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

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AC 17-111195

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

NORTHWEST DISTRICT
160 GOVERNMENTAL CENTER
PENSACOLA, FLORIDA 32501

DER
OCT 10 1985
BAQM

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 North 596,100

Latitude 30 ° 36 ' 30 "N Longitude 87 ° 19 ' 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[r] I agree to maintain and operate the pollution control source and pollution contr[ol] facilities in such a manner as to comply with the provision of Chapter 403, Flori[da] Statutes, and all the rules and regulations of the department and revisions thereof. [I] also understand that a permit, if granted by the department, will be non-transferab[le] and I will promptly notify the department upon sale or legal transfer of the permit[ted] 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[s] been designed/examined by me and found to be in conformity with modern engineer[ing] principles applicable to the treatment and disposal of pollutants characterized in [the] permit application. There is reasonable assurance, in my professional judgment, th[at]

[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

WILLARD J. DAVIS
CERTIFICATE 24531
STATE OF FLORIDA
REGISTERED ENGINEER

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 O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
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

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):

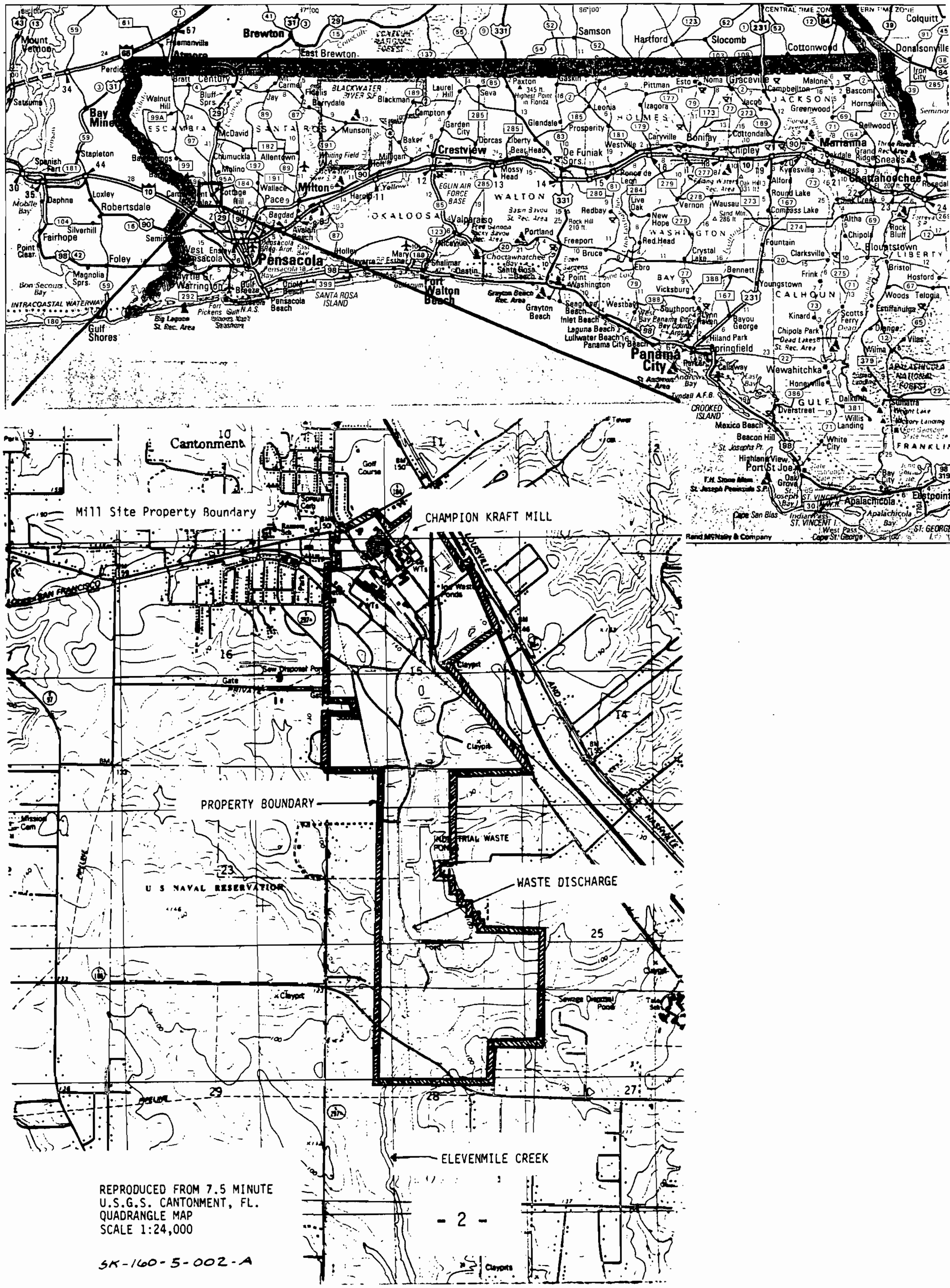
P-5 Paper Machine
Bleach Plant
Lime Slaking
Woodyard

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

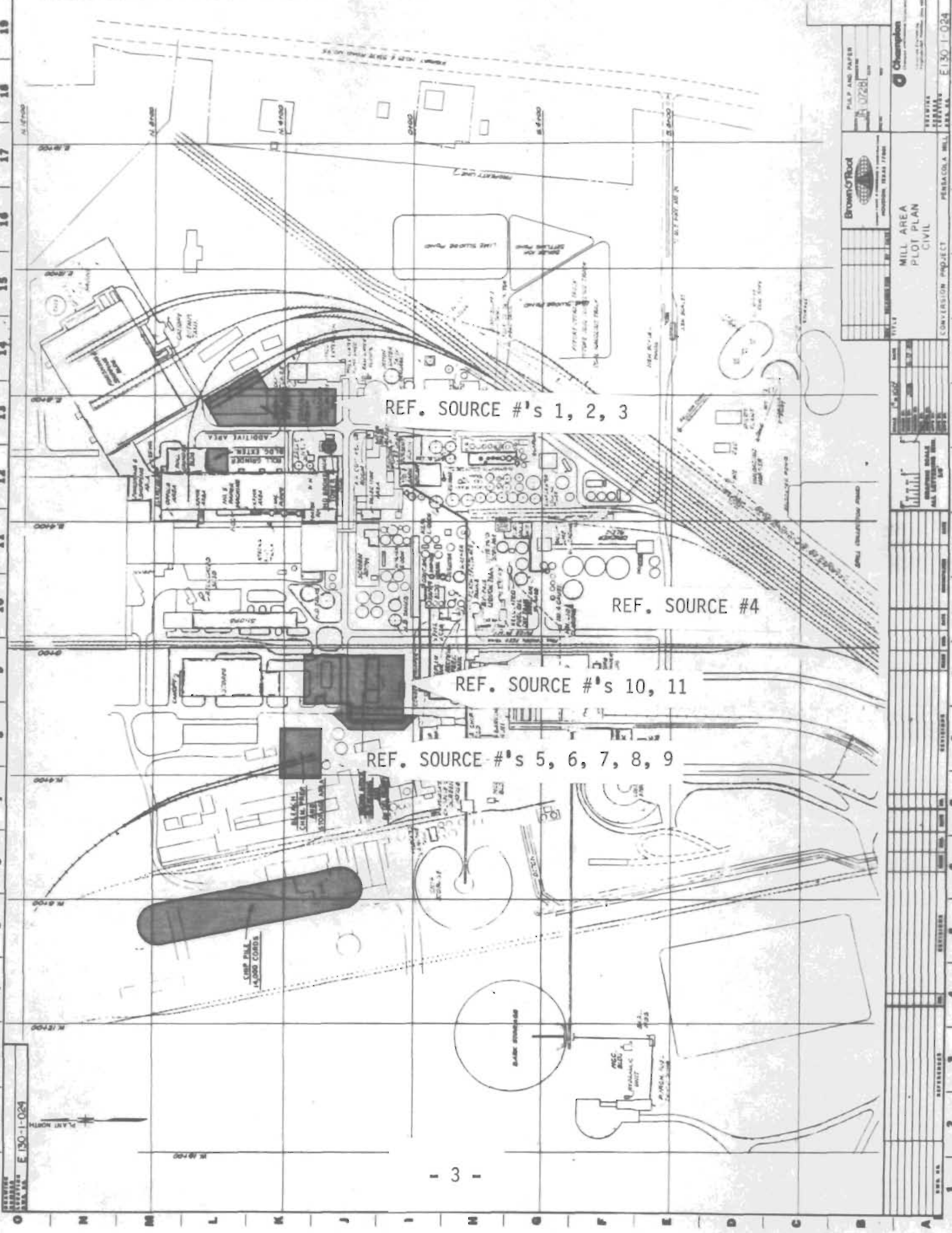


TABLE I

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

	Net Emissions (Tons/Yr)	Reference Calculations Pages
1. Fugitive Particulate Emissions		
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	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

	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.

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:

- disc saveall
- broke thickening and storage
- deaerator - cleaner (stock cleaners)
- wet chemical additive system
- headbox fan pump
- Bel-form top wire former
- press section
- 13 steam drum dryers
- size press
- broke pulpers
- roll wrapping, rewinding and sheeting facilities
- 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

CHEMICAL	UNIT	DESIGN	FORM RECEIVED
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. <u>Lime Slaking</u>

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. <u>Woodyard</u>

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:

- All conveyors are covered.
- 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).
- Chips are screened once removed from storage prior to conveying to the digesters.
- 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

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. <u>Calculations of Existing Conditions</u>
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. <u>Calculations of Future Conditions</u>
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

Total Existing Emissions = (77,500) x (2) x (0.14) - 2,000
= 11.2 tons/year

Total Projected Emissions = (113,000) x (2) x (0.144) - 2,000
= 16.3 tons/year

Net TSP Emissions Increase = 5.1 Tons/Year

Truck Travel On Paved Roads

Emission Factor (EF):

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

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

$$\frac{(\text{ACFM}) \times \text{gr/SCF} \times \frac{\text{min}}{\text{hr.}} \times \frac{\text{hrs.}}{\text{yr.}}}{7{,}000 \text{ gr/lb}} - 2{,}000$$

$$\frac{(940) \times (.02) \times (60) \times (1334)}{7{,}000} - 2000 = 0.1 \text{ T/yr.}$$

2. Bulk Starch Unloading - Silo Collector

Data Base:

Air Flow -	794 ACFM
Residual Dust from Collector	.02 gr/ACFM
Operating hrs.	1334

Calculations

$$\frac{\text{Flow (SCFM)} \times \text{gr./ACFM} \times \text{min/hr}}{7{,}000 \text{ gr./lb.}} \times \frac{\text{hrs.}}{\text{yr.}} - 2{,}000 \frac{\text{lbs.}}{\text{ton}} = \frac{\text{Tons}}{\text{Yr.}}$$

$$\frac{(794) \times (.02) \times (60) \times (1334)}{7{,}000} - 2{,}000 = 0.1 \text{ Tons/Yr.}$$

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 h - Lb./T = Tons/Yr.

$$F(\text{Gas}) = \text{Molecular Weight (Gas)} \left(\frac{\text{grams}}{\text{mole}}\right) - 0.865\ \text{ft.}^3/\text{mole}$$

$$- 454\ \frac{\text{grams}}{\text{lbs.}} \times 60\ \frac{\text{min.}}{\text{hr.}} \times 10^{-6}\ (\text{ppm})$$

$$F(Cl_2) = 1.08 \times 10^{-5};\ F(ClO_2) = 1.03 \times 10^{-5}$$

(9000) x (17) x 1.08 x 10^{-5} = 1.7 Lbs./Hr. Cl_2 x 8400 - 2000 = 7.1 T/yr.

