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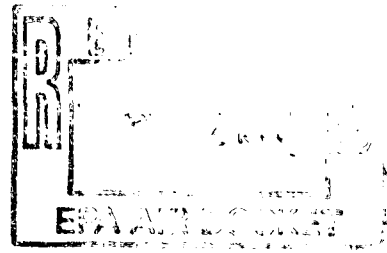


UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

AUG 14 1995

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Ms. Debbie Shprentz
1350 New York Avenue,
NW Suite 300
Washington, DC 20005



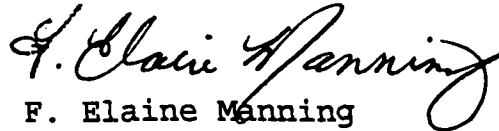
Dear Ms. Shprentz:

During the past few months, the Environmental Protection Agency (EPA) has been working with a team of State and Regional air pollution control agencies to develop preliminary Presumptive maximum achievable control technology (MACT) for the remaining sources (Pulp and Paper MACT III) in the Pulp and Paper Production source category not covered by the December 17, 1993 proposed NESHAP/effluent guideline rules. Presumptive MACT is an estimate of what MACT would be using information currently available. At a minimum, Presumptive MACT would serve as guidance to State and local air pollution control agencies in the event that the provisions of section 112(g) and (j) of the Clean Air Act take effect. Presumptive MACT will also serve as a starting point for developing a national emission standard for hazardous air pollutants (NESHAP) for the Pulp and Paper MACT III.

Our meetings with State and Regional agency representatives have been informative, resulting in an outline for preliminary Presumptive MACT. The attached preliminary Presumptive MACT package summarizes the Presumptive MACT development process to date, and presents preliminary Presumptive MACT for Pulp and Paper MACT III. This package is being distributed to industry and environmental groups for review and the opportunity to provide comments and suggestions that might improve our final determination of Presumptive MACT.

Please call me at (919) 541-5499 if you have questions or comments on the attached preliminary Presumptive MACT package.

Sincerely,



F. Elaine Manning
Waste and Chemical Processes Group
Emission Standards Division

1 Enclosure

cc: Lauren Blum, Environmental Defense Fund
Conrade Schneider, Natural Resource Council of Maine

**PRELIMINARY
PRESUMPTIVE MACT FOR
NON-CHEMICAL AND OTHER PULP AND
PAPER MILLS
(MACT III)**

August 4, 1995

PURPOSE

- Provide overview of the source category
- Summarize current status of standard development
- Describe the presumptive MACT process
- Identify data gaps/considerations in defining presumptive MACT
- Document basis for preliminary presumptive MACT determination
- Document current status of presumptive MACT decisions

OVERVIEW

- Statutory Requirements
- Industry Profile
- MACT III Process Summary
- MACT III Emission Points
- Pollutants of Concern
- Emissions Summary for MACT III Mills
- Information and Data Collection
- Process Descriptions
- Control Options
- Current Industry Practices
- Definition of Presumptive MACT
- The Presumptive MACT Process
- Preliminary Presumptive MACT Suggestion

STATUTORY REQUIREMENTS

- Promulgation of emissions standards for listed source categories required under Section 112(d) of the Clean Air Act (CAA) category
- Pulp and Paper Production is a listed source category under Section 112(c)
- Section 112(e)(5) requires the EPA to promulgate standards for Pulp and Paper Production by November 15, 1997
- If no MACT standard within 18 months (May 1999 for Pulp and Paper Production), Section 112(j)(2) requires major sources* to apply for a permit (in States with approved permit programs) and comply with emissions limitations equivalent to MACT
- Section 112(g) requires compliance with MACT on a case-by-case basis for major source modifications when no national MACT standard has been set by EPA

* *"Major source" means any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year of any HAP or 25 tons per year of any combination of HAP.*

INDUSTRY PROFILE

- There are approximately 560 Pulp and Paper Mills in the source category.
- An integrated NESHAP/effluent guidelines rule was proposed on December 17, 1993. However, the MACT I NESHAP portion only addresses emissions from pulping, bleaching, and wastewater operations at approximately 160 mills.
- Operations included in MACT III (i.e., all operations not included in MACT I or MACT II) are:

Pulping

- mechanical (non-chemical)
- secondary fibers
 - deinking
 - non-deinking
- non-wood

Papermaking

- printing grade paper
- industrial grade paper
 - paperboard
 - construction materials
 - bags
- tissue grade paper
 - facial tissue, toilet paper, napkins, filters
 - retail towels, wipes

Papermaking, continued

- industrial tissue (condenser, carbonizing, wrapping paper)
- Coating and converting operations are covered under a separate source category

MACT III Process Summary Table

Mill Total	Region	MP	NWCP	SFD	SFND	FLP	TGP
83	1	6	6	5	43	32	40
64	2	3	1	5	42	14	32
50	3	2	0	1	38	7	13
106	4	11	4	7	56	9	24
140	5	15	1	16	88	44	38
39	6	8	0	3	22	2	4
7	7	0	0	0	7	0	0
3	8	0	0	0	3	0	0
36	9	1	0	4	28	3	5
36	10	11	0	2	15	4	13
564	Total	57	12	43	342	115	169

