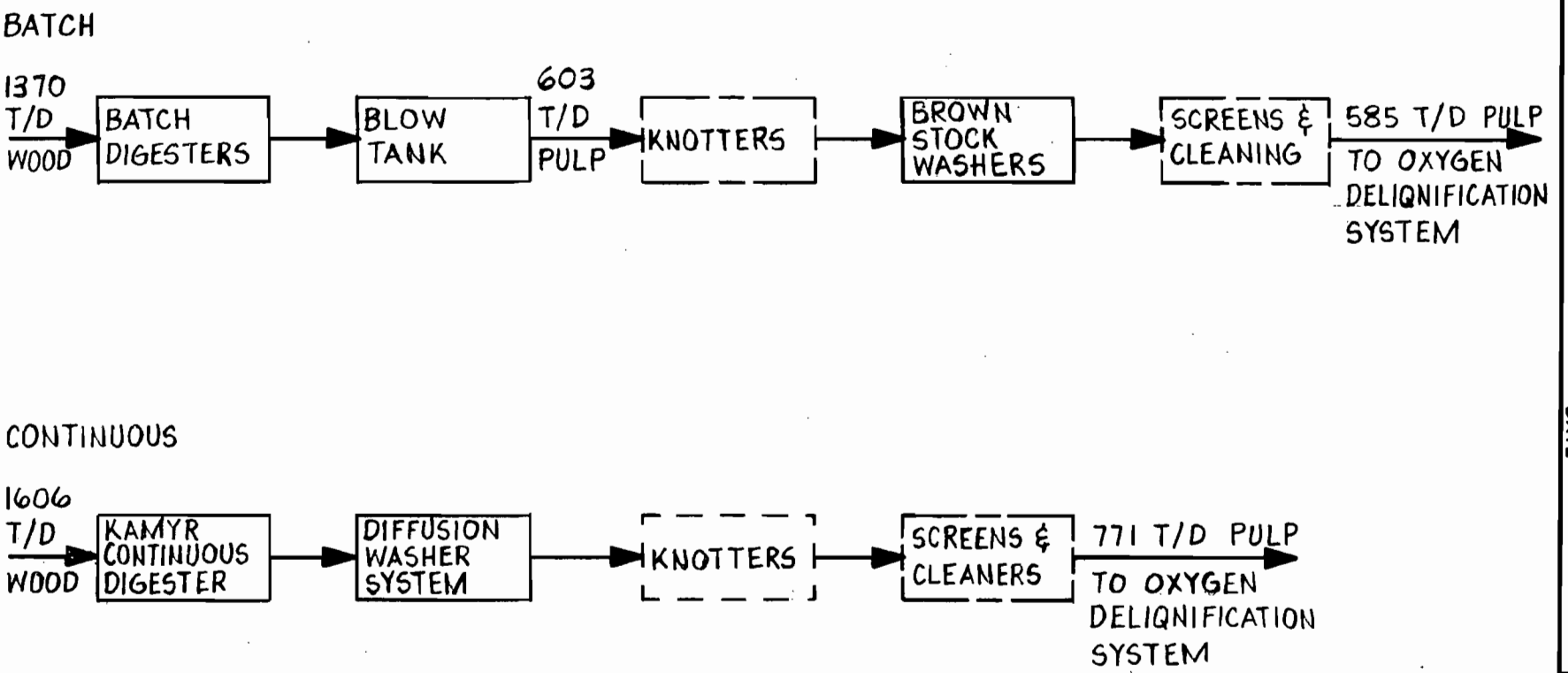
NEW BLEACHING FACILITIES DESCRIPTION

AND

FLOW DIAGRAMS

FORM NO. EF-000-50.11-0-US

WOOD COOKING SYSTEM



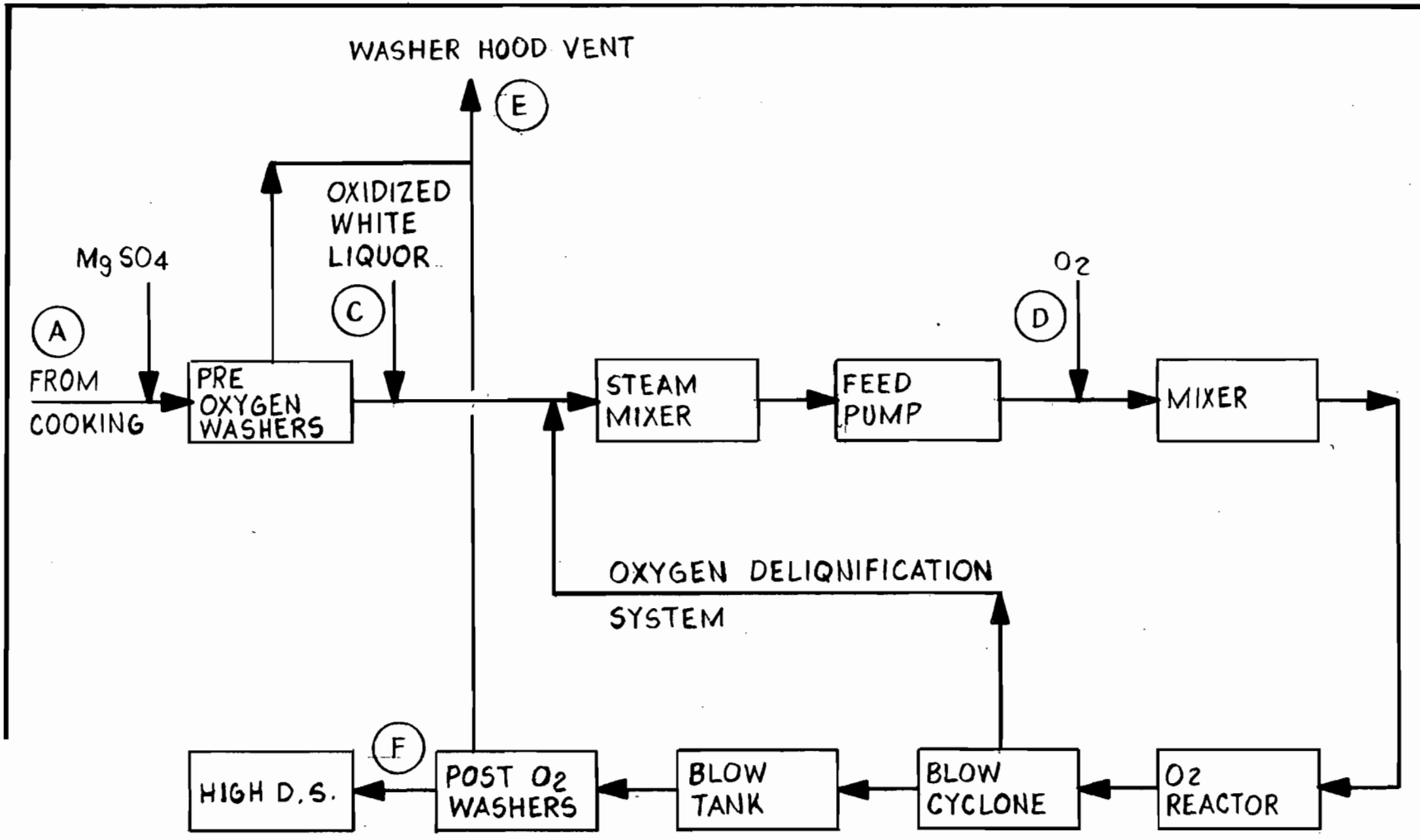
Brown & Root U.S.A., Inc.