(9000) x (17) x 1.03 x 10^{-5} = 1.6 Lbs./Hr. ClO_2 x 8400 - 2000 = 6.7 T/yr.

(6500) x (17) x 1.08 x 10^{-5} = 1.2 Lbs./Hr. Cl_2 x 8400 - 2000 = 5.0 T/yr.

(6500) x (17) x 1.03 x 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:

- 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.)

$$\times \frac{\text{Existing Bleach Production}}{\text{New Bleach Production}} = \text{Existing Bleach Plant } Cl_2 \text{ Emissions}$$

$$(12 \text{ T/Yr.}) - (1 - .93) \times \frac{285}{1400} = 35 \text{ Tons/Yr. } Cl_2 \text{ from existing bleach plant.}$$

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)

$$(11 \text{ T/Yr.}) - (1 - .90) \times \frac{285}{1400} = 22 \text{ T/Yr. } ClO_2 \text{ emissions from existing bleach plant.}$$

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

<u>Data Base</u>:

Air Flow	1000 SDCFM
Residual Chlorine	0.5 mg/l
Residual Chlorine Dioxide	1.0 mg/l
Operating Hours	8400

<u>Factors</u>: 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:

- o Existing ClO_2 generator is an R-2 rated at 6 tons/day.
- o The existing generator has a tail gas scrubber but no storage tank vent scrubbers.
- o 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.
- o 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

$$\frac{\text{Flow (SNCFM) x Gr. Residual/SDCF x Min/Yr.}}{\text{Gr. per Lb.}} \text{ x Operating Hrs. - 2,000 = Tons/Yr. Emission}$$

$$\frac{3{,}700 \text{ x } .05 \text{ x } 60}{7{,}000} \text{ x } 8{,}400 \text{ - } 2{,}000 = 6.7 \text{ Tons/Yr.}$$

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	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.

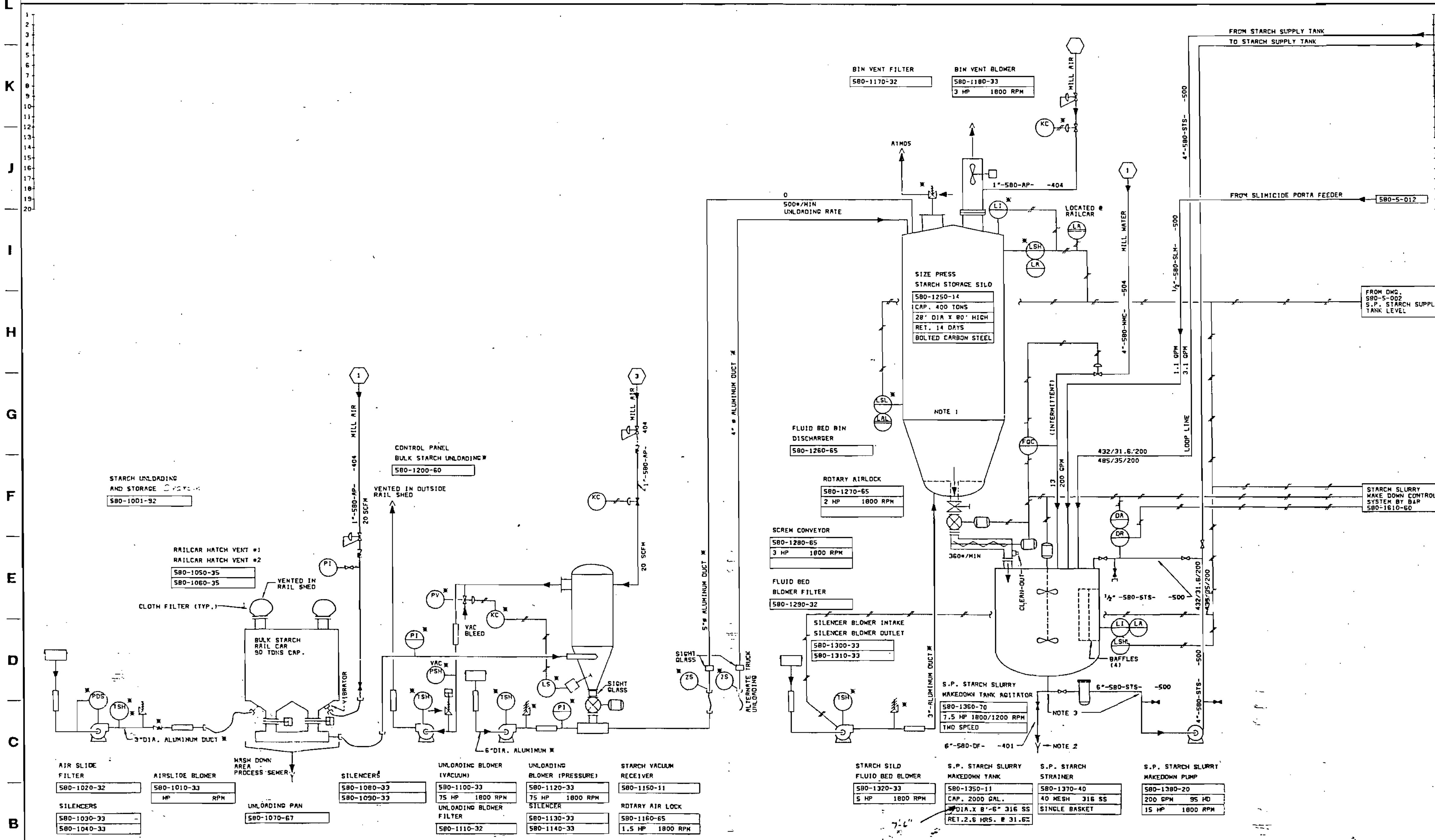
11. Air piping to connect vacuum filter receiver to the vacuum blower unit and to pipe the pressure blower to the conveying line attachment under the vacuum filter receiver.
12. Piping to connect the vacuum filter receiver to the top of the storage silo.

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 / %SOL / GPM = NORMAL FLOW
TPD / %SOL / GPM = DESIGN FLOW
* VENDOR SUPPLIED PACKAGE OR ITEM.
EXISTING
LINE SHOWN FOR REFERENCE ONLY
NEW
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 848 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	0.8
CAUSTIC(50%)BOILOUTS(GAL)	1000	1500
WET END DYES: (#/DAY)		
(A) BLUE DYE	76	102
(B) RED DYE	13	18
(C) YELLOW DYE	59	79
(D) BLACK DYE	20	27
AMMONIUM PERSULFATE (#/DAY)	33	93
DEFOAMER (GPH)	0	1.5
FELT ACID (GPH)	0.2	1.7

ISSUED FOR ESTIMATING JOB #JR-072 PENSACOLA MILL CONVERSION PROJECT

NO.	RELEASED FOR	BY	DATE
C	ESTIMATE REPORT		
B	CLIENT APPROVAL	EJS	08-15-85
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

DWG. NO.	REFERENCES	NO.	REVISIONS	MADE	CKD.	DATE	NO.	REVISIONS	MADE	CKD.	DATE	MICROFILMED	DATE

GRAPHIC SCALE
ALL LETTERING MIN. 1/8"

SCALE
DESIGN BY: RTL 06-27-85
DRAWN BY: LA 06-27-85

SEAL

TITLE
ADDITIVE SYSTEMS
S.P. STARCH UNLOADING,
STORAGE & MAKEDOWN
PROCESS FLOW DIAGRAM

CONVERSION PROJECT PENSACOLA MILL

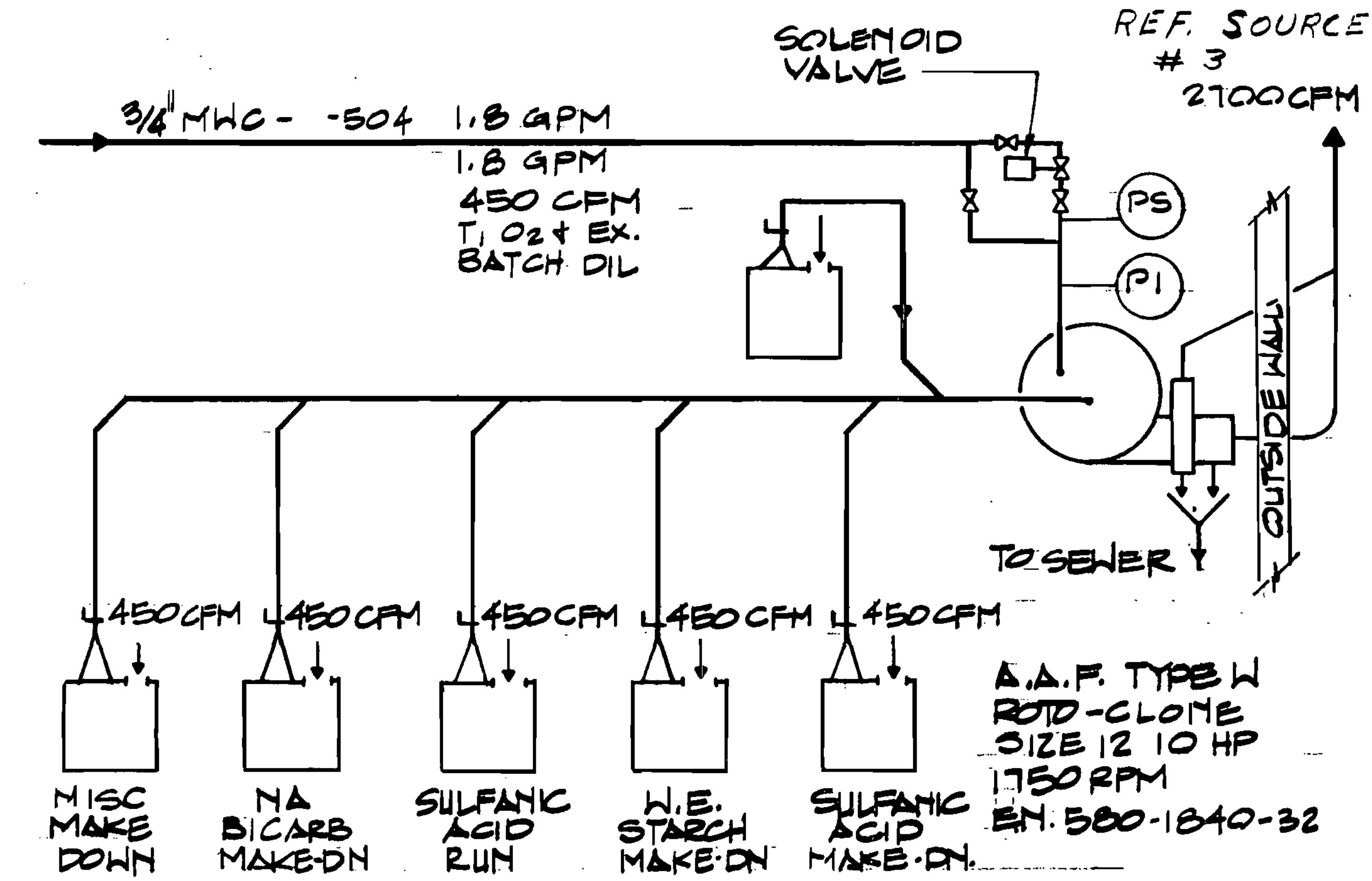
Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020

DRAWING NUMBER
LOCATION DWG. NO. 580-5-001-C

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.