MP - Mechanical Pulping

NWCP - Non-wood Chemical Pulping

SFD - Secondary Fibers, Deinking

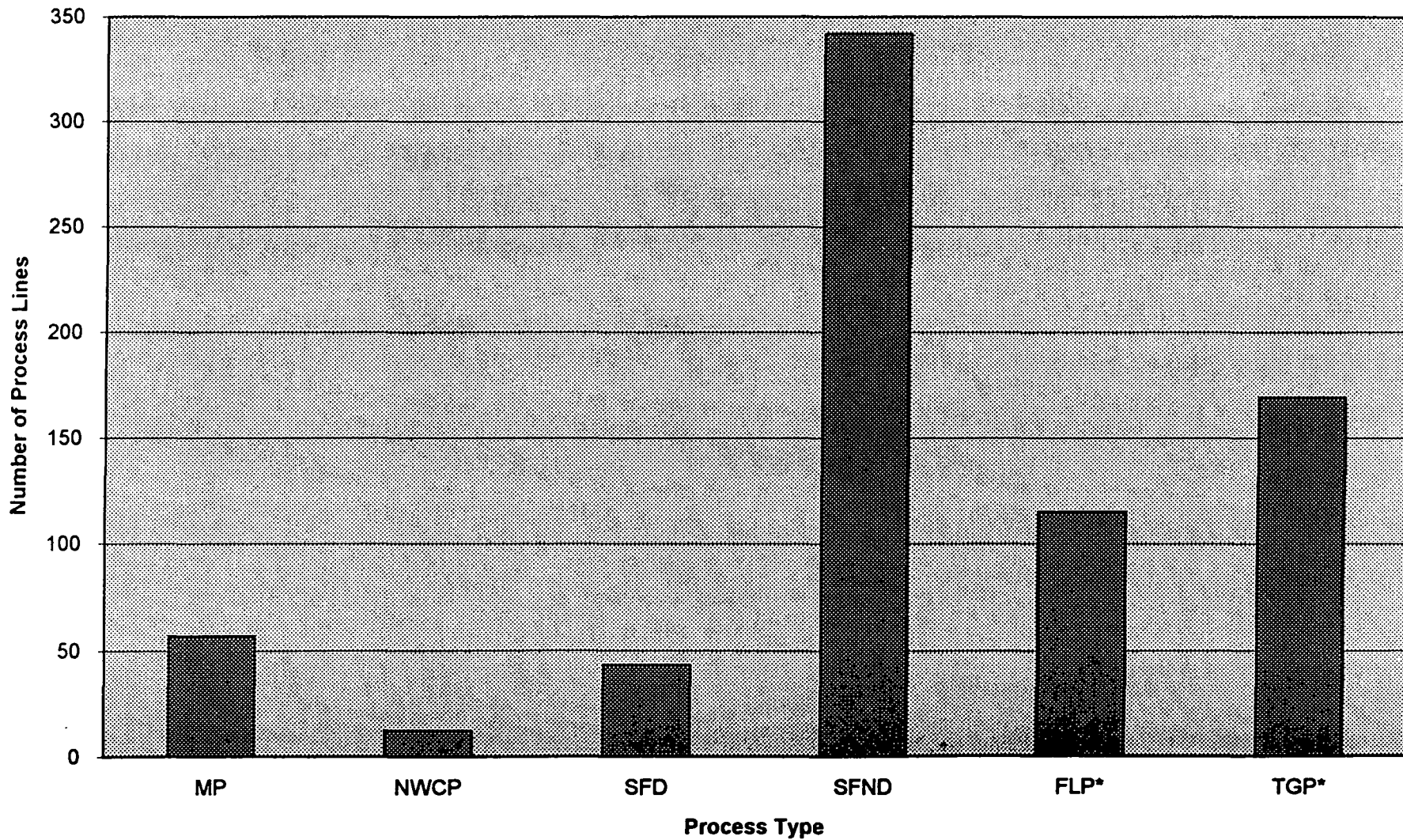
SFND - Secondary Fibers, Non-deinking

FLP - Fine and Lightweight Paper

TGP - Tissue Grade Paper

*Based on current OW subcategories.

MACT III Processes



* All papermaking may not be included under FLP and TGP.

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MACT III EMISSION POINTS FOR PULPING

<u>Pulping Emission Source</u>	Groundwood Pulping	Thermo-Mechanical Pulping	Non-Wood Chemical Pulping	Secondary Fibers, Deinking	Secondary Fibers, Non-Deinking
Caustisizer	N/A	N/A	X	N/A	N/A
Chemical Recovery	N/A	N/A	X	N/A	N/A
Chip Cooker	N/A	X	X (b)	N/A	N/A
Chip Pre-Steamng Vessel	N/A	X	N/A	N/A	N/A
De-ink Flotation	N/A	N/A	N/A	X	N/A
De-ink Washing	N/A	N/A	N/A	X	N/A
Decker	X	X	X	N/A	N/A
Digestor	N/A	N/A	X	N/A	N/A
Evaporator	N/A	N/A	X	N/A	N/A
Latency Chest	X	X	X	X	X
Pulper	X	X	X	X	X
Refiner Vent	X	X	X (b)	X	X
Roll Press	N/A	N/A	X	X	X
Screen	X	X	X	X	X
Stone Grinder Vent	X	X	N/A	N/A	N/A
Surge Tank	X	X	X	X	X
Thickening Tank	N/A	N/A	X	X	X
Vacuum Press	N/A	N/A	X	X	X
Washer	N/A	N/A	X	X	X
Wastewater (a)	X	X	X	X	X

(a) Wastewater emission points may include the chip cooker, de-ink flotation tank, de-ink washing tank, dilution tanks, pulp washers, and pulpers.

(b) **X**: Controls in use at MACT III sources (based on available data).

Note: Based on information from MACT I, all the above emission points could be evaluated for controls (wastewater control/no control would be a function of HAP content).

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MACT III EMISSION POINTS FOR BLEACHING

<u>Bleaching Emission Source</u>	Groundwood Pulping (a)	Thermo-Mechanical Pulping (a)	Non-Wood Chemical Pulping (b)	Secondary Fibers, Deinking (c)	Secondary Fibers, Non-Deinking (c)
Filtrate Tank Vent	X	X	X	X	X
Scrubber Outlet	X	X	X	X (e)	X
Storage Tank	X	X	X	X	X
Tower Vent	X	X	X	X	X
Washer Vent	X	X	X	X	X
Wastewater (d)	X	X	X	X	X

(a) Mechanical pulp is typically bleached using sodium bisulfite and/or sodium peroxide. Because of this, the equipment used in bleaching mechanical pulps is typically less sophisticated than equipment used in the bleaching of chemical pulps or secondary fibers.

(b) Non-wood chemical pulp can be bleached with a number of different processes depending on the fiber used and the end use of the pulp.

(c) Secondary fibers that are deinked are typically bleached in the traditional C-E-H sequence. Depending on the end use of non-deinked fibers (paperboard or whitened low end paper) this type of pulp may not be bleached at all or bleached in a C-E-H sequence.

(d) Sources of wastewater emissions may include bleach washers and filtrate tanks.

(e) **X**: Controls in use at MACT III sources (based on available data).

Note: Based on information from MACT I, all the above emission points could be evaluated for controls (wastewater control/no control would be a function of HAP content).

MACT III EMISSION POINTS FOR PAPER MACHINES

- Potential Sources

- Calendars
- Dry End Exhaust
- Dryer
- Former Exhaust
- Fourdrinier
- Saveall Hood
- Solvent Cleaning of Paper Machines
- Storage Tank
- Vacuum Pump
- Wastewater
- Wet End Exhaust

- Factors Affecting Emissions

- Pulp type (i.e., bleached or unbleached)
- Use of recycled water containing HAPs (in house pulp and purchased pulp)
- Type of paper made as an end product (due to different additives)

HAP EMISSION POINTS - QUESTIONS

- Are the emission points/sources shown indeed emitting HAPs?
- Are there additional emission points?
- Which chemical mills have paper machines?
- Is the water going into the paper machines or coming out being recycled at any point?

POLLUTANTS OF CONCERN

- The Clean Air Act lists 189 hazardous air pollutants (HAPs).
- All 189 HAPs must be used in the determination of major sources.
- A regulation is based on HAPs, although VOC emissions are quantified after determining HAP emissions and control.