CONTRACT NO. JR-0728

IDENTIFICATION NO.

PAGE OF

APPROVAL DATE



	A	C	D	E	F
BATCH	585 T/D	797 GPM	3000 LBS/HR	6700 ACFM	561 T/D
CONTINUOUS	771 T/D	1045 GPM	4352 LBS/HR	7400 ACFM	745 T/D

Brown & Root U.S.A., Inc.

CONTRACT NO. JR-0728

IDENTIFICATION NO.

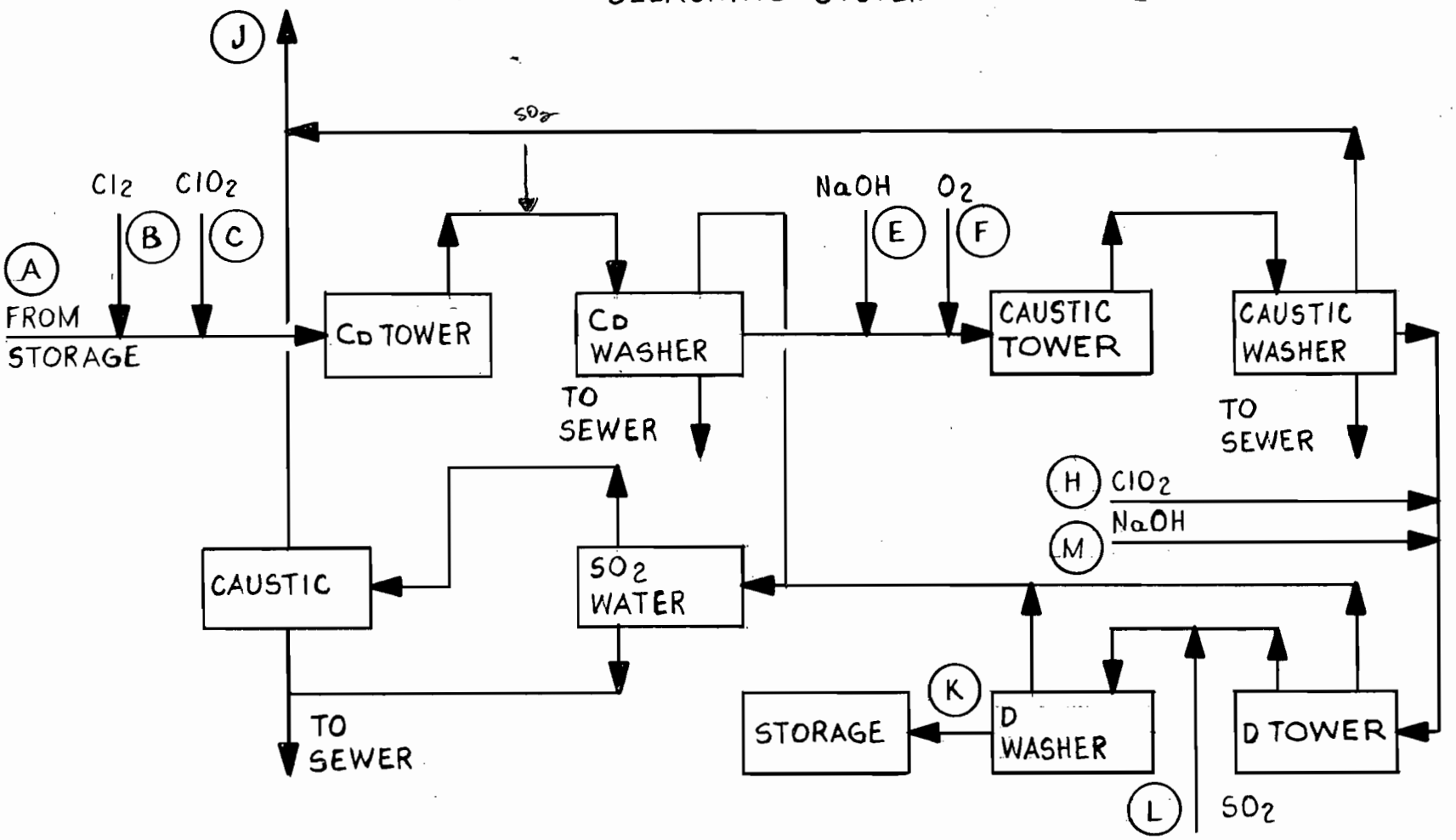
PAGE OF

APPROVAL DATE

FORM NO. EF-000-50.11-0-US

REF. SOURCE #10,11

BLEACHING SYSTEM



	A	B	C	E	F	H	J	K	L	M
A-LINE	745 T/D	16.9 T/D	1.13 T/D	24 GPM	3.28 T/D	5.49 T/D	15800 CFM	720 T/D	2.48 T/D	6 GPM
B-LINE	561 T/D	15.9 T/D	1.07 T/D	23 GPM	2.46 T/D	3.94 T/D	11200 CFM	540 T/D	1.87 T/D	4 GPM

Brown & Root U.S.A., Inc.

CONTRACT NO. JR-0728

IDENTIFICATION NO.

PAGE OF

APPROVAL DATE

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHWEST DISTRICT

160 GOVERNMENTAL CENTER
PENSACOLA, FLORIDA 32501-5794

October 2, 1985

Mr. R. C. Wigger
Champion International Corporation
One Champion Plaza
Stanford, Connecticut 06921

Dear Mr. Wigger:

We have arranged the following agenda for Champion's permitting meetings with the Department:

Thursday, October 10, at 9:00 a.m. - meet with Bureau of Air Quality Management (BAQM). BAQM Third Floor Conference Room, 2600 Blair Stone Road, Tallahassee, to discuss air permitting.

Thursday, October 10, at 1:30 p.m. - meet with Dr. Robert Patton, Chief Chemist, also in the BAQM Conference Room, to discuss laboratory quality control in wastewater analyses.

Friday, October 11, at 9:00 a.m. - meet with District staff, Room 202 Conference Room, 160 Governmental Center, Pensacola, to discuss industrial waste permitting.

I will meet you and Champion's party at the BAQM offices in Tallahassee.