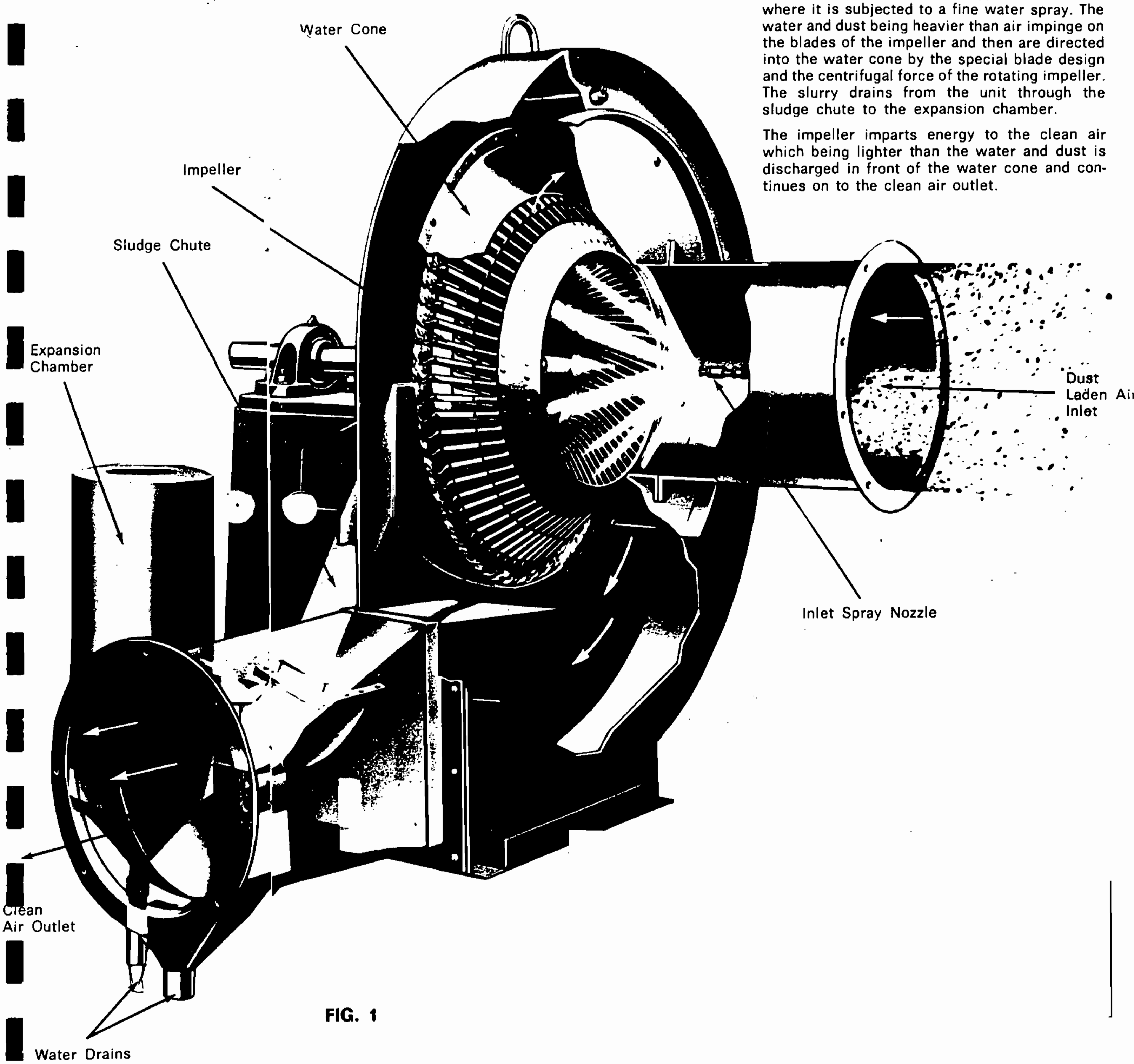
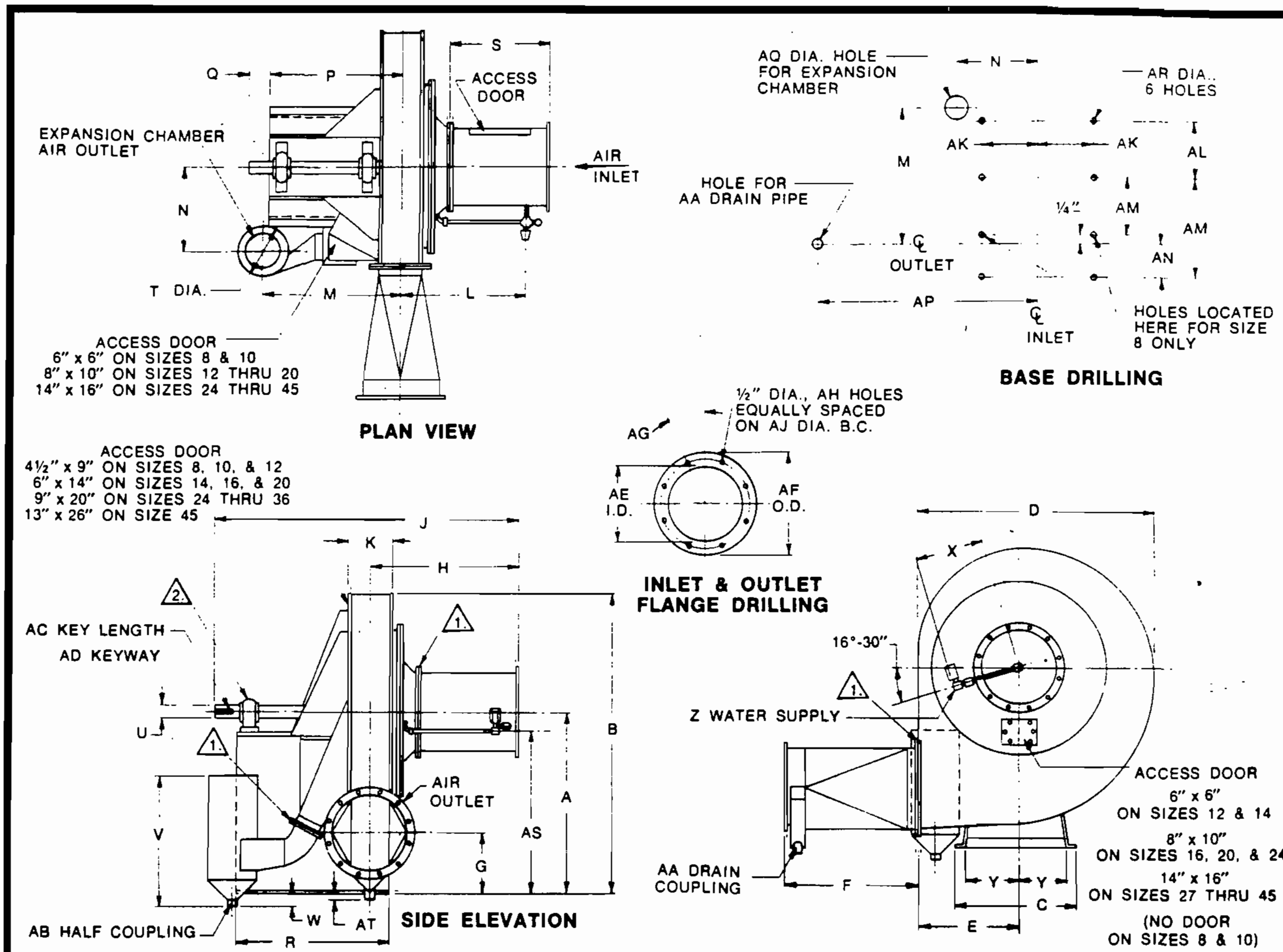


