SULFATE AND SULFURIC ACID MIST PROJECT

NAME: Frances Wolf

PLANT NAME: Champion International Paper Company

PLANT CONTACT: Bob Seevers, Employee Relations Manager
Bob Jones, Safety Director

LOCATION: Canton, North Carolina

PURPOSE: To determine the feasibility of including this pulp facility in the Sulfate and Sulfuric Acid Mist Project.

DATE OF SURVEY: April 27, 1976

PROCESS: The pulping operation is a kraft process where the wood chips are chemically treated with caustic soda and sodium sulfide for 2½ hours under pressure. After discharge from the digestors the pulp is held in blow pits. The raw pulp is later washed, screened, bleached and finally sent to the paper manufacturing operations.

POTENTIAL HEALTH HAZARDS:

Potential Hazard	Conditions of Potential Hazard	Approximate No. Of Persons Exposed
SO_2	Exposure may occur at the digestor, tank, unloading area or during chemical recovery if connections are loose, piping damaged or if the control systems malfunction.	8
Cl_2 Cl_2O	Exposure is possible if leaks occur in chlorine handling lines or if the exhaust system at the pulp bleaching operation are malfunctioning.	150
Methyl Mercaptan	Malfunctions in the chemical recovery processing may result in exposure.	3

Potential Hazard	Conditions of Potential Hazard	Approximate No. Of Persons Exposed
Thiosulfate	Exposure is possible during start-up and shut-down of the lime kiln.	3
Asbestos	Exposure is possible during filter changing in the bleach production area.	150
Wood Dust	Any malfunction of the dust collecting units at debarking and chipping may result in exposure.	3

PERSONNEL RECORDS: They include work histories, medical records, x-rays for persons in the chlorine manufacturing area. These records also include medical histories with the previous personnel records.

RECOMMENDATIONS: The exposure to sulfates and sulfuric acid mist and at this operation does not warrant inclusion in the Sulfate and Sulfuric Acid Mist Project.

Work Sheet

for

Preliminary Industrial Hygiene
Survey of

Plant Name: Champion International Paper Company

City, State: Canton, North Carolina

Survey Date: April 27, 1976

Survey Conducted By: David Brown, Epidemiologist
Gary White, Industrial Hygienist
Frances Wolf, Industrial Hygienist

Environmental Investigations Branch
Division of Surveillance, Hazard Evaluations and Field Studies
National Institute for Occupational Safety and Health
Cincinnati, Ohio

I. General:

1. Establishment Name Champion International Paper Company

Address _____ City Canton

State North Carolina Zip Code 28716 Tel. No. (704) 648 2331

2. Persons Interviewed Perry Bartsch

Title Vice President

Others: See attached sheet

3. A) Union Representative: Joe Hyatt

Title Safety and Health Representative Telephone Number _____

B) Name of Union(s) United Paper Workers Int'l Union, 90% of employees represented by UPIU

5. NIOSH Staff Present David Brown, Gary White, Frances Wolf

II. Plant Description:

1. Is plant a subsidiary or independently owned? Independent

Name of parent company _____

Legal Owner Champion International Paper Company

2. Date plant built 1908 using the sulfite process; 1922 paper manufacture began.

Date of plant additions 1925 conversion to the Kraft process

3. Acreage of plant site 160 acres

4. Number of major buildings _____ Total Square Feet _____

5. A) How many people are on your payroll at the present time? 2150

B) Of this number, how many are normally in the

Production Area? 1800 hourly

Administrative Area? 300 salaried

Other Areas? _____

Other Persons Interviewed

Bob Seevers	Employee Relations Manager
Lon Wood	Pulp mill Supervisor
Bill Miller	Process Technician
Bob Jones	Safety Director
Hocult Phillips	Chief Chemist
Ed Dyer	Department Manager, Technical Control
Vella Williams	Registered Nurse

Raw Materials

Wood	
pinewood	1,375 cords/day
mixed hardwood	845 cords/day
woodchips	1,328 cords/day
stored wood	32,000 cords/day

NaS

$NaSO_4$

NaOH

Na_2CO_3

Chlorine

Coal

Oil

Contaminants	Location of Contaminants
SO_2	Cooking, tank unloading and chemical recovery
Cl_2, Cl_2O	Bleach production and pulp bleaching
Wood Dust	Debarking and chipping
Methyl Mercaptan	Chemical recovery
Thiosulfate	Lime kiln on start-up and shut-down

Production Processes The pulp is sent to beaters and hydropulpers where various compoinds are added depending on the quality of paper to be produced. In Jordans the fibers are cut to appropriate lengths and 0.5% pulp is mixed with water and sent to foundriners. The pulp mixture is passed over the foundriner wire which forms a loosely matted web and part of the water is removed. From the foundriner wire the pulp is passed to woolen felts and most of the water is removed by pressure and suction. The paper is dried on large steam heated rollers, sized with starch and dried again. The paper then enters calendar stacks and is "ironed" before it is wound on the rolls. The rolls are sent to rewinders which cut the paper to specified widths and then rewound. Some of the paper is shipped as rolls and some is cut into flat sheets before shipping. The paper is inspected to insure high quality before shipping.