Sincerely,

Thomas W. Moody

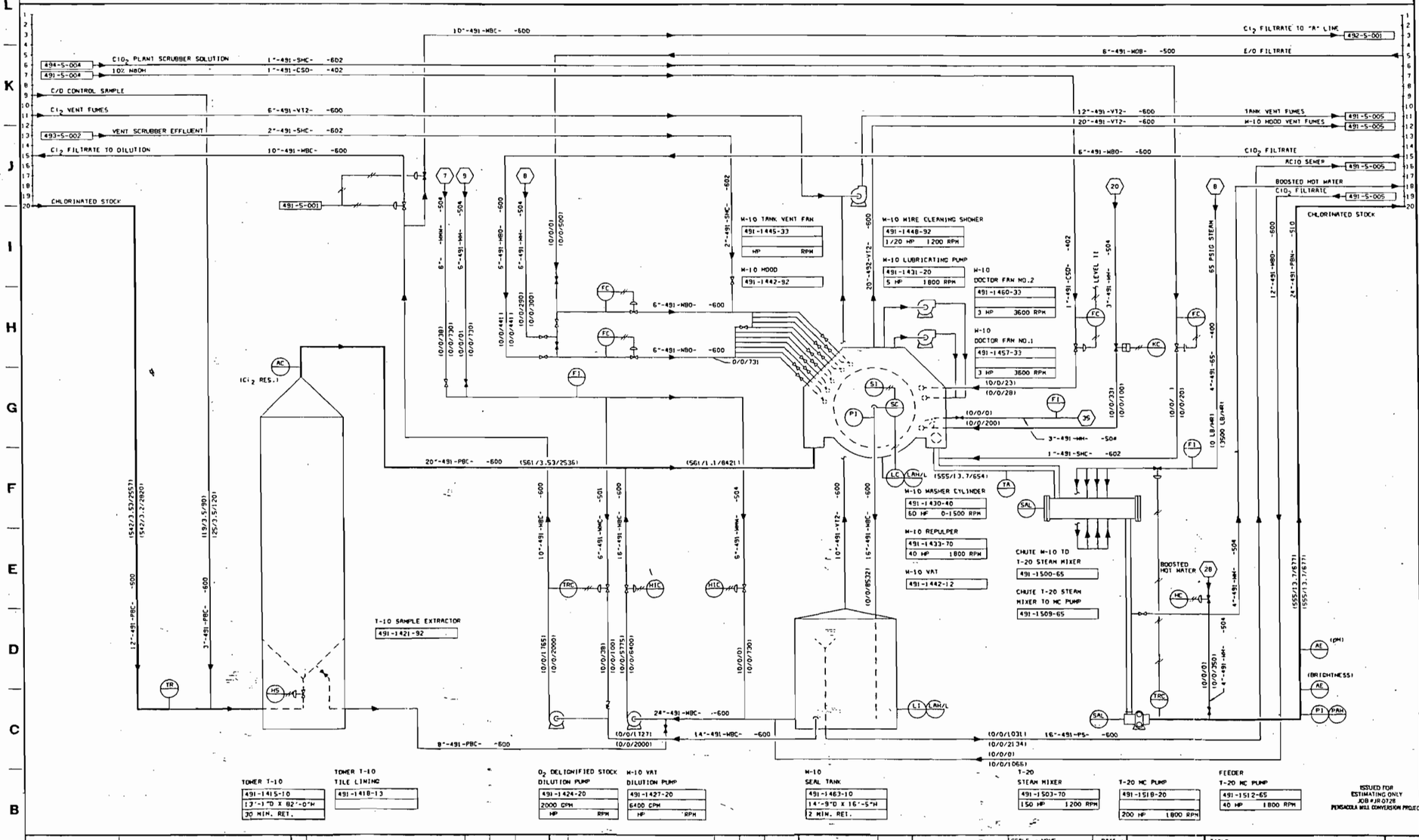
Thomas W. Moody, P.E.
Special Programs Supervisor

TWM/tmc

cc: Steve Fox
Bob Patton
Bill Thomas
Abdul Khatri
Bob Brazzell
Jack Preece

DRAWING NUMBER
LOCATION DWG. NO. 491-5-003-C

NOTES :
1. FOR DESIGN BASIS & LEGEND SEE DWG. NO. 491-5-001.



ISSUED FOR ESTIMATING ONLY JOB # JR 0728 PENSACOLA MILL CONVERSION PROJECT

NO.	RELEASED FOR	BY	DATE
C	ESTIMATE REPORT		
A	OFFICE CHECK AND CLIENT APPROVAL		

Brown & Root U.S.A., Inc.
ENGINEERS & CONSTRUCTORS
HOUSTON, TEXAS

CONTRACT NO. JR-0728 | OWNER NO.
APPROVED BY | DATE

DWG. NO.	REFERENCES	NO.	REVISIONS	MADE	CKD.	DATE	NO.	REVISIONS	MADE	CKD.	DATE	MICROFILMED	DATE

FM1054 09/22/95

GRAPHIC SCALE ALL LETTERING MIN. 1/8"

SCALE - NONE | DATE
DESIGN BY:
DRAWN BY: KAR | 08-11-95
PROCESS BY:
CHECKED BY:
APP'D BY:
SUBMITTED BY:
APP'D BY:
APP'D BY:

SEAL

TITLE
"B" LINE BLEACH PLANT
CHLORINATION STAGE-Cd
PROCESS FLOW DIAGRAM
CONVERSION PROJECT PENSACOLA MILL

Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, ohio 45020

DRAWING NUMBER
LOCATION DWG. NO. 491-5-003-C

DRAWING NUMBER
LOCATION DWG. NO. 491-5-004-C

E/O FILTRATE TO W-10 SHOWERS 6"-491-WOB- -500
491-S-005 10% NaOH 2"-491-CSD- -402
494-S-011/19 OXYGEN 1 1/2"-491-O2- -505
ClO_2 FILTRATE 6"-491-WBO- -600
BOOSTED HOT WATER 4"-491-WH- -504
CHLORINATED STOCK
24"-491-PBW- -510
1555/13.7/677
1555/13.7/677
1 1/2"-491-O2- -505
1208 LB/HR
1244 LB/HR
8"-491-VT2- -600
24"-491-VT2- -600
E/O VENT GASES 493-S-002
BOOSTED HOT WATER
2"-491-CSD- -402
10% NaOH 491-S-003
24"-491-PS- -600
ALKALINE SEWER
ClO_2 FILTRATE
0/0/1066
0/0/441
10/0/951
10/0/1201
10/0/6251
8"-491-WBO- -600
8"-491-WH- -504
W-20 VENT FAN
491-1557-33
20 HP 1800 RPM
W-20 HOOD
491-1554-92
W-20 WIRE CLEANING SHOWER
491-1560-92
1 1/20 HP 1200 RPM
W-20 LUBRICATING PUMP
491-1546-20
15 HP 1800 RPM
W-20 DOCTOR FAN NO.2
491-1569-33
3 HP 3600 RPM
W-20 DOCTOR FAN NO.1
491-1566-33
3 HP 3600 RPM
10/0/41
10/0/5
3"-491-WH- -504
10/0/01
10/0/2001
10/0/332
10/0/100
20"-491-WH- -500
20"-491-POB- -500
[555/2.5/3663]
[555/1.1/8324]
24"-491-POB- -500
W-20 WASHER CYLINDER
491-1545-40
60 HP 1500 RPM
W-20 REPULPER
491-1548-70
40 HP 1800 RPM
W-20 VAT
491-1551-12
CHUTE W-20 TO T-30 STEAM MIXER
491-1600-65
CHUTE T-30 STEAM MIXER TO MC PUMP
491-1606-65
T-20 SAMPLE EXTRACTOR
491-1530-92
491-POB- -510
10/0/01
10/0/3501
8"-491-POB- -500
[72/3.0/4001]
10/0/5001
10/0/5101
10/0/2986
10/0/3001
10/0/4682
10/0/2681
10/0/10001
10/0/6411
10"-491-VT2- -600
16"-491-WH- -500
12"-491-WBO- -500
16"-491-WBO- -500
24"-491-PS- -600
20"-491-WH- -500
10 LB/HR
18000 LB/HR
0/0/498
0/0/550
[545/14.0/643]
65 PSIG STEAM
6"-491-565- -400
E/O FILTRATE
STOCK
(BRIGHTNESS)
T-20 CHEMICAL-MIXER (ClO_2)
491-1521-70
200 HP 1800 RPM
TOWER T-20
491-1524-10
13'-1"DIA.X 82'-0"H
90 MIN RET.
TOWER T-20 TILE LINING
491-1527-13
TOWER T-20 SCRAPER
491-1533-65
15 HP 1800 RPM
E/O FILTRATE TO W-10 SHOWERS PUMP
491-1543-20
500 GPM
HP RPM
TOWER T-20 DILUTION PUMP
491-1536-20
3300 GPM
HP RPM
WASHER W-20 VAT DILUTION PUMP
491-1529-20
5100 GPM
HP RPM
WASHER W-20 SEAL TANK
491-1532-10
14'-9"DIA.X 16'-5"H
2 MIN. RET.
W-20 FILTRATE TO ClO_2 HEAT EXCH. PUMP
491-1542-20
550 GPM
HP RPM
T-30 STEAM MIXER
491-1603-70
150 HP 1200 RPM
T-30 MC PUMP
491-1612-20
200 HP 1800 RPM
FEEDER T-30 MC PUMP
491-1609-65
40 HP 1800 RPM

ISSUED FOR ESTIMATING ONLY JOB # JR 0728 PENSACOLA MILL CONVERSION PROJ.