FIG. 1

ARRANGEMENT 1



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 13/16"	12¾"	2'-1⅞"	11⅛"	14"	7⅜"	18 3/16"	3'-7¼"	4 3/16"	11 9/16"	20 1/16"	10"	21 9/16"	3½"	23 9/16"	14"	7⅛"	1 7/16"	18¾"	1 13/16"
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 13/16"
12	2'-5"	4'-0¼"	19¾"	3'-2½"	16 9/16"	21"	10"	2'-1"	4'-10 1/16"	6 3/16"	17⅞"	2'-3⅝"	14½"	2'-4 9/16"	4½"	2'-7 9/16"	18"	10⅛"	1 15/16"	2'-3¼"	3 3/16"
14	2'-8½"	4'-6¾"	21½"	3'-8½"	19⅛"	24½"	10 5/16"	2'-4"	5'-2 15/16"	7¼"	20⅝"		16 9/16"	2'-5 1/16"	5⅞"	2'-8 9/16"	20"	11⅛"	2 3/16"	2'-5 11/16"	4⅝"
16	3'-1½"	5'-3⅛"	2'-4½"	4'-3¼"	22"	2'-4"	12⅛"	2'-7 3/16"	5'-6½"	8¼"	22 15/16"	2'-6 9/16"	18½"	2'-5 3/16"	5¼"	2'-9 9/16"	22"	12¼"	2 7/16"	2'-8¼"	2 11/16"
20	3'-10"	6'-5 9/16"	2'-8½"	5'-3⅛"	2'-3 1/16"	2'-11"	14⅝"	2'-11½"	6'-9 3/16"	10¼"	2'-8⅛"	3'-0 13/16"	21⅜"	3'-3 1/16"	6⅝"	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 15/16"	3'-9 11/16"	7'-10 15/16"	12⅜"	3'-2 11/16"	3'-7¼"	2'-2"	3'-6 11/16"	6 9/16"	4'-0 11/16"	2'-8"	15¼"	2 15/16"	3'-4 11/16"	3 11/16"
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 7/16"	4'-4 5/16"	2'-11"	17¼"	3 3/16"	3'-9 11/16"	4"
30	5'-7¼"	9'-5¾"		7'-9"	3'-3¾"	4'-4½"	21"	4'-7 1/16"	9'-3 3/16"	15⅜"	4'-0 7/16"	4'-6 3/16"	2'-8"	3'-10 5/16"	9 13/16"	4'-5 13/16"	3'-2"	18¾"	3 7/16"	4'-2 7/16"	5¾"
33	6'-2"	10'-5 13/16"	4'-2½"	8'-7⅝"	3'-8 5/16"	4'-10"	22½"	4'-11 13/16"	10'-1 7/16"	17"	4'-4 13/16"	5'-0 7/16"	3'-1"	4'-3"	10⅝"	4'-11¼"	3'-5"	19½"	3 15/16"	4'-6⅝"	5 5/16"
38	6'-7½"	11'-3¼"		9'-3½"	3'-11⅝"	5'-3½"	24"	5'-4¼"	10'-11⅛"	18½"	4'-9¼"	5'-3 5/16"	3'-3"	4'-6¼"	12⅛"	5'-3¼"	3'-8"	20¼"		4'-10"	4¼"
45	8'-0¾"	13'-9 3/16"	5'-2½"	11'-4⅞"	4'-10 15/16"	6'-7"	2'-4½"	6'-8 7/16"	12'-1 9/16"	23"	5'-10 11/16"	6'-7¼"	4'-0"	4'-5¾"	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	9⅝"	5¾"	12"	7"		22 9/16"	4¾"		16¾"	1½"
10	11¾"	6"	¾"	1½"	1½"	3¼"	⅜"	10"	13⅛"			11⅝"	6⅞"		10"	¼"	2'-4⅝"	6¼"	9/16"	20¾"	2¼"
12	14"	7⅞"				3¾"		12"	15⅝"			14"	9"	14"	13"	¾"	2'-11"	7¼"		2'-1"	1¾"
14	15 5/16"	8¾"					½"	14"	17⅛"	22½°	8	15¾"	9⅞"	14½"	13½"	1¼"	3'-4"	9⅝"		2'-3¼"	2 15/16"
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 13/16"	16¼"				6"		24"	2'-4⅛"	15°	12	2'-2¼"	18"	24"	20⅛"	3¾"	5'-10⅝"	8½"	1 3/16"	4'-2¼"	1 9/16"
27	23⅝"		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'-11¾"		2'-3"	2'-3¼"	6"	8'-2 11/16"	12"		5'-6¼"	4¼"
36	2'-5 5/16"	22¼"			3"	11"	1"	3'-0"	3'-4⅛"	11¼°	16	3'-2⅜"	24"	2'-5"	2'-6¼"	6¾"	8'-11½"	11¼"	1⅛"	5'-11¼"	4¾"
45	2'-10 13/16"	2'-4¼"		2½"	3½"	10"		3'-9"	4'-3⅛"	9°	20	4'-0⅝"	2'-6"	2'-3"	2'-9½"	9"	11'-2 9/16"	14"		7'-2¾"	7 13/16"

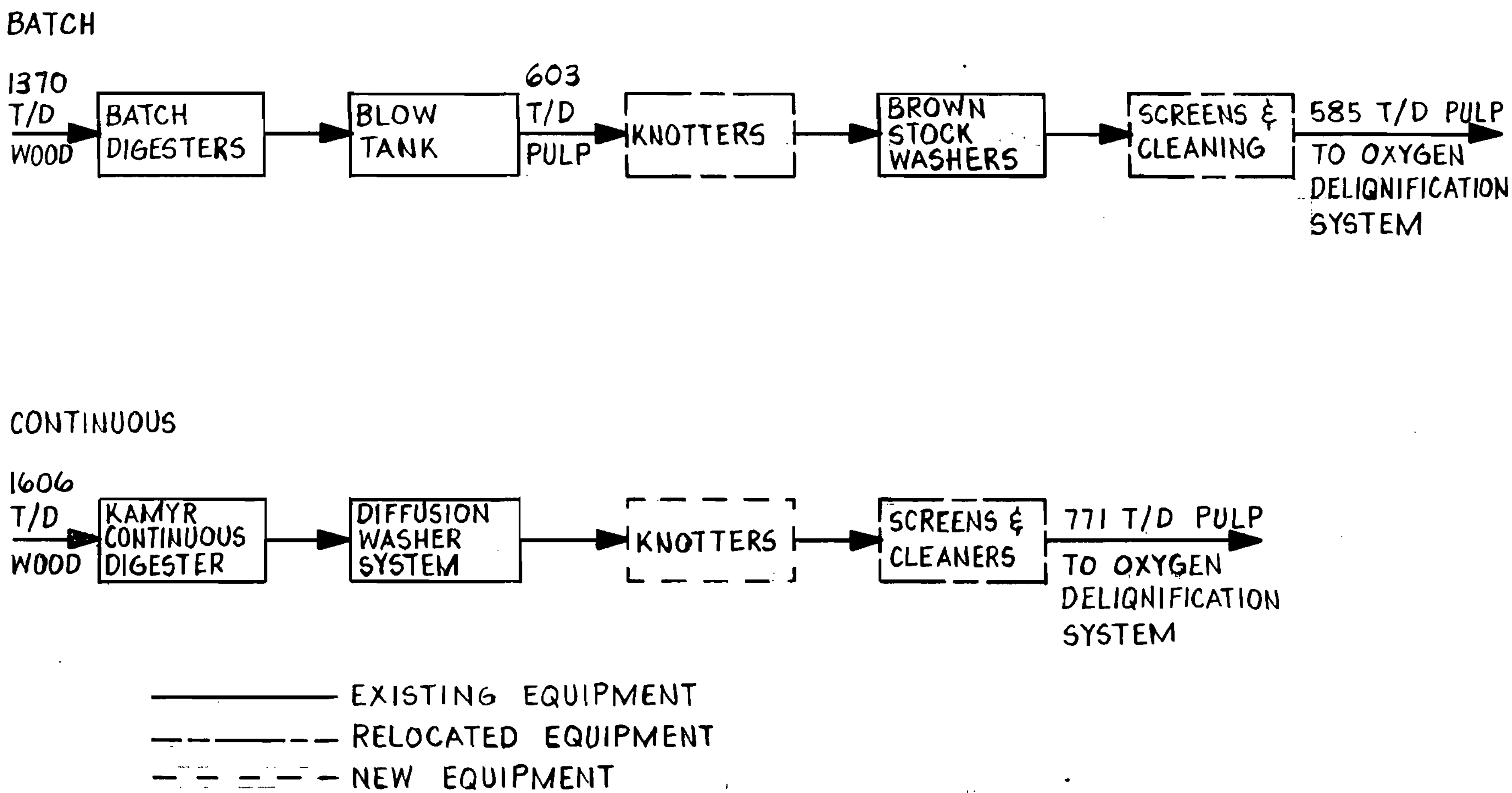
ATTACHMENT C

NEW BLEACHING FACILITIES DESCRIPTION

AND

FLOW DIAGRAMS

WOOD COOKING SYSTEM



Brown & Root U.S.A., Inc.

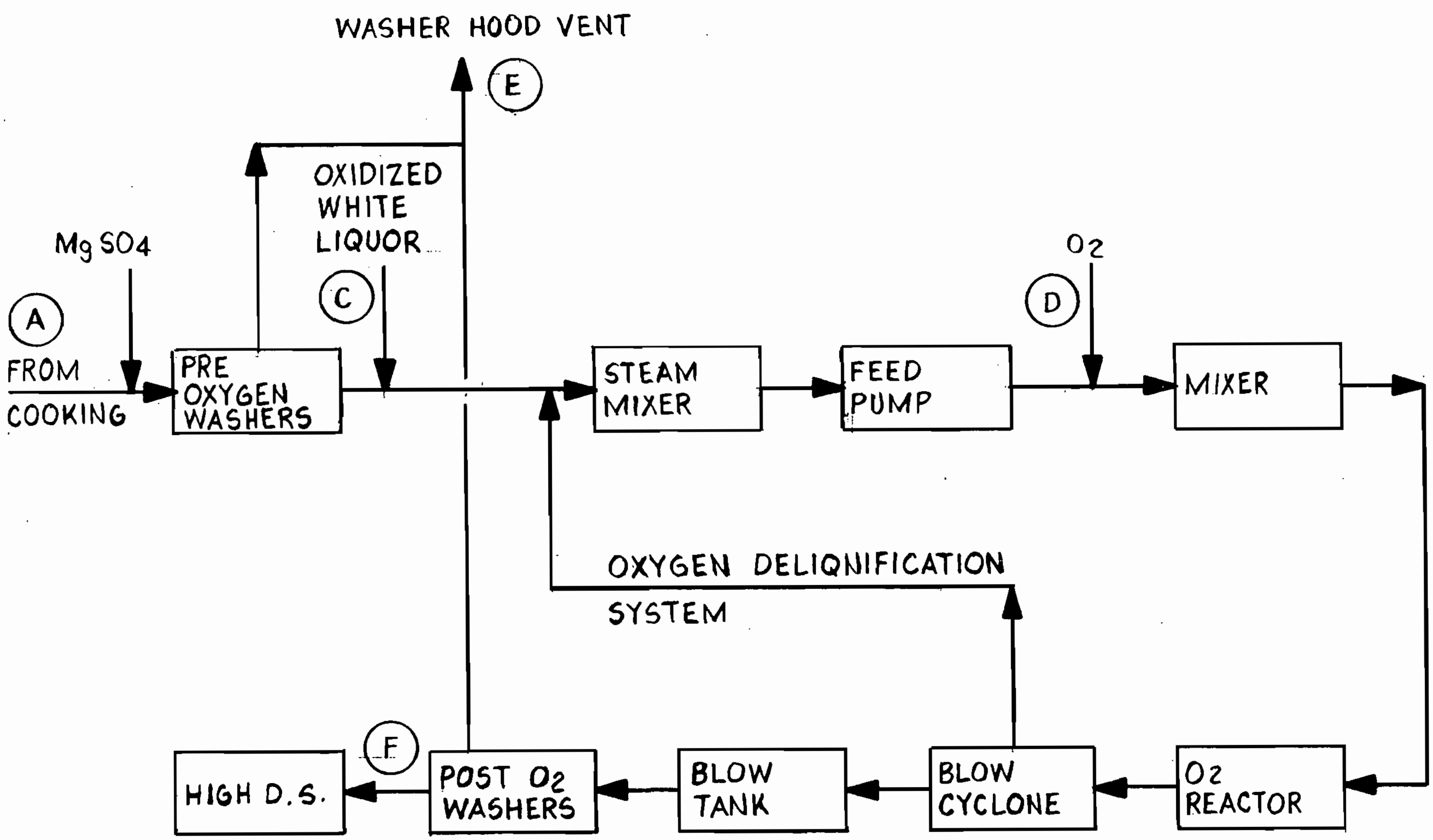
APPROVAL DATE

CONTRACT NO. JR-0728

IDENTIFICATION NO.

PAGE OF

FORM NO. EF-000-50.11-0-US



	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.