IV. Description of Medical, Safety and Industrial Hygiene Programs:

1. A) Does your company employ an industrial hygienist?

Yes, at this location_____

Yes, at corporate headquarters X

Yes, on a consulting basis_____

Yes, insurance carrier_____

Yes, specify_____

No_____

B) Name_____ Telephone Number_____

Address_____

C) What types of measurements are routinely taken? Explain.

H_2S, Cl, SO_2

Vessel entry procedure: check for O_2 depletion. In the boiler there is a cold water wash and persons entering have life lines. The "sniffer" is present to check for O_2 depletion periodically. In the digester and sewer air is blown in, the air checked and persons entering use lift lines.

D) Were industrial hygiene measurements obtained: Yes_____ No X

2. Do you have an agreement with a physician to give your employees emergency or other medical car?

Yes, at this location--full-time_____

Yes, at this location--part-time_____

SPECIAL EXAM
(Six Months Intervals)

Trucker Drivers	Chloride Manufacturing (150 persons)	Maintenance and Utility
Complete EKG, physicals visual audio metric testing	X-ray for asbestosis	Blood Lead

C) How many people are involved in this program? 2 full-time

D) How many lost-time accidents did you have last year?

21 disabled

Frequency 481 Severity 165.49 722 lost work days

2083 employees; 4,362,664 man hours

9. Has there been any medical abnormalities among workers which can be contributed to an occupational exposure? No

Explain _____

_____

_____

10. What protective equipment is required:

Equipment Provided by Employer		
Clothing	Yes X	No
Glasses	Yes X	No
Shoes (Available at ½ cost, but are not mandatory.	Yes	No X
Respirators	Yes X	No

Type Appropriate for area and hazard involved

Where Used SO_2 cartridge, ½ face mask available in SO_2 loading areas.

Other Ear plugs, hard hats

11. A) Are there facilities for taking showers?

Yes X No

B) Are there facilities for changing clothes?

Yes X No

C) Obtained descriptive literature on products?

Yes No X

V. Narrative:

1. Description of Medical, Safety and Industrial Hygiene Program:

Safety: Handouts of Responsibilities of the various areas and a ½ hour slide show and training in use of safety equipment constitutes the initial training

2. Potential Health Hazards:

SO_2-tank unloading, chemical recovery, digestors if improperly sealed.

H_2SO_4-tall oil production

Cl and Cl_2O-bleach manufacture-bleaching

asbestos-bleach manufacture

3. Have product lines changed over the years? (If they have, include and other raw materials used).

Pulping process changed from sulfite process to Kraft process. The acid sulfite process uses calcium, sodium, magnesium or ammonium bisulfite with excess sulfur dioxide to digest the chips.

4. Are waste products reused: (If not, how are they disposed?)

The trimmings of milk carton stock are recycled, as are inplant wastes. Chemical recovery as outlined in attached sheet entitled Chemical Recovery Cycle.

5. Briefly describe any past air sampling data.

Routine sampling and reports to EPA, including some continuous monitorin and the sulfur content of the coal and oil.

OSHA visits four times/year

6. Describe status of personnel records. (i.e. completeness of records - social security numbers, work history, lost time accident data, availability of past records, etc.)

Excellent, includes medical histories of previous employees, x-rays on personnel in chlorine gas production.

7. Ventilation: (include type, size, kinds of collectors, H.P. of blowers etc.)

History of Changes

Continual improvements in ventilation and recovery systems.

ESP used as collector at oxidation furnace and lime kilns

Wet contact scrubbers at the digestors.