NO.	RELEASED FOR	BY	DATE
C	ESTIMATE REPORT		
A	OFFICE CHECK & CLIENT APPROVAL		

Brown & Root U.S.A., Inc.
ENGINEERS • CONSTRUCTORS
HOUSTON, TEXAS

CONTRACT NO. JR-0728
OWNER NO.
APPROVED BY
DATE

DWG. NO.	REFERENCES	NO.	REVISIONS	MADE	CKD.	DATE	NO.	REVISIONS	MADE	CKD.	DATE	MICROFILMED	DATE

GRAPHIC SCALE ALL LETTERING MIN. 1/8"

SCALE NONE
DESIGN BY:
DRAWN BY: LS
CHECKED BY:
SUPV. BY:
SUBM TO BY:
APP'D BY:
APP'D BY:
DATE 08-12-85

SEAL

TITLE
"B" LINE BLEACH PLANT
OXIDATIVE EXTRACTION STAGE-E/O
PROCESS FLOW DIAGRAM
CONVERSION PROJECT PENSACOLA MILL

Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020

DRAWING NUMBER
LOCATION DWG. NO. 491-5-004-C

FM 055 09/23/85

DRAWING NUMBER

LOCATION DWG. NO. 491-5-005-C

NOTES :

1. FOR DESIGN BASIS & LEGEND SEE DWG. NO. 491-5-001.

494-5-006 — CHILLED WATER / BOOSTED HOT WATER

494-5-010/18 — 10% NaOH WITH ClO_2 — 2"-491-CSD- -402

494-5-005/17 — ClO_2 SOLUTION — 2"-491-CDL- -600

494-5-011/13 — SO_2 — 2"-491-SDD- -402

491-5-003 — W-10 HOOD VENT — 20"-491-VT2- -600

ClO_2 FILTRATE — 8"-491-WBD- -600

491-5-003 — ACID SEWER / E/D FILTRATE — 16"-491-PS- -600

ALKALINE SEWER — 24"-491-PS- -600

491-5-003 — ClO_2 FILTRATE STOCK — 16"-491-WBD- -600

8"-491-WW- -500 — MACHINE WHITE WATER — 491-5-006

10% NaOH — 491-5-004

ClO_2 SOLUTION — 491-5-002

SO_2 — 493-5-002

30"-491-VT2- -600 — W-10 HOOD & W-30 VENT FUMES — 494-5-002

30"-491-PS- -600 — ACID SEWER — 1360-5-001

ALKALINE SEWER — 1360-5-001

493-5-001

W-30 VENT FAN
491-1669-33
25 HP 1800 RPM

W-30 HOOD
491-1666-92

W-30 LUBRICATING PUMP
491-1658-20
5 HP 1800 RPM

W-30 DOCTOR FAN NO.1
491-1678-33
3 HP 3600 RPM

W-30 WIRE CLEANING SHOWER
491-1672-92
1/20 HP 1200 RPM

W-30 DOCTOR FAN NO.2
491-1681-33
3 HP 3600 RPM

W-30 WASHER CYLINDER
491-1657-40
60 HP 0-1500 RPM

W-30 REPULPER
491-1660-70
40 HP 1800 RPM

W-30 VAT
491-1663-12

CHUTE W-30 TO BL. STORAGE MC PUMP
491-1700-65

T-30 SAMPLE EXTRACTOR
491-1633-92

TOWER T-30 EXPLOSION HATCH
491-1634-65

ClO_2 HEAT EXCHANGER
491-1615-30

(RESIDUAL) 240 MIN.

(RESIDUAL) 30 MIN.

(DH) 30 MIN.

(14 TYP.)

(D/O/2831) (D/O/712)

8"-491-WW- -500 — D/O/712

(D/O/4291) (D/O/4291)

(D/O/4981) (D/O/4981) (D/O/0) (D/O/251) (D/O/4981) (D/O/4981)

(D/O/847) (D/O/101) (D/O/0) (D/O/250)

(D/O/1066) (D/O/1200) (D/O/0) (D/O/2501) (D/O/0) (D/O/8001)

(D/O/4550)

(D/O/22901) (D/O/2450)

(D/O/28861) (D/O/31001)

(D/O/606) (D/O/650)

(D/O/0) (D/O/2001)

(D/O/0) (D/O/95121)

(D/O/0) (D/O/1066)

(D/O/0) (D/O/2501) (D/O/0) (D/O/350)

(545/13.9/7655) (545/12.9/7655)

(545/12.3/740) (545/12.1/751)

(545/3.0/30301) (545/2.9/31901)

(545/2.5/3636) (545/2.4/3940)

(545/1.1/8186)

(545/14.0/6371) (545/14.0/6371)

T-30 AGITATOR NO.1
491-1639-70
25 HP 1200 RPM

T-30 AGITATOR NO.2
491-1642-70
25 HP 1200 RPM

T-30 DILUTION NOZZLES
491-1636-92

T-30 PRERETENTION TUBE
491-1621-10
9'-1"D X 93'-0"H
60 MIN. RET.

T-30 PRERETENTION TUBE LINING
491-1624-13

T-30 CHEMICAL MIXER (ClO_2)
491-1618-70
25 HP 1800 RPM

TOWER T-30
491-1627-10
17'-0"D X 108'-0"H
180 MIN. RET.

TOWER T-30 TILE LINING
491-1630-13

W-30 FILTRATE TO W-20 SHOWERS PUMP
491-1648-20
1200 GPM- HP RPM

TOWER T-30 DILUTION PUMP
491-1651-20
3100 GPM- HP RPM

W-30 VAT DILUTION PUMP
491-1654-20
5000 GPM- HP RPM

T-30 STOCK PUMP
491-1645-20
3200 GPM

W-30 SEAL TANK
491-1684-10
14'-9"D X 16'-5"H
2 MIN. RET.

FEEDER-BLEACHED STORAGE MC PUMP
491-1703-65
40 HP 1800 RPM

BLEACHED STORAGE MC PUMP
491-1706-20
540 GPM
350 HP 1800 RPM

BOOSTED HOT WATER

ISSUED FOR ESTIMATING ONLY BCR# R.R.0728 PENSACOLA MILL CONVERSION PROJECT

NO.	RELEASED FOR	BY	DATE
C	ESTIMATE REPORT	Kmc	8-24-E
A	OFFICE CHECK	Kmc	8-24-E
	CLIENT APPROVAL	Kmc	8-24-E

Brown & Root U.S.A., Inc.

ENGINEERS • CONSTRUCTORS
HOUSTON, TEXAS

CONTRACT NO. JR-0728 | OWNER NO.