APPROVAL DATE

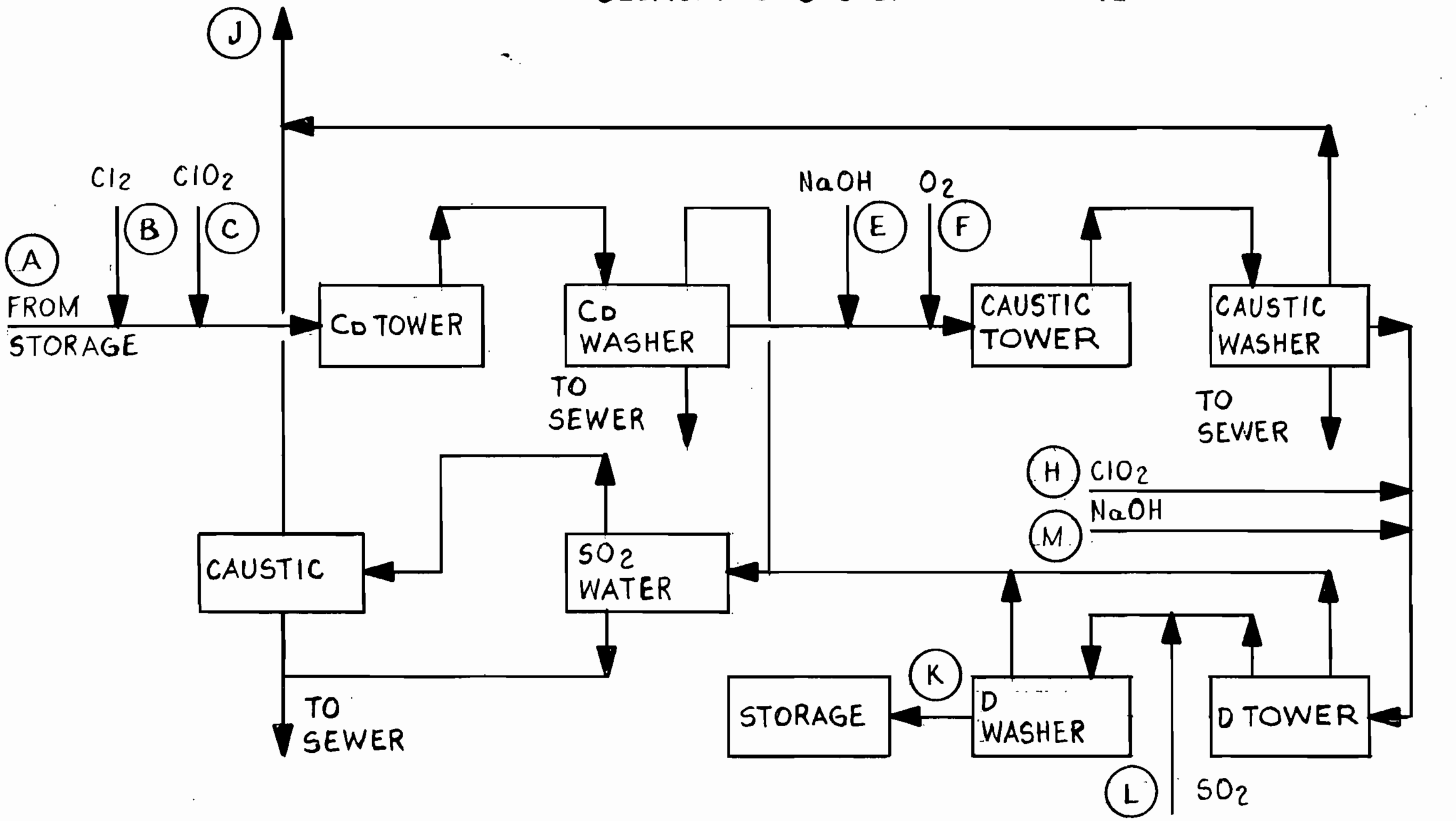
CONTRACT NO. JR-0728

IDENTIFICATION NO.

PAGE OF

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

APPROVAL DATE

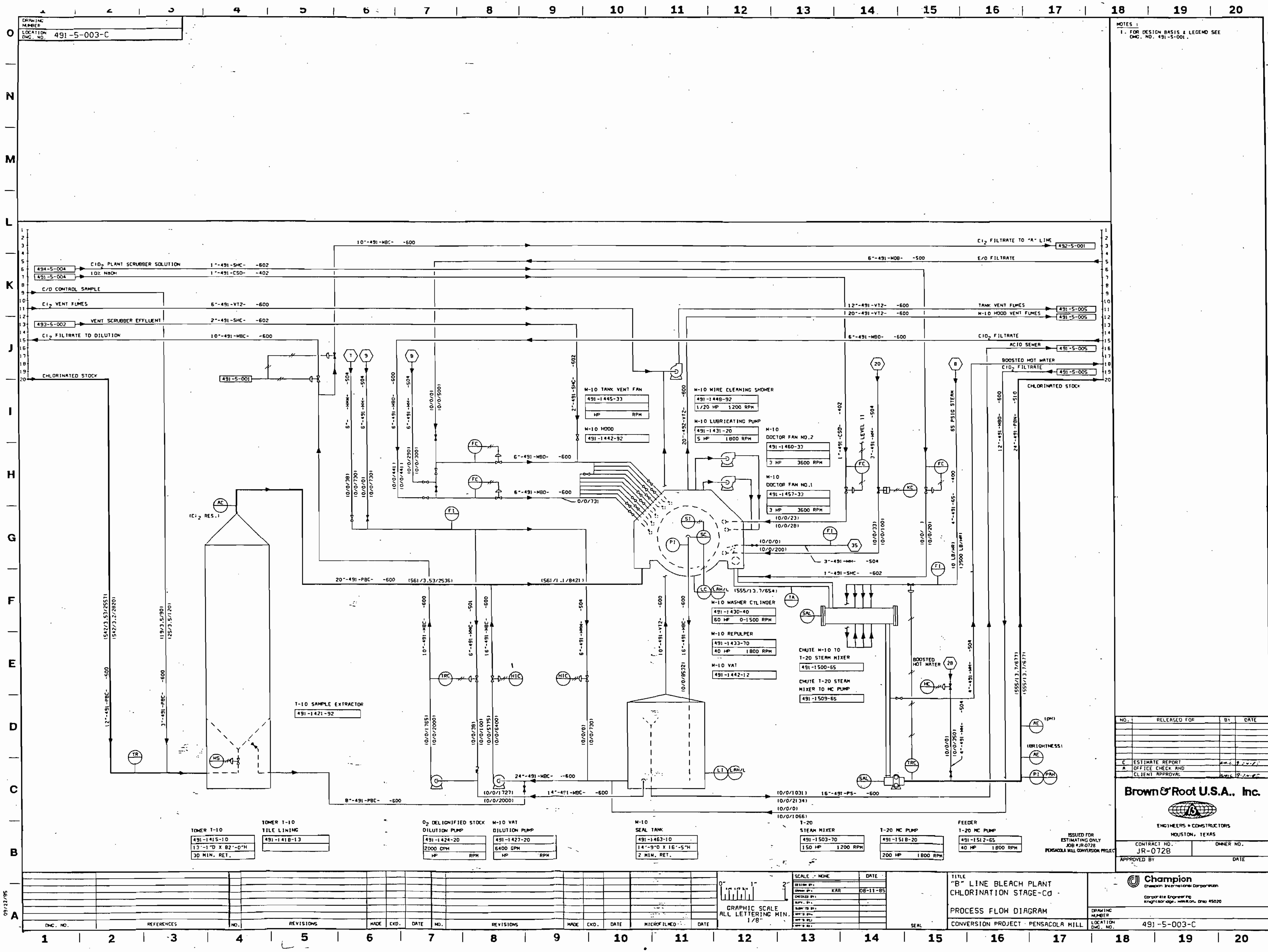
PAGE OF

Brown & Root U.S.A., Inc.

CONTRACT NO. JR-0728

IDENTIFICATION NO.