HAZARDOUS AIR POLLUTANTS OF CONCERN

HAPs that have been identified from each operation:

- Mechanical Pulping
 - Chlorine
 - Chloroform
 - Methanol
 - Methyl Ethyl Ketone

- Non-Wood Pulping
 - ?

- Secondary Fibers, Deinking
 - Chloroform
 - Formaldehyde
 - Xylenes
 - 1,1,1-trichloroethylene
 - Naphthalene
 - Cumene
 - Methylene Chloride

- Secondary Fibers, Non-Deinking
 - ?

- Papermaking
 - Formaldehyde
 - Methyl Ethyl Ketone
 - Naphthalene
 - Methanol
 - Acetaldehyde

Emissions Summary for MACT III Mills, Miscellaneous References

<u>Source</u>	<u>Location</u>	<u>Type of Pulp</u>	<u>Machine</u>	<u>Compound</u>	<u>Emissions (lbs/year)</u>
AB (a)	n/a (f)	Secondary Fiber Deinked	n/a	Cumene	20,400
AB (a)	n/a	Secondary Fiber Deinked	n/a	Napthalene	28,983
AB (a)	n/a	Secondary Fiber Deinked	n/a	Xylene	66,100
Abitibi-Price Corp. (c)	Roaring River, NC	Groundwood	Hardboard Manufacture	Formaldehyde	23,570
Abitibi-Price Corp. (c)	Roaring River, NC	Groundwood	Hardboard Manufacture	Methanol	27,747
AD (a)	n/a	Secondary Fiber Deinked	n/a	Cumene	21,200
AD (a)	n/a	Secondary Fiber Deinked	n/a	Xylene	59,683
AG (a)	n/a	Secondary Fiber Deinked	n/a	Cumene	41,600
AG (b)	n/a	Secondary Fiber Deinked	n/a	Dichloromethane	42,500
AG (b)	n/a	Secondary Fiber Deinked	n/a	Xylene	28,100
AN (b)	n/a	Secondary Fiber Deinked	n/a	Xylene	4,290
AO (a)	n/a	Secondary Fiber Deinked	n/a	Trichloroethylene	18,000
AT (a)	n/a	Secondary Fiber Deinked	n/a	Formaldehyde	6,000
AU (a)	n/a	Secondary Fiber Deinked	n/a	Formaldehyde	15,000
Fort Howard (d)	Rincon, GA	Secondary Fiber Deinked	Former Exhaust	Chloroform	672
Fort Howard (d)	Rincon, GA	Secondary Fiber Deinked	Wet End Exhaust	Chloroform	336
Fort Howard (d)	Rincon, GA	Secondary Fiber Deinked	Saveall Hood Exhaust	Chloroform	336
Fort Howard (d)	Rincon, GA	Secondary Fiber Deinked	Thickner Hood Exhaust	Chloroform	3,696
Fort Howard (d)	Rincon, GA	Secondary Fiber Deinked	Washer Exhaust	Chloroform	19,320
Georgia-Pacific (c)	Conway, NC	Groundwood	Pulp Dryer	Formaldehyde	69,420
Bleached Mill (e)	n/a	Typical 1000 ton/day Mill	Bleached Paper Machine	Methanol	26,400
Unbleached Mill (e)	n/a	Typical 1000 ton/day Mill	Unbleached Paper Machine	Methanol	374,000
Weyerhaeuser (c)	Surry County, NC	Groundwood	Hardboard Manufacture	Formaldehyde	32,400

(a) Chapter 6, "Secondary Fiber Recycling", Edited by R.J. Spanganburg, TAPPI Press, 1993, p. 57.
1989 data from SARA Section 313 Form R.

(b) Chapter 6, "Secondary Fiber Recycling", Edited by R.J. Spanganburg, TAPPI Press, 1993, p. 57.
1990 data from SARA Section 313 Form R.

(c) Based on North Carolina 1993 Air Emissions Survey.

(d) Based on data provided by the Georgia Environmental Protection Division, collected for a 1991 state toxic emissions review.

(e) Based on a memorandum from Tom Olsen (Radian) to Steve Shedd (EPA), dated July 12, 1995.

(f) n/a = not available

(g) From EPA FIRE database, emission factor for total volatile organic compounds from paperboard manufacture equals 0.2 lb/ton.

(h) From EPA FIRE database, emission factor for total volatile organic compounds from fiberboard manufacture equals 2.5 lb/ton.

MACT III Emissions Data from NCASI Technical Bulletin No. 681

<u>Source</u>	<u>Type of Pulp</u>	<u>Machine</u>	<u>Acetaldehyde (lb/ton)</u>	<u>Methanol (lb/ton)</u>	<u>Total HAP (lb/ton) (c)</u>	<u>Paper Production (ton/day)</u>	<u>Total HAP (lb/year)</u>
G	Unbleached Kraft	Paper Machine	0.041	1.5	1.6	1300	707200(e)
H	Unbleached Kraft	Paper Machine	0.18	0.92	1.2	1100	448800
K	Bleached Kraft	Paper Machine	0.048	0.041	0.15	800	40800
N (a)	Thermo-mechanical	Pulp Dryer	0.128	0.145	0.18	270 (b)	16524
Q	Semi-chemical	Paper Machine	0.077	0.29	0.45	750	114750

(a) Did not test paper machine.

(b) Includes all thermo-mechanical pulp (170 ton/day) and 100 ton/day of Kraft chemical pulp.

(c) Other hazardous (HAPs) air pollutants tested include: methylene chloride, methyl ethyl ketone, n-hexane, chloroform, 1,2-dichloroethane, 1,1,1-trichloroethane, benzene, carbon tetrachloride, trichloroethylene, methyl isobutyl ketone, 1,1,2-trichloroethane, toluene, tetrachloroethylene, chlorobenzene, m,p-xylene, o-xylene, xylenes, styrene, 1,2,4-trichlorobenzene, and acrolein.

(d) Acetaldehyde and methanol typically accounted for approximately 90% of HAPs tested.

(e) Based on 340 production days a year.

HAP EMISSION QUESTIONS

- What are the other HAPs emitted at each emission point and how much is emitted?
- How do emissions differ:
 - among the pulping processes
 - among the types of bleaching processes
 - between bleached and unbleached pulp
 - among the types of paper produced
 - among the types of pulp used (including purchased pulp)

INFORMATION AND DATA COLLECTION

- A literature search has been conducted.
- Available State regulations have been reviewed; applicable air toxics rules have been identified for Wisconsin, New Hampshire, and Virginia.
- Information supplied by industry for several operations has been reviewed and compiled.
- The Toxics Release Inventory (TRI) database and the Aerometric Information Retrieval System (AIRS) have been searched.
- The industry technical bulletin (NCASI 681) on emissions from integrated bleached and unbleached paper machines has been reviewed.
- The industry technical bulletin (NCASI 677) on emissions from a mechanical mill has been reviewed.
- The EPA FIRE database has been searched.
- Resource universities with forestry programs have been explored, namely:
 - North Carolina State University, Raleigh, NC
 - Pulp & Paper Research Institute, Montreal, Canada
- Louisiana compliance plan for Louisiana mills will be reviewed.