APPROVED BY | DATE

DWG. NO.	REFERENCES	NO.	REVISIONS	MADE	CK'D.	DATE	NO.	REVISIONS	MADE	CK'D.	DATE	MICROFILMED	DATE

GRAPHIC SCALE ALL LETTERING MIN. 1/8"

SCALE NONE	DATE
DESIGN BY:	
DRAWN BY: KAR	08-10-85
CHECKED BY:	
SUPV. BY:	
SUBMITTED BY:	
APP'D BY:	
APP'D BY:	
APP'D BY:	

SEAL

TITLE
"B" LINE BLEACH PLANT
CHLORINE DIOXIDE STAGE-"D"

PROCESS FLOW DIAGRAM

CONVERSION PROJECT PENSACOLA MILL

Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020

DRAWING NUMBER
LOCATION DWG. NO. 491-5-005-C

FM1058 09/23/85

DRAWING NUMBER
LOCATION DWG. NO. 457-5-003-C

NOTES:
1. FOR DESIGN BASIS & LEGEND SEE DWG. NO. 457-5-001.

458-5-005
3"-459-LWD- -500
457-5-001
PRIMARY SCREEN ACCEPTS
1579/1.3/73531
600/1.0/10000
DECKER FILTRATE TO SCREENS & CLEANERS DILUTION
DECKER FILTRATE TO SCREEN SHOWERS
450-5-003
459-5-001
DECKER FILTRATE TO B.S. WASHERS
H_2SO_4
0/0/12
0/0/20
10/0/9361
0/0/1100
8"-457-LBD- -500
DECKER HOOD EXHAUST FAN
457-1555-33
15 HP 1800 RPM
DECKER HOOD
457-155
#1 & #2 DECKER AIR DOCTOR BLOWERS
457-1552-33
457-1553-33
CFM HD
3 HP 1800 RPM
DECKER OIL PUMP
457-1557-20
5 HP 1800 RPM
DECKER WIRE CLEANING SHOWER
457-1554-92
GPM PSI
1/20 HP RPM
2"-457-LWD- -500
10/10/211
0/5/60
0/0/270 (INTERMITTENT)
22
13
8
8"-457-WH- -504
HOT WATER
493-5-004
NO.1 POST OXYGEN FILTRATE
457-5-005
TO OXYGEN REACTOR
12"-457-V1- -500
VENT STEAM FROM BLOW CYCLONE
FILTRATE
457-5-005
UNBLEACHED STOCK
8"-457-LBD- -500
3000+HWI
3000+HWI
18"-457-LBD- -401
6"-457-LBD- -401
16"-457-LBD- -401
24"-457-PUM- -401
10/0/7310
0/0/5000
10/0/22111
0/0/3600
579/1.0/9564
600/1.0/10000
24"-457-PUM- -401
12"-457-PUM- -401
6"
6"
1579/12.8/7431
FIC
SIC
LIC
KS
CHUTE 1579/12.5/7641
10/0/25771
0/0/11000
18"-457-LBD- -401
FOAM BREAKER
457-1505-40
FOAMBREAKER FAN
457-1506-33
HP RPM
FOAMBREAKER CYCLONE
457-1507-66
B.S. DECKER (CYLINDER) (R)
457-1550-40
50 HP VAR. S.
DECKER REPULPER
457-1551-70
40 HP GEARMOTOR
DECKER VAT
457-1556-11
SA
TA
S.S. CHUTE
20" VENT
457-5-005
10/0/9491
0/0/1200
TIC
8"-457-WHM- -504
WARM MILL MIXER
DECKER SHOWER WATER COOLER
457-1565-30
10/0/01
0/0/1600
1579/12.0/7931
10/0/20821
0/0/3100
10/0/4631
800 GPM
10/0/25921
0/0/6600
18"-457-LBD- -401
24"-457-LBD- -401
20"-457-LBD- -401
24"-457-PDM- -510

B.S. WASHER SHOWER PUMP
457-1580-20
3700 GPM 95' HD
150 HP 1200 RPM

SCREEN DILUTION PUMP
457-1575-20
800 GPM 150' HD
50 HP 1800 RPM

DECKER VAT DILUTION PUMP
457-1570-20
6600 GPM 70' HD
200 HP 1200 RPM

DECKER SEAL TANK
457-1560-10
36'-1"DIA.X24'-7"HT
25030 CU FT

OXYGEN STAGE STEAM MIXER
457-2020-70
HP RPM

OXYGEN STAGE MC STOCK PUMP FEEDER
457-2011-70 16Z
600 TPD CAP CONS
40 HP 1800 RPM

OXYGEN STAGE MC STOCK PUMP
457-2010-20
600 GPM THD
300 HP 1800 RPM

ISSUED FOR ESTIMATING ONLY
JOB # JR-0728
PENSACOLA MILL CONVERSION PROJECT

NO.	RELEASED FOR	BY	DATE
C	ESTIMATING REPORT		
A	OFFICE CHECK AND CLIENT APPROVAL		

Brown & Root U.S.A., Inc.
ENGINEERS & CONSTRUCTORS
HOUSTON, TEXAS

CONTRACT NO. JR-0728
OWNER NO.
APPROVED BY
DATE

DWG. NO.	REFERENCES	NO.	REVISIONS	MADE	CKD.	DATE	NO.	REVISIONS	MADE	CKD.	DATE	MICROFILMED	DATE

GRAPHIC SCALE ALL LETTERING MIN. 1/8"

SCALE NONE	DATE
DESIGN BY:	
DRAWN BY: DM	08/12/85
CHECKED BY:	
SUPV. BY:	
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APP'D BY:	
APP'D BY:	

SEAL

TITLE
BATCH SCREENING & DECKERING
DECKER

PROCESS FLOW DIAGRAM

CONVERSION PROJECT PENSACOLA MILL

Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020

DRAWING NUMBER
LOCATION DWG. NO. 457-5-003-C

Fm 070 09/21/85

DRAWING NUMBER
LOCATION DWG. NO. 457-5-004-C

NOTES:
1. FOR DESIGN BASIS & LEGEND SEE DWG. NO. 457-5-001

458-5-006 OXYGEN FROM VAPORIZER

UNBLEACHED STOCK

VENT

OXYGEN REACTOR DISCHARGER
457-2060-70
30 HP 1800 RPM

NO.1 P.D. FILTRATE

TO NO.1 P.D. WASHER

NO.1 P.D. FILTRATE

10/0/01
1400 GAL

165 PSIG STEAM

457-5-005

OXYGEN STAGE CHEMICAL MIXER
457-2030-70
200 HP 1200 RPM

OXYGEN REACTOR
457-2040-10
13'-1 1/2"X70'-9"
145 PSIG 3560 CU.FT.
316 S.S. 60 MIN.RET.

OXYGEN REACTOR DISTRIBUTOR
457-2050-70
40 HP 1200 RPM

OXYGEN REACTOR BLOW CYCLONE
457-2071-10
3'-3" X 16'-5"
440 CU.FT. 316 S.S.
145 PSI

BLOW TANK
457-2070-10
19'-8"DIA 29'-6"HT
8830 CU.FT. 316 S.S.