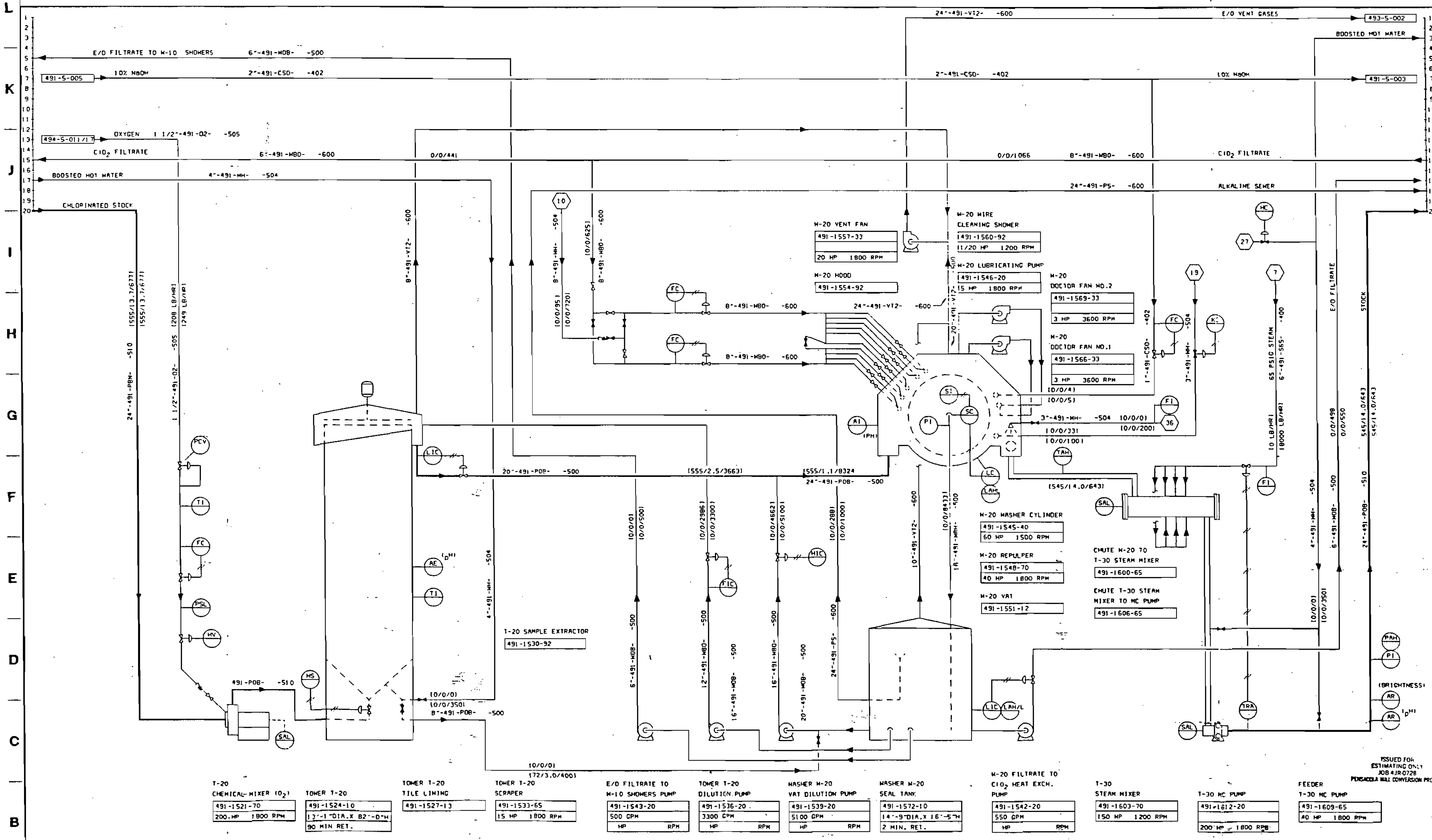
FORM NO. EF-000-50.11-0-US



DRAWING NUMBER
LOCATION DWG. NO. 491-5-003-C
NOTES :
1. FOR DESIGN BASIS & LEGEND SEE DWG. NO. 491-5-001.
ClO2 PLANT SCRUBBER SOLUTION
10% NaOH
C/D CONTROL SAMPLE
Cl2 VENT FUMES
VENT SCRUBBER EFFLUENT
Cl2 FILTRATE TO DILUTION
CHLORINATED STOCK
Cl2 FILTRATE TO "A" LINE
E/O FILTRATE
TANK VENT FUMES
W-10 HOOD VENT FUMES
ClO2 FILTRATE
ACID SEWER
BOOSTED HOT WATER
ClO2 FILTRATE
CHLORINATED STOCK
W-10 TANK VENT FAN
491-1445-33
W-10 HOOD
491-1442-92
W-10 WIRE CLEANING SHOWER
491-1448-92
1/20 HP 1200 RPM
W-10 LUBRICATING PUMP
491-1431-20
5 HP 1800 RPM
W-10 DOCTOR FAN NO.2
491-1460-33
3 HP 3600 RPM
W-10 DOCTOR FAN NO.1
491-1457-33
3 HP 3600 RPM
W-10 WASHER CYLINDER
491-1430-40
60 HP 0-1500 RPM
W-10 REPULPER
491-1433-70
40 HP 1800 RPM
W-10 VAT
491-1442-12
CHUTE W-10 TO T-20 STEAM MIXER
491-1500-65
CHUTE T-20 STEAM MIXER TO MC PUMP
491-1509-65
T-10 SAMPLE EXTRACTOR
491-1421-92
BOOSTED HOT WATER
TOWER T-10
491-1415-10
13'-1"D X 82'-0"H
30 MIN. RET.
TOWER T-10 TILE LINING
491-1418-13
O2 DELIGNIFIED STOCK DILUTION PUMP
491-1424-20
2000 GPM
W-10 VAT DILUTION PUMP
491-1427-20
6400 GPM
W-10 SEAL TANK
491-1463-10
14'-9"D X 16'-5"H
2 MIN. RET.
T-20 STEAM MIXER
491-1503-70
150 HP 1200 RPM
T-20 MC PUMP
491-1518-20
200 HP 1800 RPM
FEEDER T-20 MC PUMP
491-1512-65
40 HP 1800 RPM
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
GRAPHIC SCALE
ALL LETTERING MIN. 1/8"
SCALE - NONE
DATE 08-11-85
SEAL
TITLE
"B" LINE BLEACH PLANT
CHLORINATION STAGE-Cd
PROCESS FLOW DIAGRAM
CONVERSION PROJECT · PENSACOLA MILL
Champion
Champion International Corporation
Corporate Engineering
DRAWING NUMBER
LOCATION DWG. NO. 491-5-003-C

DRAWING NUMBER

LOCATION DWG. NO. 491-5-004-C



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 | DATE

DRAWN BY: LS 08-12-85

CHECKED BY:

SEAL

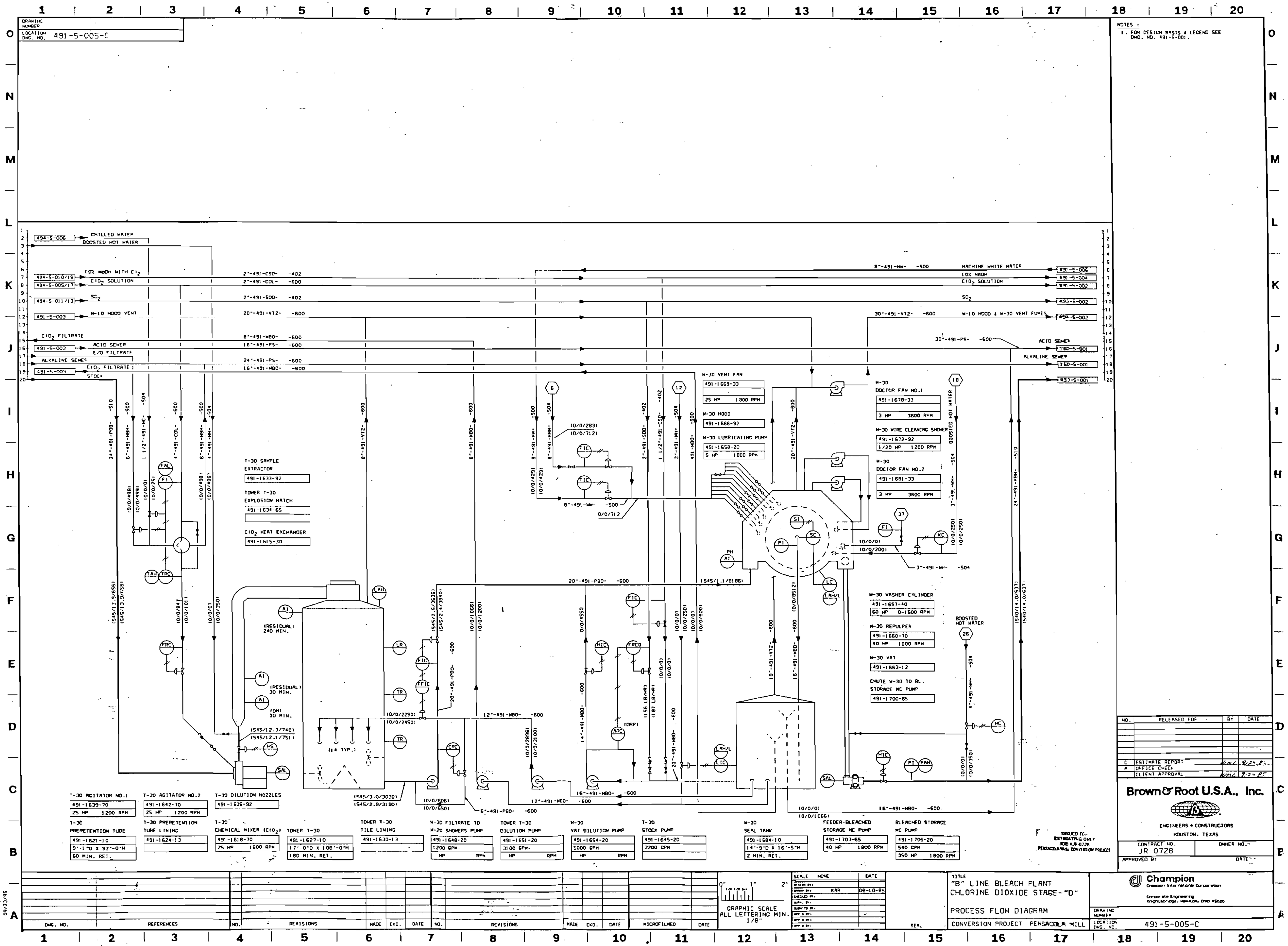
TITLE
"B" LINE BLEACH PLANT
OXIDATIVE EXTRACTION
STAGE-E/O
PROCESS FLOW DIAGRAM

CONVERSION PROJECT PENSACOLA MILL

Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020

DRAWING NUMBER

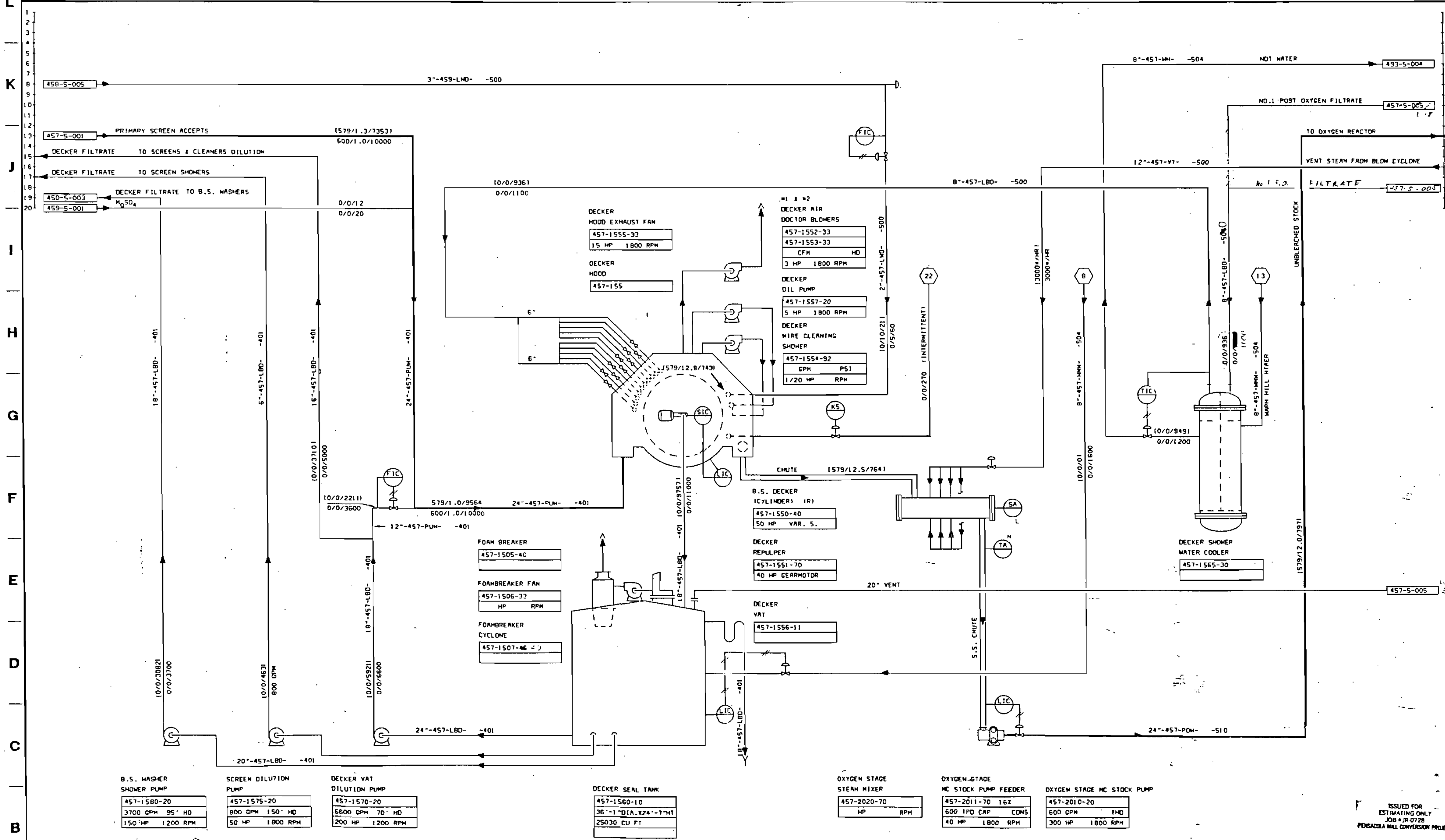
LOCATION DWG. NO. 491-5-004-C



LOCATION DWG. NO. 491-5-005-C
NOTES :
1. FOR DESIGN BASIS & LEGEND SEE DWG. NO. 491-5-001.
CHILLED WATER
BOOSTED HOT WATER
MACHINE WHITE WATER
ClO2 SOLUTION
SO2
ClO2 FILTRATE
ACID SEWER
ALKALINE SEWER
T-30 SAMPLE EXTRACTOR
491-1633-92
TOWER T-30 EXPLOSION HATCH
491-1634-65
ClO2 HEAT EXCHANGER
491-1615-30
M-30 VENT FAN
491-1669-33
M-30 HOOD
491-1666-92
M-30 LUBRICATING PUMP
491-1658-20
M-30 DOCTOR FAN NO.1
491-1678-33
M-30 WIRE CLEANING SHOWER
491-1672-92
M-30 DOCTOR FAN NO.2
491-1681-33
M-30 WASHER CYLINDER
491-1657-40
M-30 REPULPER
491-1660-70
M-30 VAT
491-1663-12
CHUTE M-30 TO BL. STORAGE MC PUMP
491-1700-65
T-30 AGITATOR NO.1
491-1639-70
T-30 AGITATOR NO.2
491-1642-70
T-30 DILUTION NOZZLES
491-1636-92
T-30 PRERETENTION TUBE
491-1621-10
T-30 PRERETENTION TUBE LINING
491-1624-13
T-30 CHEMICAL MIXER (ClO2)
491-1618-70
TOWER T-30
491-1627-10
TOWER T-30 TILE LINING
491-1630-13
M-30 FILTRATE TO M-20 SHOWERS PUMP
491-1648-20
TOWER T-30 DILUTION PUMP
491-1651-20
M-30 VAT DILUTION PUMP
491-1654-20
T-30 STOCK PUMP
491-1645-20
M-30 SEAL TANK
491-1684-10
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
ISSUED FOR ESTIMATING ONLY JOB #JR-0728 PENSACOLA MILL CONVERSION PROJECT
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
SCALE NONE
DRAWN BY: KAR 08-10-85
GRAPHIC SCALE
ALL LETTERING MIN. 1/8"
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

DRAWING NUMBER
LOCATION DWG. NO. 457-5-003-C

NOTES:
1. FOR DESIGN BASIS & LEGEND SEE DWG. NO. 457-5-001.



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
DRAWN BY: DM 08/12/85

SEAL

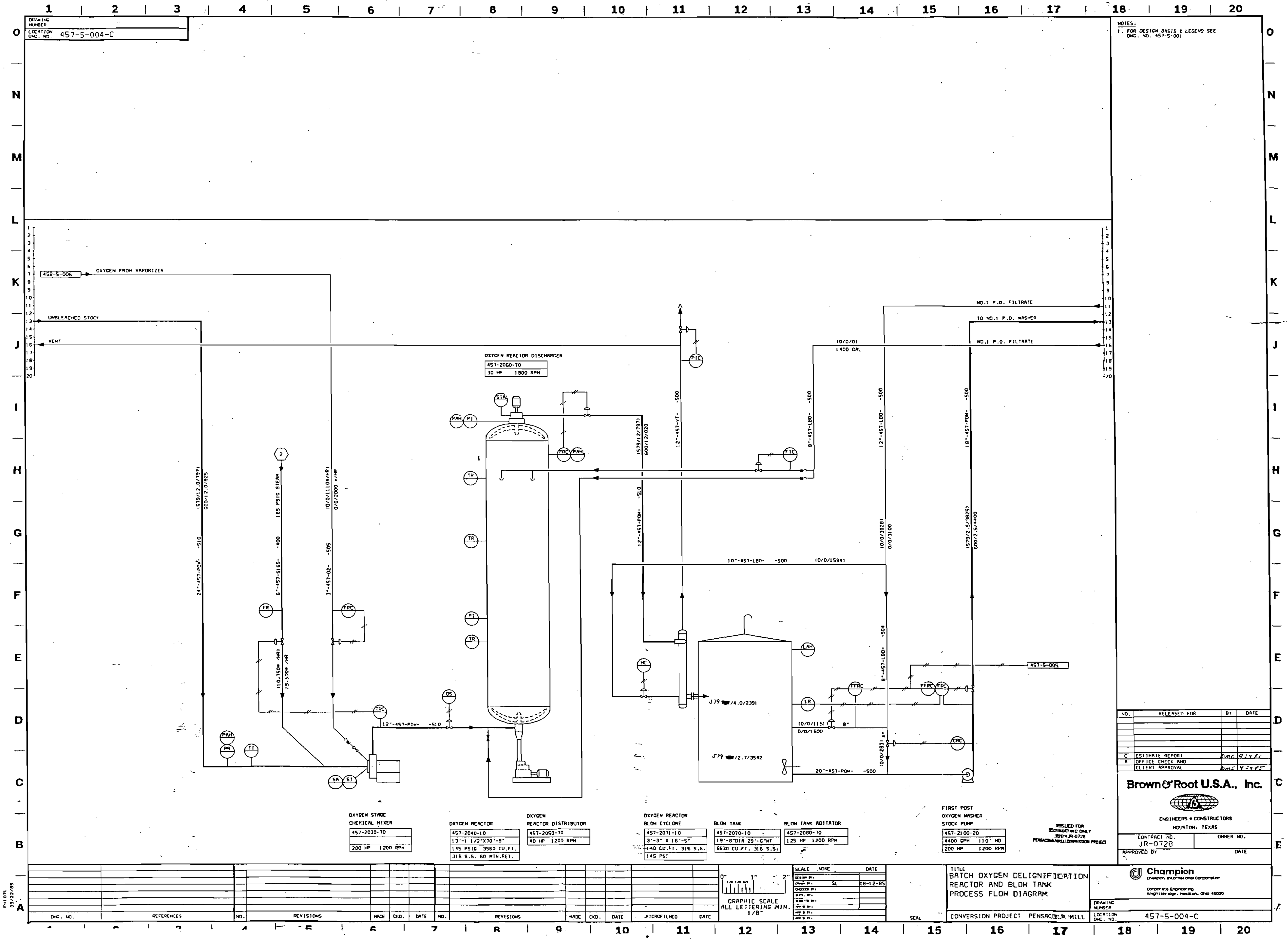
TITLE
BATCH SCREENING & DECKERING
DECKER

PROCESS FLOW DIAGRAM

CONVERSION PROJECT PENSACOLA MILL

Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020

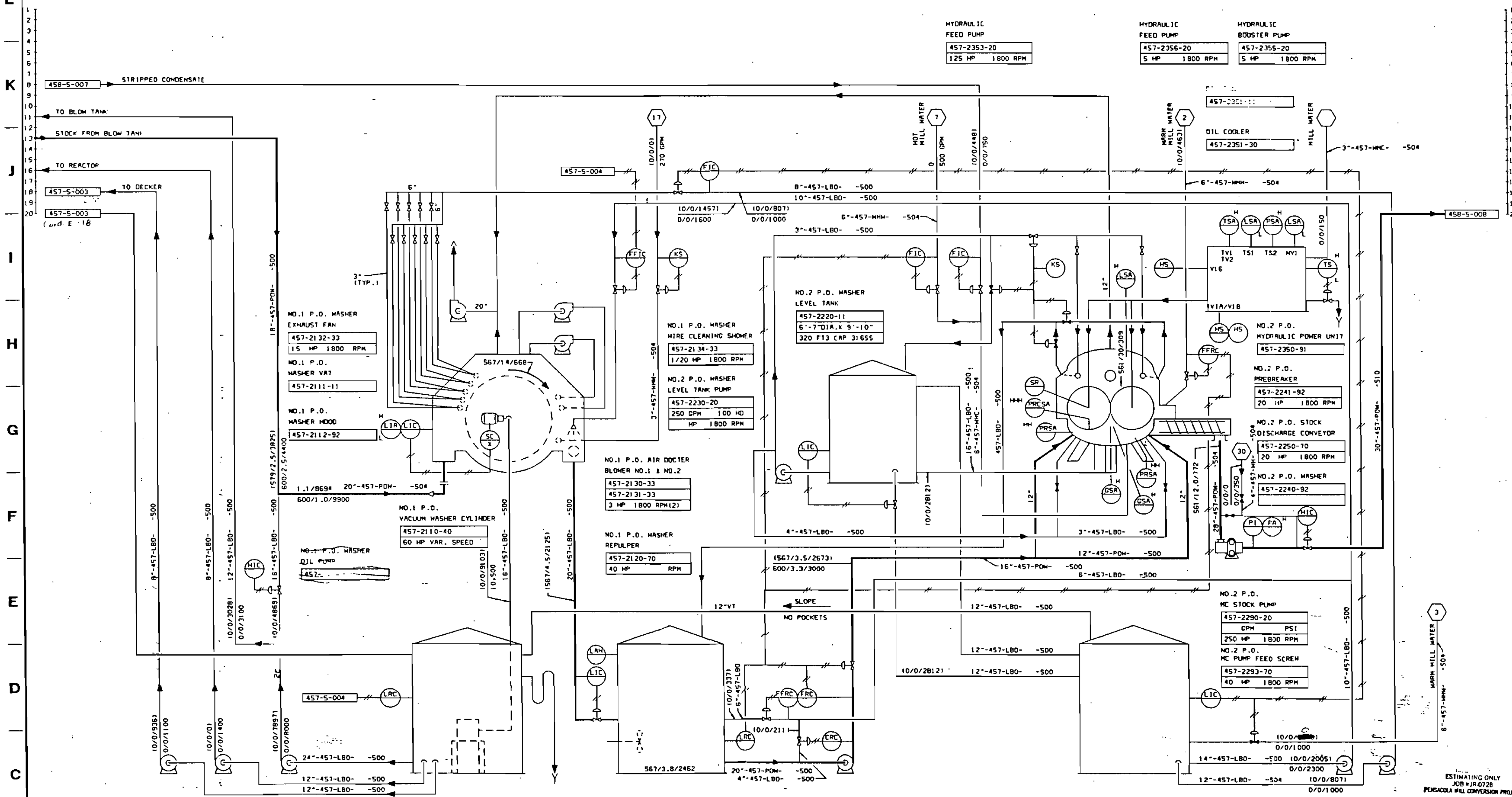
DRAWING NUMBER
LOCATION DWG. NO. 457-5-003-C



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
NO.1 P.O. FILTRATE
TO NO.1 P.O. WASHER
NO.1 P.O. FILTRATE
(0/0/0)
1400 GAL
OXYGEN REACTOR DISCHARGER
457-2060-70
30 HP 1800 RPM
24"-457-POW- -510
6"-457-S165- -400
165 PSIG STEAM
3"-457-02- -505
12"-457-POW- -510
12"-457-VT- -500
8"-457-LBO- -500
12"-457-LBO- -500
18"-457-POW- -500
10"-457-LBO- -500
10/0/15941
8"-457-LBO- -504
20"-457-POW- -500
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"
140 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 ESTIMATING ONLY
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
SCALE NONE
DRAWN BY: SL 08-12-85
GRAPHIC SCALE
ALL LETTERING MIN. 1/8"
SEAL
TITLE
BATCH OXYGEN DELIGNIFICATION REACTOR AND BLOW TANK PROCESS FLOW DIAGRAM
CONVERSION PROJECT PENSACOLA MILL
Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020
DRAWING NUMBER
LOCATION DWG. NO. 457-5-004-C
DWG. NO.
REFERENCES
NO.
REVISIONS
MADE
CKD.
DATE
MICROFILMED

DRAWING NUMBER
LOCATION DWG. NO. 458-5-005-C

NOTES :
1. FOR DESIGN BASIS & LEGEND SEE DWG. NO. 457-5-001.