INFORMATION AND DATA COLLECTION QUESTIONS

- What equipment, techniques, or technologies are currently used to control HAP emissions? What data exists on those control methods (e.g., availability, reliability, efficiencies)?

- Are there State rules that limit HAP emissions?
 - Wisconsin - NR445
 - New Hampshire - State Toxics Regulation
 - Virginia - State Toxics Regulation
 - Other?

- Is there any information on control technology costs or cost effectiveness?

- Should there be different requirements for new versus existing sources?

PROCESS DESCRIPTIONS

The following process diagrams are based on information from EPA (OAQPS, OW), industry studies, and private consultants.

MODEL PROCESSES - THERMO-MECHANICAL
PULPING

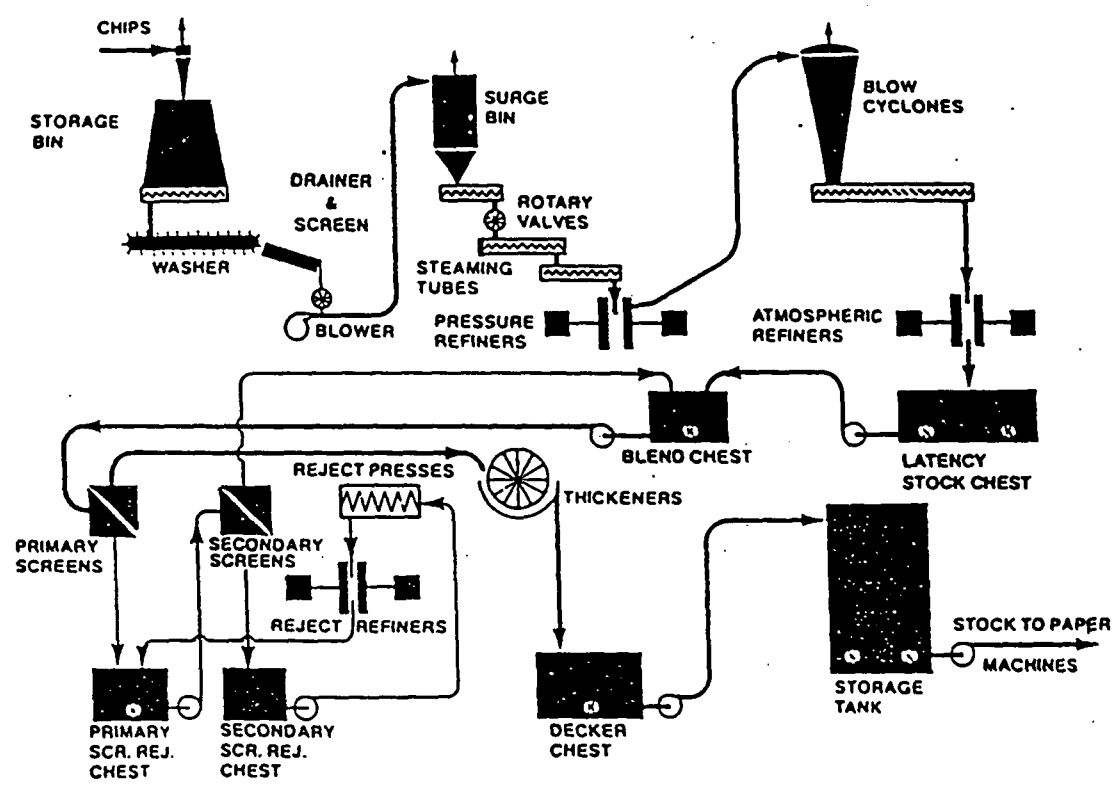
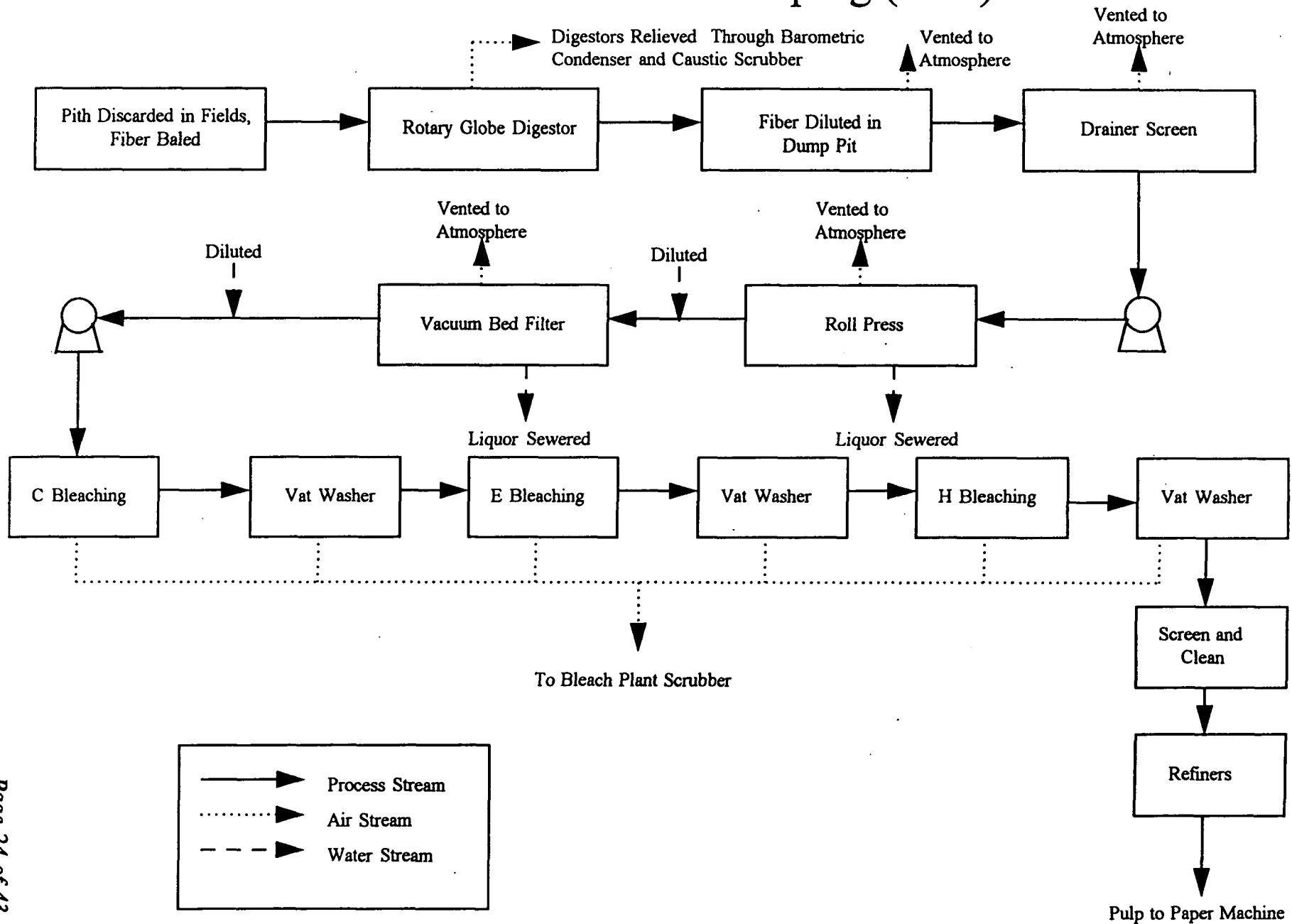