BLOW TANK AGITATOR
457-2080-70
125 HP 1200 RPM

FIRST POST OXYGEN WASHER STOCK PUMP
457-2100-20
4400 GPM 110' HD
200 HP 1200 RPM

ISSUED FOR BIDDING/ESTIMATING ONLY
JOB NO. JR-0728
PENSACOLA WALL EXPANSION PROJECT

NO.	RELEASED FOR	BY	DATE
C	ESTIMATE REPORT		
A	OFFICE CHECK AND CLIENT APPROVAL		

Brown & Root U.S.A., Inc.
ENGINEERS & CONSTRUCTORS
HOUSTON, TEXAS

CONTRACT NO. JR-0728
OWNER NO.
APPROVED BY
DATE

DWG. NO.	REFERENCES	NO.	REVISIONS	MADE	CKD.	DATE

GRAPHIC SCALE ALL LETTERING MIN. 1/8"

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DESIGN BY:
DRAWN BY: SL 08-12-85
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SUPV. BY:
SUBMITTED BY:
APP'D BY:
APP'D BY:
APP'D BY:

SEAL

TITLE
BATCH OXYGEN DELIGNIFICATION REACTOR AND BLOW TANK PROCESS FLOW DIAGRAM

Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020

DRAWING NUMBER
LOCATION DWG. NO. 457-5-004-C

CONVERSION PROJECT PENSACOLA MILL

Fm101 09/22/95

DRAWING NUMBER
LOCATION DWG. NO. 458-S-005-C

NOTES :
1. FOR DESIGN BASIS & LEGEND SEE DWG. NO. 457-S-001.

HYDRAULIC FEED PUMP
457-2353-20
125 HP 1800 RPM

HYDRAULIC FEED PUMP
457-2356-20
5 HP 1800 RPM

HYDRAULIC BOOSTER PUMP
457-2355-20
5 HP 1800 RPM

458-S-007 STRIPPED CONDENSATE
TO BLOW TANK
STOCK FROM BLOW TANK
TO REACTOR
457-S-003 TO DECKER
457-S-003 (cont'd. E-18)

OIL COOLER
457-2351-30

458-S-008

NO.1 P.O. WASHER EXHAUST FAN
457-2132-33
15 HP 1800 RPM

NO.1 P.O. WASHER VAT
457-2131-11

NO.1 P.O. WASHER HOOD
457-2112-92

NO.1 P.O. VACUUM WASHER CYLINDER
457-2110-40
60 HP VAR. SPEED

NO.1 P.O. WASHER OIL PUMP
457-

NO.1 P.O. AIR DOCTER BLOWER NO.1 & NO.2
457-2130-33
457-2131-33
3 HP 1800 RPM(2)

NO.1 P.O. WASHER REPULPER
457-2120-70
40 HP RPM

NO.1 P.O. WIRE CLEANING SHOWER
457-2134-33
1/20 HP 1800 RPM

NO.2 P.O. WASHER LEVEL TANK PUMP
457-2230-20
250 GPM 100 HD
HP 1800 RPM

NO.2 P.O. WASHER LEVEL TANK
457-2220-11
6'-7"DIA.x 9'-10"
320 FT3 CAP 31655

NO.2 P.O. HYDRAULIC POWER UNIT
457-2350-91

NO.2 P.O. PREBREAKER
457-2241-92
20 HP 1800 RPM

NO.2 P.O. STOCK DISCHARGE CONVEYOR
457-2250-70
20 HP 1800 RPM

NO.2 P.O. WASHER
457-2240-92

NO.2 P.O. HC STOCK PUMP
457-2290-20
GPM PSI
250 HP 1800 RPM

NO.2 P.O. HC PUMP FEED SCREW
457-2293-70
40 HP 1800 RPM

DECKER SHOWER PUMP
451-2160-20
1100 GPM 105' HD
50 HP 1800 RPM

REACTOR DILUTION PUMP
457-2170-20
1400 GPM 270' HD
200 HP 1800 RPM

POST OXYGEN WASHER DILUTION PUMP
457-2150-20
8000 GPM 60' HD
200 HP 900 RPM

SEAL TANK
457-2140-10
36'-1" DIAx24'-9"HT
25,179 FT3 CS

AGITATOR
457-2200-70
150 HP 1200 RPM

NO.2 P.O. WASHER STOCK FEED TANK
457-2190-10
19'-8" DIAx29'-6"HT
8830 FT3 CAP

NO.2 P.O. WASHER STOCK FEED PUMP
457-2210-20
3000 GPM 120' HD
150 HP 1200 RPM

NO.2 P.O. WASHER OIL PUMP
457-2357-20
5 HP 1800 RPM

NO.2 P.O. WASHER LIQUOR TANK
457-2260-10
16'-5" DIA16'-5"HT
3355 FT3 304 SS

PRESS FEED DILUTION PUMP
457-2280-20
1000 GPM 90' HD
40 HP 1800 RPM

1ST P.O. WASHER SHOWER PUMP
451-2270-20
2300 GPM 60' HD
50 HP 1200 RPM

NO.	RELEASED FOR	BY	DATE
C	ESTIMATE REPORT		
A	OFFICE CHECK AND CLIENT APPROVAL		

ESTIMATING ONLY JOB #JR.0728 (PENSACOLA MILL CONVERSION PROJECT)

Brown & Root U.S.A., Inc.
ENGINEERS & CONSTRUCTORS
HOUSTON, TEXAS

CONTRACT NO. JR-0728
OWNER NO.
APPROVED BY
DATE

DWG. NO.	REFERENCES	NO.	REVISIONS	MADE	CKD.	DATE	NO.	REVISIONS	MADE	CKD.	DATE	MICROFILMED	DATE

GRAPHIC SCALE ALL LETTERING MIN. 1/8"

SCALE NONE	DATE
DESIGN BY:	
DRAWN BY: KAP	08-11-85
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SUBM'TD BY:	
APP'D BY:	
APP'D BY:	

SEAL

TITLE
BATCH
OXYGEN DELIGNIFICATION
POST OXYGEN WASHING
PROCESS FLOW DIAGRAM
CONVERSION PROJECT PENSACOLA MILL

Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020

DRAWING NUMBER
LOCATION DWG. NO. 457-S-005-C

Form 012 05/15/85

CHEMICAL PREPARATION
CHLORINE DIOXIDE GENERATION AND ABSORPTION

System and Process Description

The generator system is made up of the generator-crystallizer, reboiler, circulating pump and manifold, and catalyst system. The five feed chemicals (chlorate, brine, hydrochloric acid, sulfuric acid and catalyst) are metered into the generator system to obtain the desired conditions.

At the point where the concentrated sulfuric acid and HCl is mixed with the recirculated chemicals from the generator and the fresh chlorate and brine, a great quantity of heat is generated. Boiling occurs almost instantly and vapors are generated. However, in order to evaporate the water entering the process with the chemicals, heat must be added; this is done by means of steam in the reboiler section.

When the stream of liquor leaves the reboiler and reenters the generator cavity (the volume above the liquid level), which is under vacuum, it rapidly expands and releases the dissolved and entrained gases (chlorine dioxide, chlorine, etc.). To maintain the chlorine dioxide concentration below the level at which it will decompose, air is metered into the generator cavity at a rate proportional to the rate at which chlorine dioxide is produced.

When the generator liquor becomes saturated with sodium sulfate (salt cake), crystals start forming in the solution. Generator liquor, containing the salt cake crystals, is withdrawn from the bottom cone of the generator and is pumped to the hydroclone, where separation of the crystals from most of the mother liquor taskes place. The crystals fall into a drum filter where the salt cake crystals are filtered from the liquid. The cake is washed with warm water (100-120^{o}F) on the drum filter after which it is dissolved in warm water for recovery in the normal kraft mill chemical reclaim system.