DECKER SHOWER PUMP	REACTOR DILUTION PUMP	POST OXYGEN WASHER DILUTION PUMP	SEAL TANK	AGITATOR	NO.2 P.O. WASHER STOCK FEED TANK
457-2160-20	457-2170-20	457-2150-20	457-2140-10	457-2200-70	457-2190-10
1100 GPM 105'HD	1400 GPM 270'HD	8000 GPM 60'HD	36'-1" DIAX24'-9"HT	150 HP 1200 RPM	19'-8" DIAX29'-6"HT
50 HP 1800 RPM	200 HP 1800 RPM	200 HP 900 RPM	25,179 FT3 CS		8830 FT3 CAP

NO.2 P.O. WASHER STOCK FEED PUMP	NO.2 P.O. WASHER OIL PUMP	NO.2 P.O. WASHER LIQUOR TANK	PRESS FEED DILUTION PUMP	1ST P.O. WASHER SHOWER PUMP
457-2210-20	457-2357-20	457-2260-10	457-2280-20	457-2270-20
3000 GPM 120'HD	5 HP 1800 RPM	16'-5" DIAX16'-5"HT	1000 GPM 90' HD	2300 GPM 60'HD
150 HP 1200 RPM		3355 FT3 304 SS	40 HP 1800-RPM	50 HP 1200 RPM

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ENGINEERS • CONSTRUCTORS
HOUSTON, TEXAS

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GRAPHIC SCALE
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SCALE NONE
DATE
DRAWN BY: KAR 08-11-85

SEAL

TITLE
BATCH
OXYGEN DELIGNIFICATION
POST OXYGEN WASHING
PROCESS FLOW DIAGRAM
CONVERSION PROJECT PENSACOLA MILL

Champion
Champion International Corporation
Corporate Engineering
Knightsbridge, Hamilton, Ohio 45020

DRAWING NUMBER
LOCATION DWG. NO. 457-5-005-C

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.

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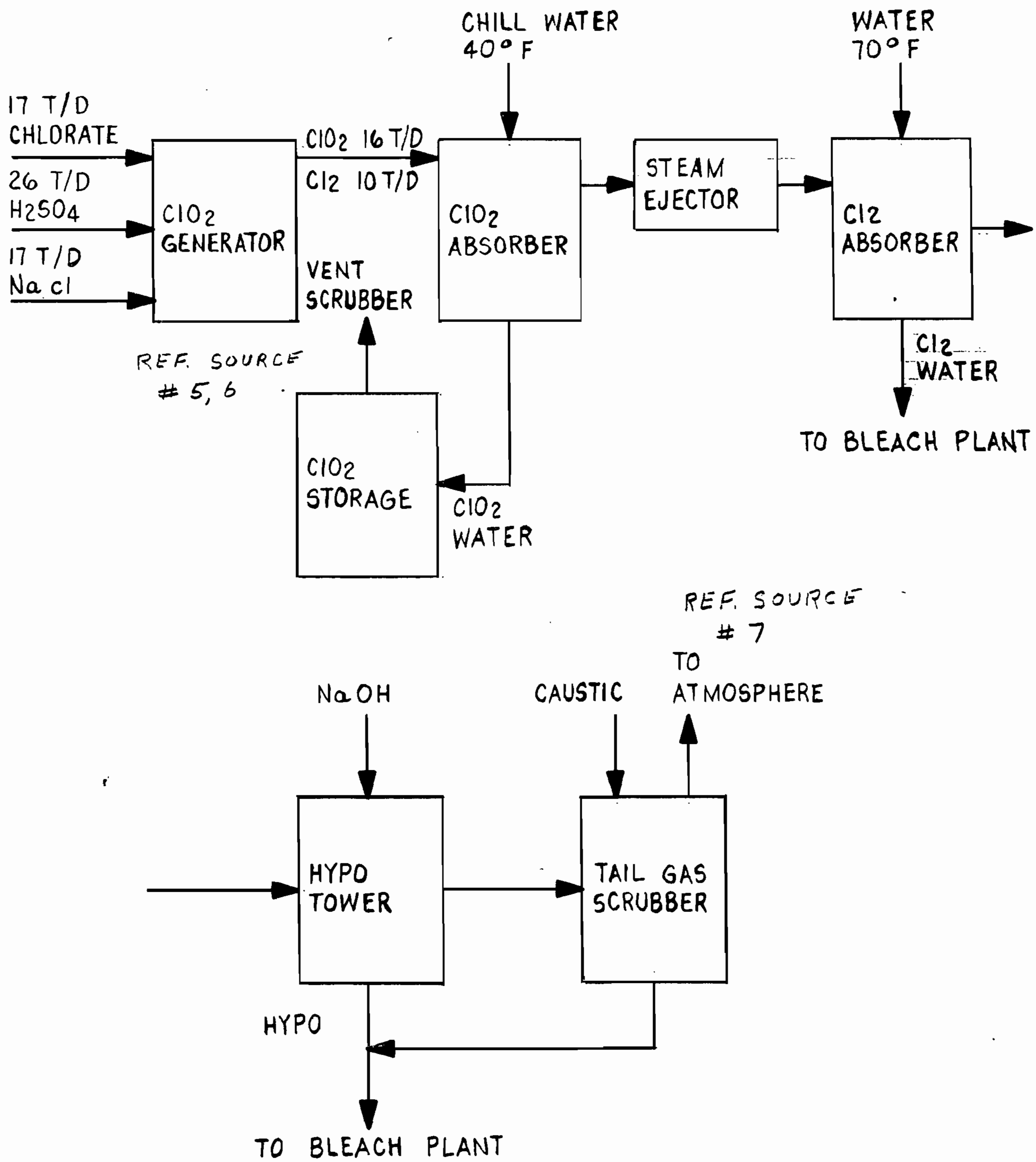
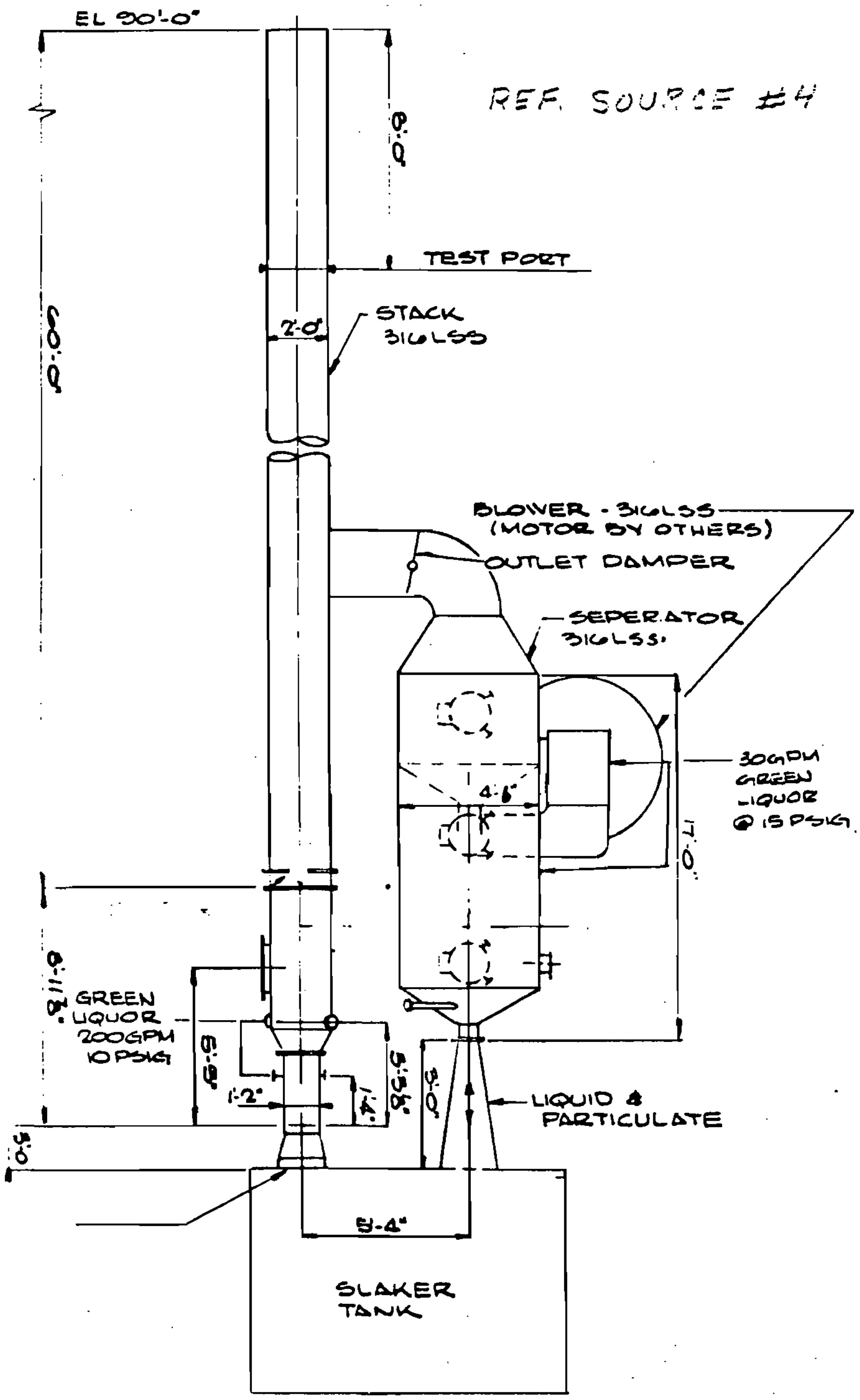
CHLORINE DIOXIDE GENERATOR



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 ____

CONT. NO.
DWG. NO.
SHT ____ OF ____

ATTACHMENT E

WOODYARD PROCESS FLOW DIAGRAM

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APPROVAL DATE

PAGE OF

WOODYARD