Fig. 5-24. Basic flow diagram for TMP process (H.A. Simons).

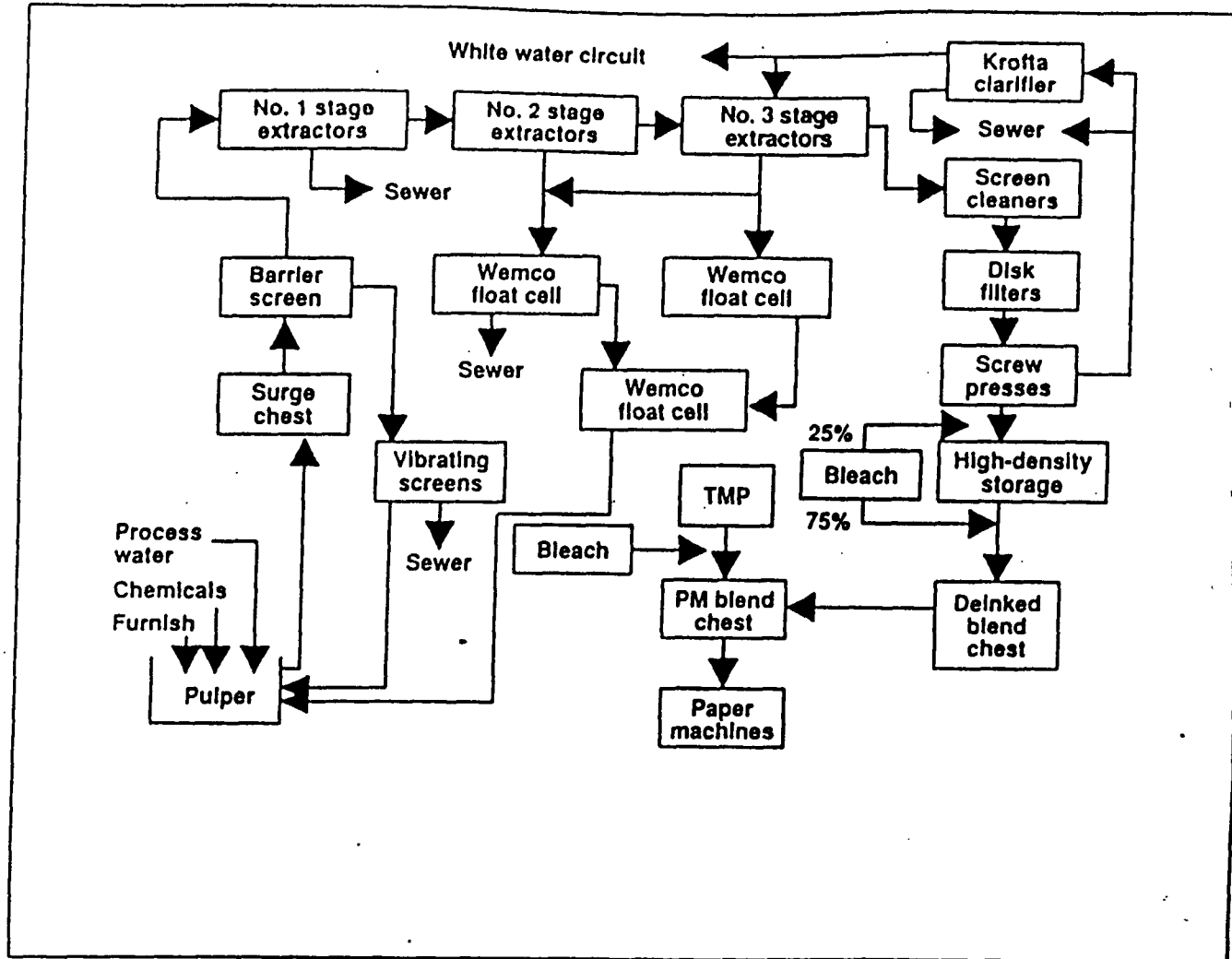
**MODEL PROCESS - NON-WOOD CHEMICAL
PULPING**

Non-Wood Chemical Pulping (Flax)