The generator gases are cooled in an indirect cooler to 122^{o}F so that the chlorine dioxide can be absorbed efficiently by the 40-50^{o}F water used in the chlorine dioxide absorption tower. As the cooled gases pass up the

absorption tower, about 99.7% of the chlorine dioxide is absorbed from the gas stream by the cold water fed into the top of the tower. The flow rate of cold water is adjusted to achieve a strength of 8-10 grams/liter.

The exit gases from the chlorine dioxide absorption system, which contain air, chlorine, traces of chlorine dioxide, and water vapor, are drawn into the generator vacuum, which discharges them to the two in-series chlorine absorption towers. The first is using water as absorbing agent, the second 10% NaOH. The flow rate of water and NaOH is controlled to produce the practical maximum strength of chlorine water, and sodium hypochlorite. The chlorine water is pumped from the chlorine absorption tower to the C_D stage chlorine mixer, the hypo is pumped to the hypo storage tank for use in the bleach plant.

Normal Air Abatement

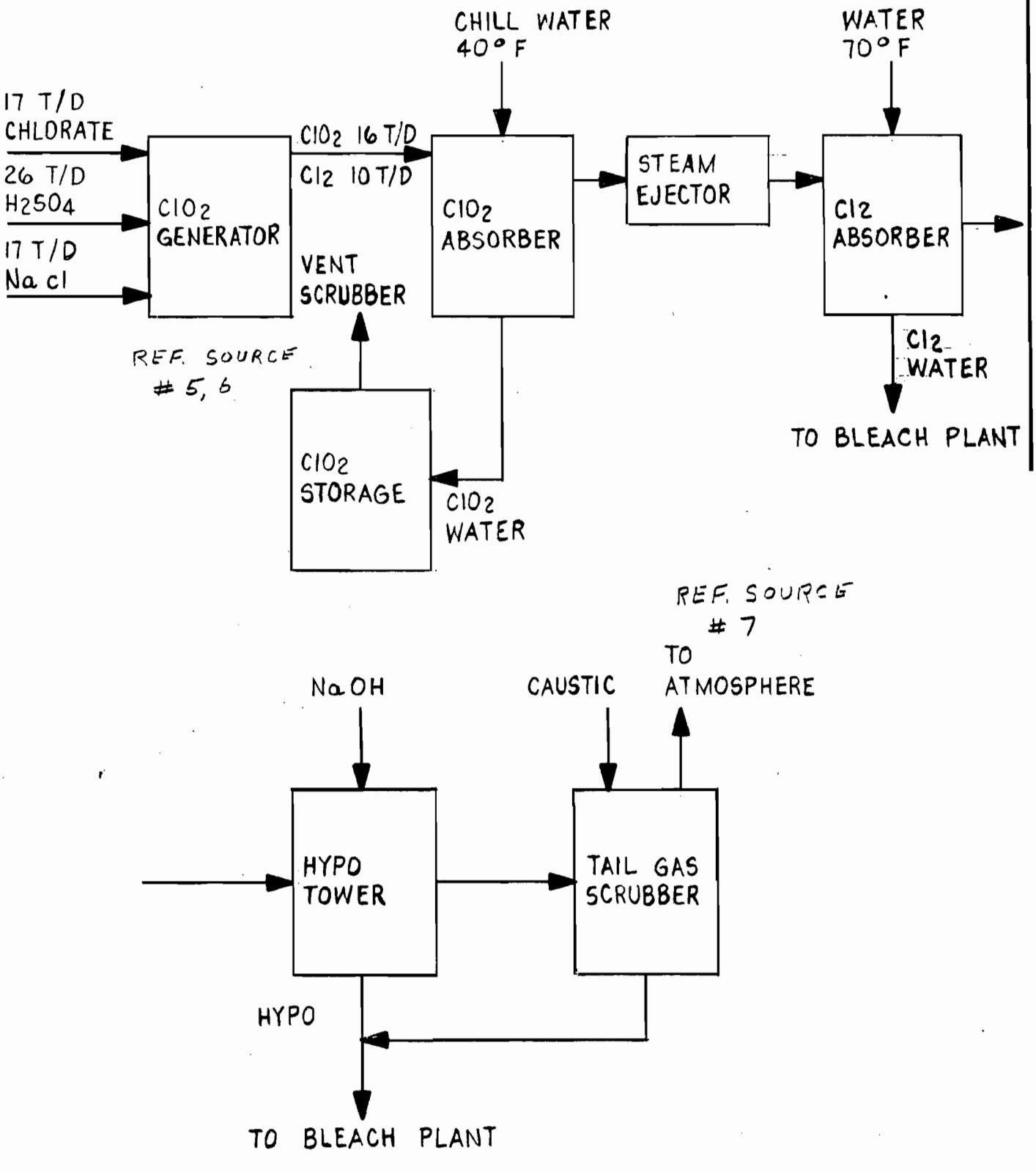
The gases not absorbed in the second chlorine absorption tower flow to a packed tail gas scrubber where weak sodium hypo is used to absorb left over chlorine. Emission from the tail gas scrubber contain 0.5 mg/l of Cl_2 and 1.0 mg/l of ClO_2.

The tail gas scrubber also receives gases from the vacuum pump on the salt cake drum filter, the salt cake dissolving tank, the ClO_2 absorber seal pot, the generator dump tank, and the scrubber for the ClO_2 storage tank vents. The dilute chlorine dioxide solution produced in the small absorber for the ClO_2 storage tank vents is sent to the main chlorine dioxide absorber for strengthening before use.

Chilled Water Supply

In the event chill water is lost to either the ClO_2 absorber or ClO_2 vent scrubber, an auto-shutdown sequence is activated. Chemical feed to the generator (H_2SO_4, $NaClO_3$ and HCl) is shut off. Purge air is automatically injected into the absorber and recycle of ClO_2 solution is activated through the ClO_2 absorber. Recycle of ClO_2 solution continues to provide removal of ClO_2 gas by increasing the concentration of the ClO_2 solution. Shutdown procedure takes 10-15 minutes.