8. Housekeeping:

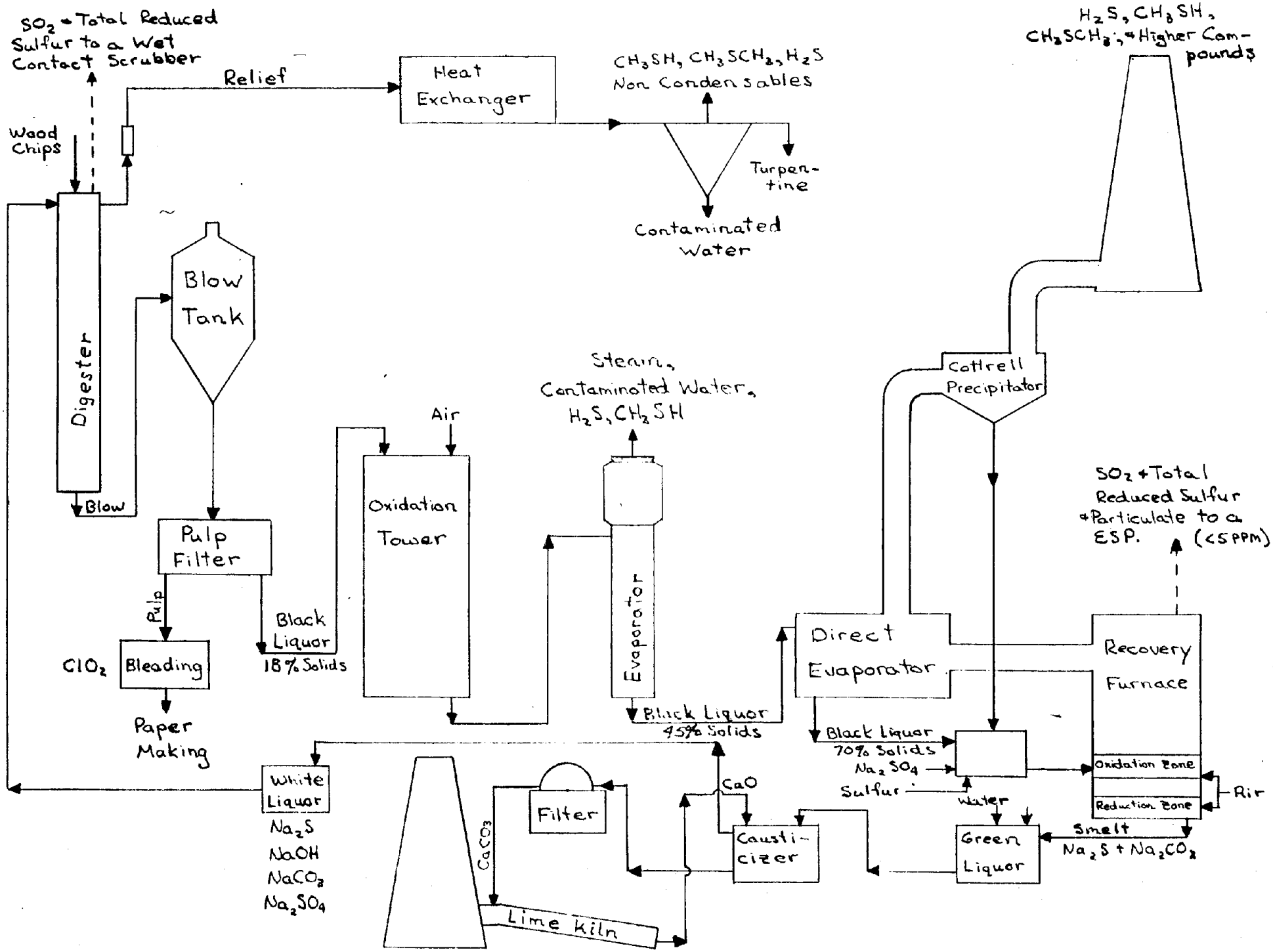
Appeared to be good in areas which we visited

9. Miscellaneous:

Several recycling process - see attached sheet entitled "Chemical Recovery Cycle." Tall oil recovery system recover 14 fatty acid, tall oil soap, tall oil: $6NH_2SO_4 \rightarrow NA_2SO_4$ and spent oils