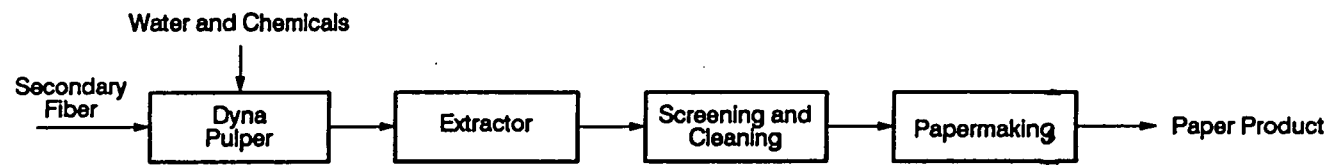


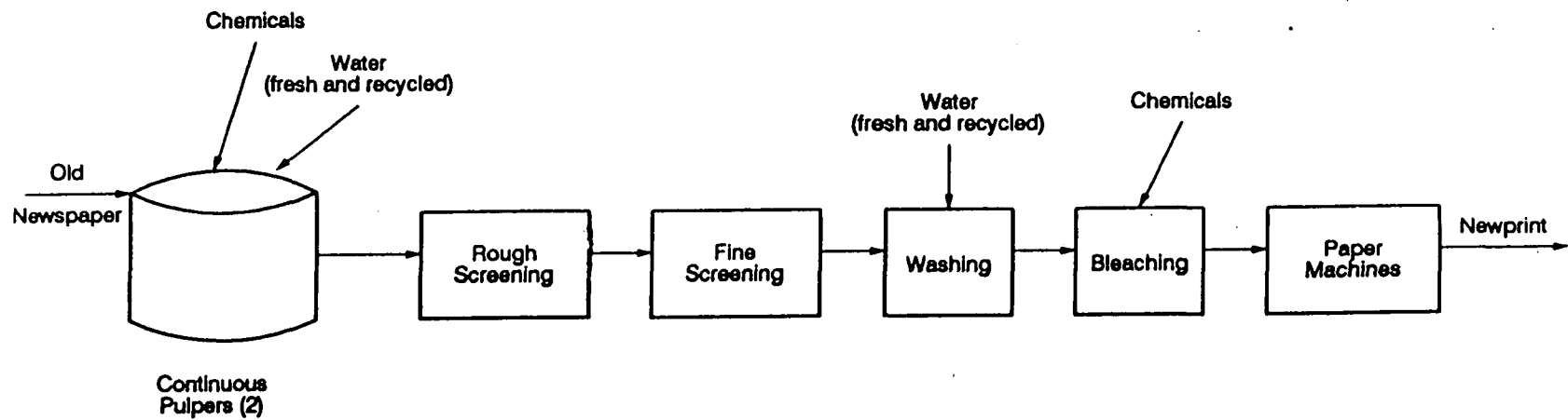
**MODEL PROCESS - SECONDARY FIBER
DEINKING**