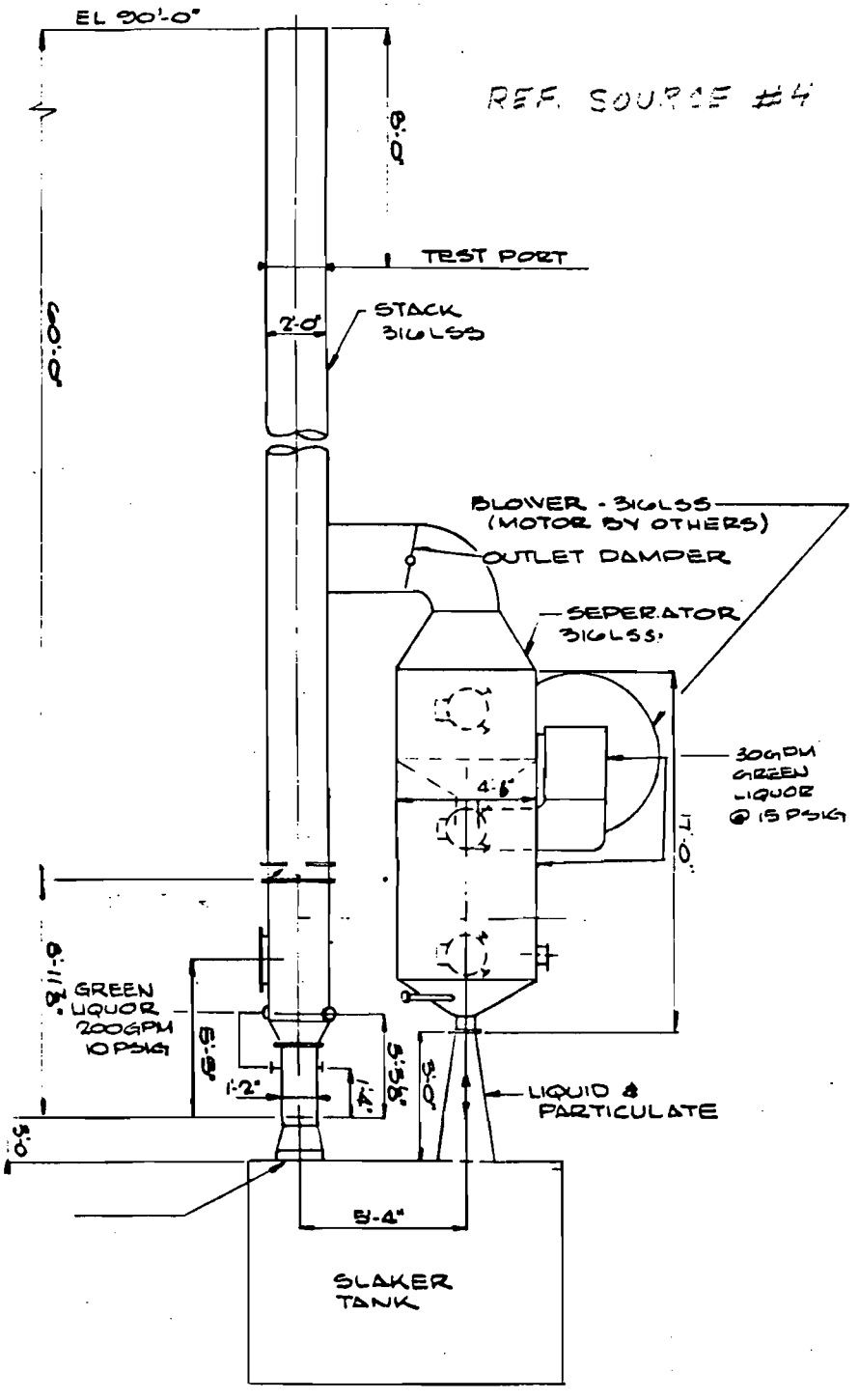
CHLORINE DIOXIDE GENERATOR



ATTACHMENT D

LIME SLAKER SCRUBBER DIAGRAM

REF. SOURCE #4



NOTES

REVISIONS	BY	DATE

BROWN & ROOT Inc. HOUSTON, TEXAS

ELEVATION
SLAKER SCRUBBER ARRANGEMENT

DRAWN BY SFE CHECKED APPROVED

DATE

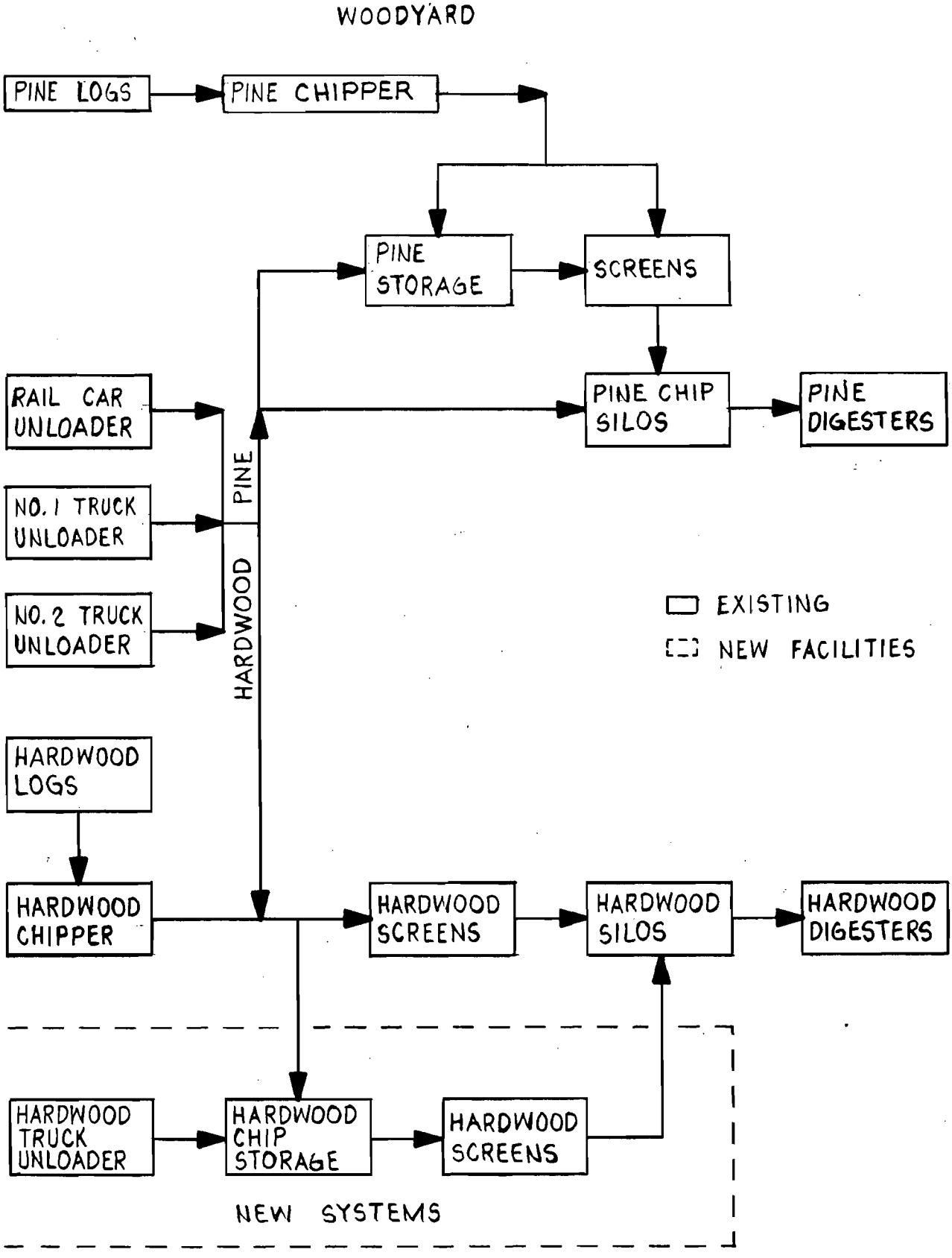
SHT OF

DWG. NO.

CONT. NO.

ATTACHMENT E

WOODYARD PROCESS FLOW DIAGRAM


WOODYARD
PINE LOGS
PINE CHIPPER
PINE STORAGE
SCREENS
RAIL CAR UNLOADER
NO. 1 TRUCK UNLOADER
NO. 2 TRUCK UNLOADER
PINE
HARDWOOD
PINE CHIP SILOS
PINE DIGESTERS
EXISTING
NEW FACILITIES
HARDWOOD LOGS
HARDWOOD CHIPPER
HARDWOOD SCREENS
HARDWOOD SILOS
HARDWOOD DIGESTERS
HARDWOOD TRUCK UNLOADER
HARDWOOD CHIP STORAGE
HARDWOOD SCREENS
NEW SYSTEMS