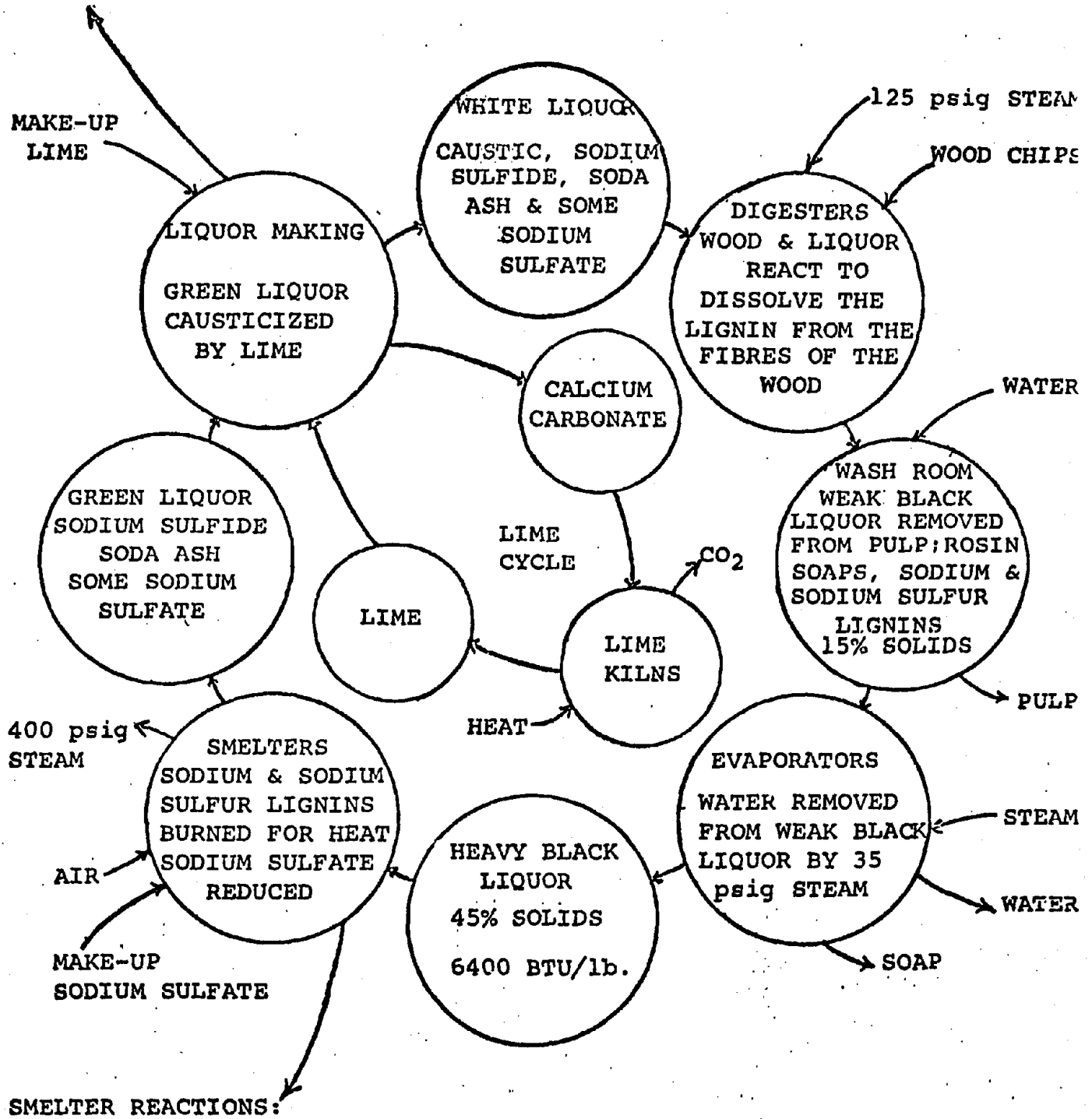
Turpentine recovery

Reference: Considine, Douglas M., Chemical and Process Technology Encyclopedia, McGraw-Hill Book Company, New York, New York, 1974, pp. 934-941.


SO_2 + Total Reduced Sulfur to a Wet Contact Scrubber
Relief
Heat Exchanger
CH_3SH, CH_3SCH_3, H_2S Non Condensables
Turpentine
Contaminated Water
H_2S, CH_3SH, CH_3SCH_3, + Higher Compounds
Wood Chips
Digester
Blow
Blow Tank
Cottrell Precipitator
Steam, Contaminated Water, H_2S, CH_3SH
Air
Oxidation Tower
Evaporator
SO_2 + Total Reduced Sulfur + Particulate to a ESP. (<5 PPM)
Pulp Filter
Pulp
Black Liquor 18% Solids
ClO_2
Bleading
Paper Making
Direct Evaporator
Recovery Furnace
Black Liquor 45% Solids
Black Liquor 70% Solids
Na_2SO_4
Sulfur
Water
Oxidation Zone
Reduction Zone
Air
White Liquor
Na_2S
NaOH
$NaCO_3$
Na_2SO_4
Filter
CaO
$CaCO_3$
Causti-cizer
Green Liquor
Smelt
$Na_2S + Na_2CO_3$
Lime kiln

CHEMICAL RECOVERY CYCLE

LIQUOR MAKING REACTION:
SODA ASH + LIME + WATER = CAUSTIC + CALCIUM CARBONATE



SMELTER REACTIONS:
CARBON FROM LIGNIN + AIR = HEAT + CARBON DIOXIDE
SODIUM SULFATE + CARBON = SODIUM SULFIDE + CARBON DIOXIDE
SODIUM LIGNIN + HEAT = SODA ASH + CARBON DIOXIDE
SODIUM SULFUR LIGNIN + HEAT = SODA ASH + CARBON DIOXIDE + HYDROGEN SULFIDE