1. Newberg deinking circuit

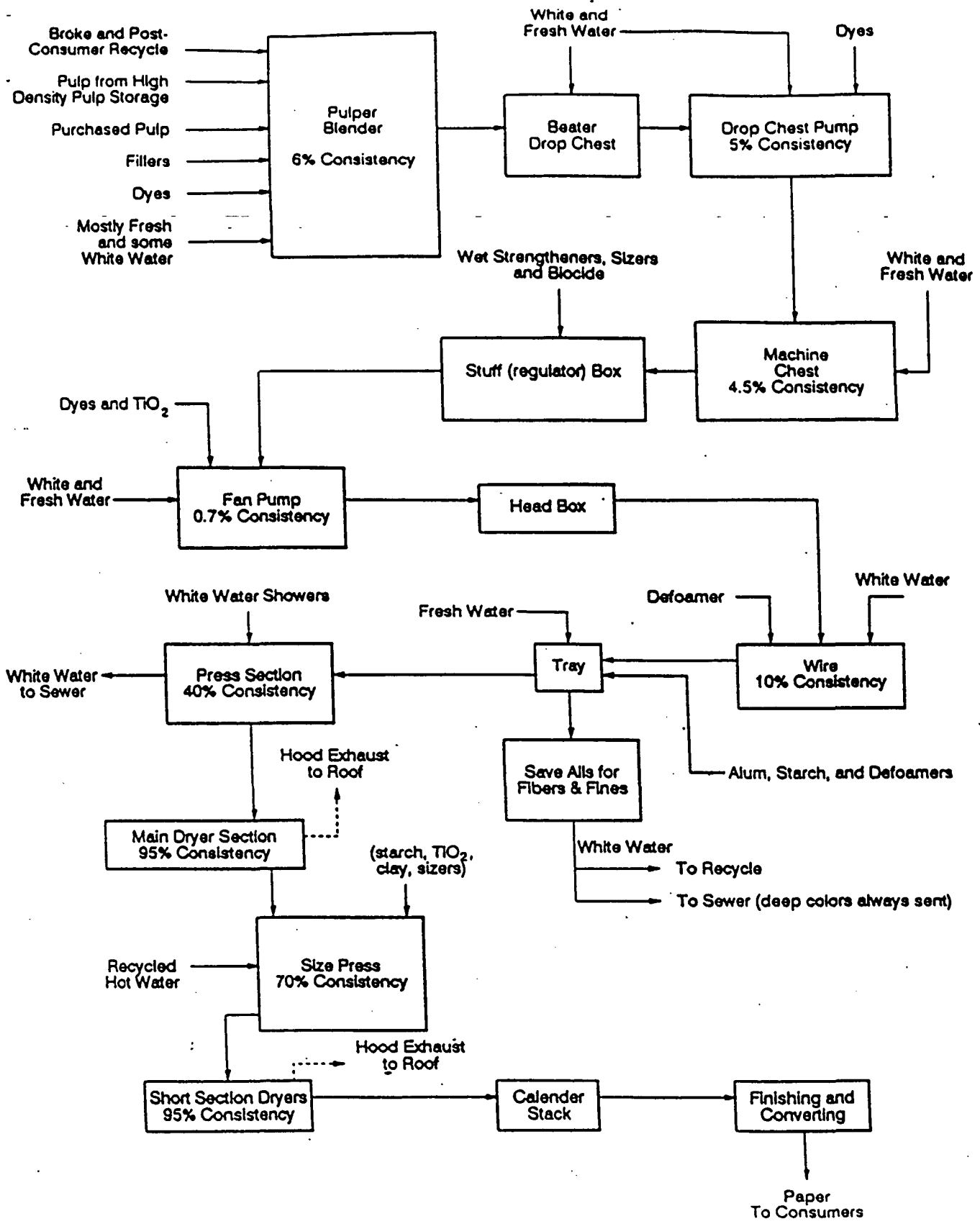


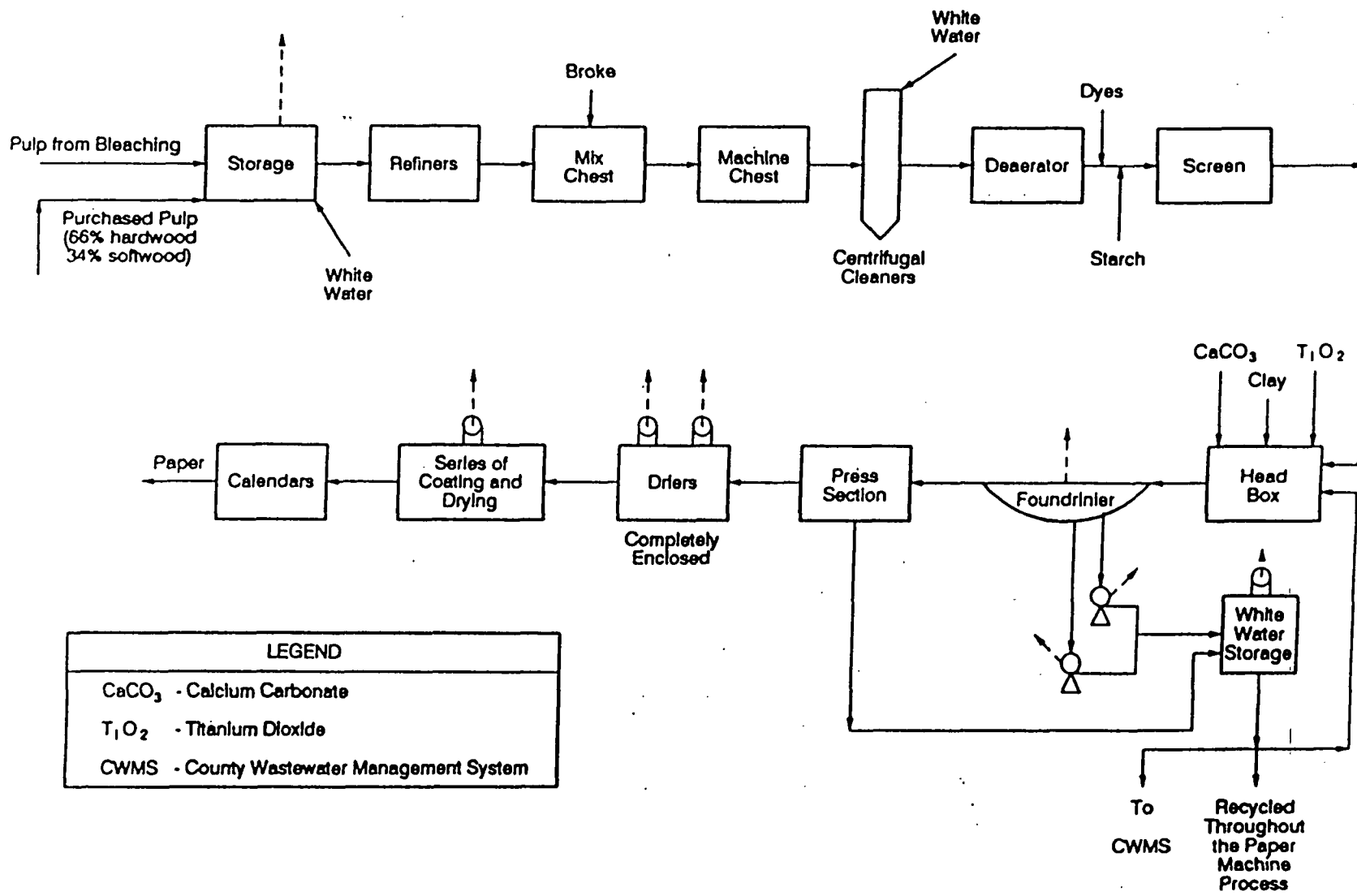
Deinking

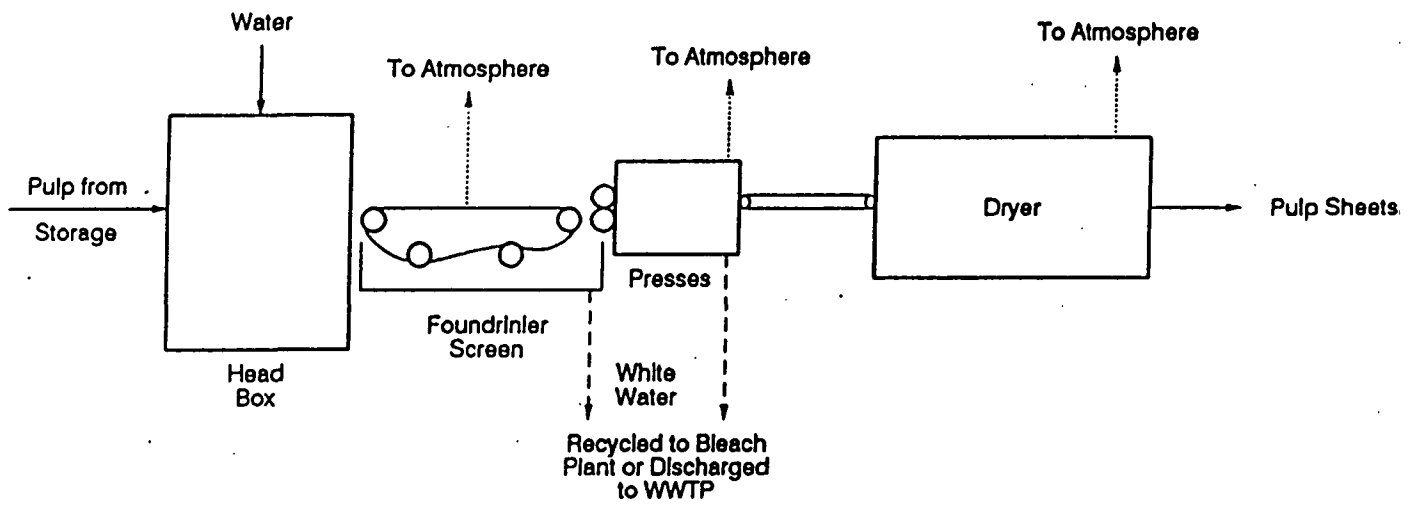


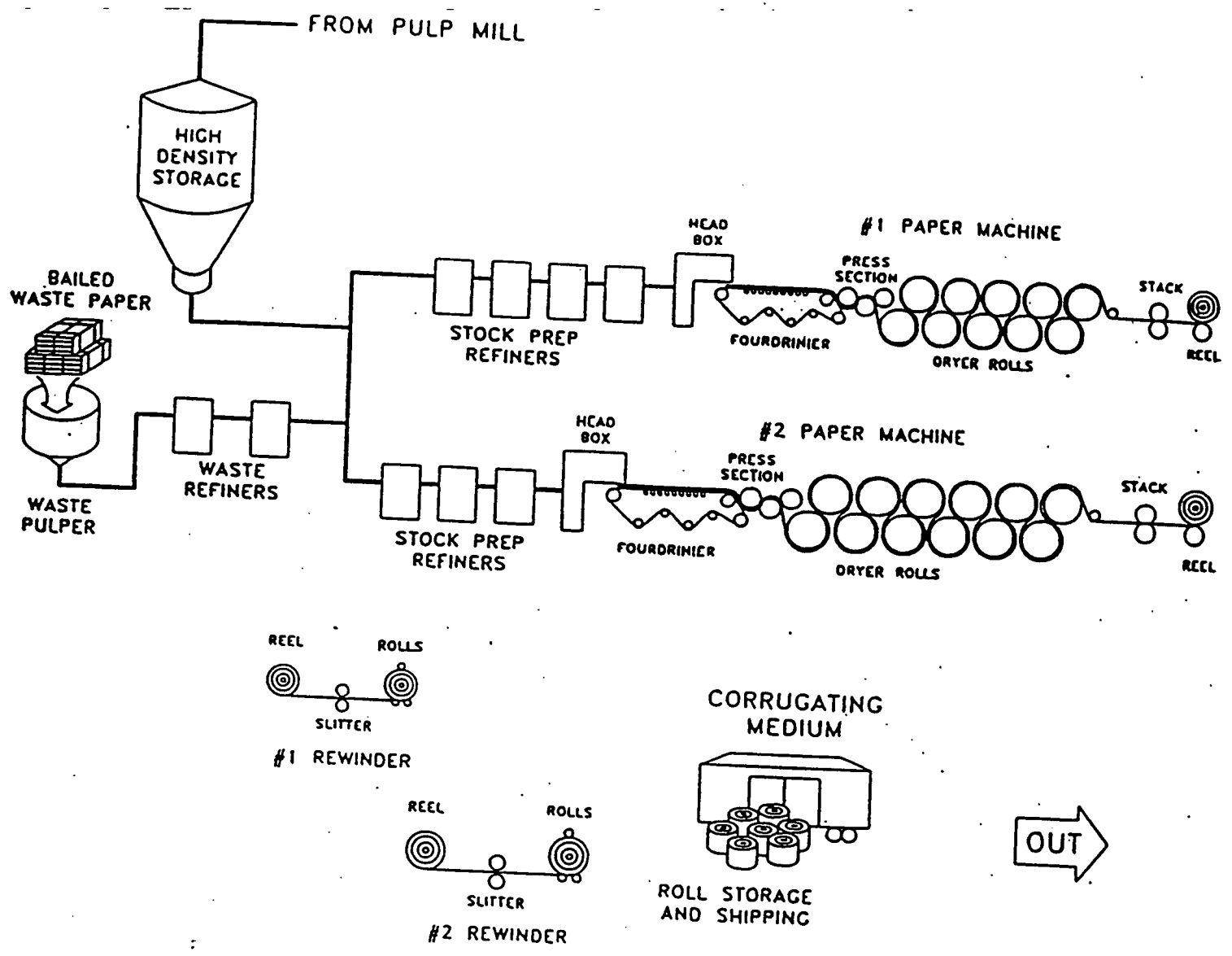


MODEL PROCESS - PAPERMAKING

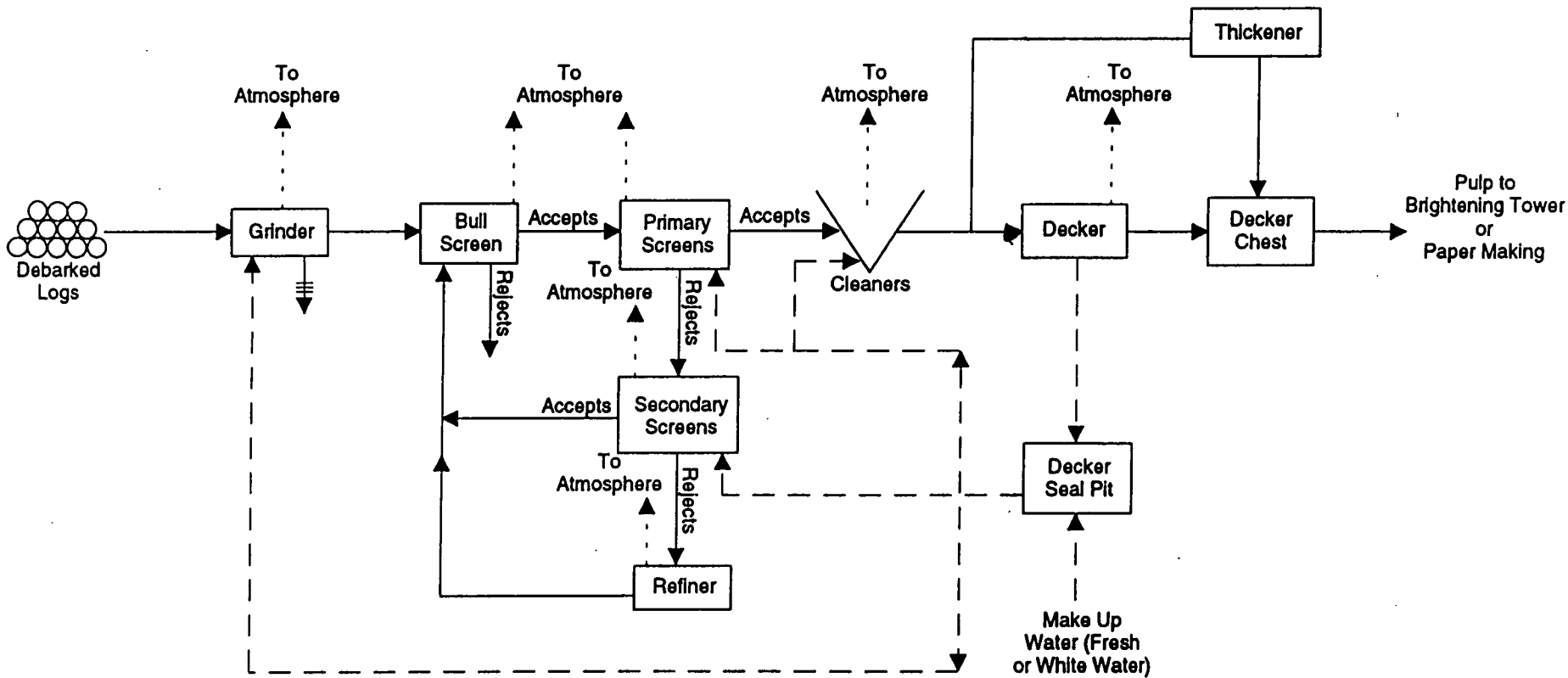








MODEL PROCESS - GROUNDWOOD
PULPING



Legend	
—	Pulp
- - -	Water
· · · · ·	Gas

CONTROL OPTIONS FOR MACT III AIR EMISSIONS

Pulping

- Capture high volume low concentration gas streams (blow tank, pulper, digester, washer), then convey streams to existing combustion device.

Bleaching

- Capture all gas streams and
 - Send collected streams to caustic scrubber, or
 - Send collected streams to combustion device followed by caustic scrubber.

Paper Machines

- Substitute or modify the HAP additives, e.g., use low formaldehyde or formaldehyde-free additives/resins, add formaldehyde scavengers.
- Capture air emissions from paper line (wet end exhaust, dry end exhaust, vacuum pumps) and
 - Convey streams to existing combustion device, or
 - Convey streams to combustion device followed by caustic scrubbing.
- Substitute solvents for lower volatility and/or non-HAP alternatives.

Wastewater

- Capture concentrated wastewater streams and use controlled conveyance to a:
 - Steam stripper with air emissions control device, or
 - Combustion device.

EMISSION CONTROLS - QUESTIONS

- Are the MACT I controls viable for the MACT III sources?
- Are there other options for MACT III sources?
 - Mechanical pulping
 - Non-wood pulping
 - Secondary fibers pulping
 - Papermaking
- Can the processes be retrofitted, or do these controls just apply to new processes?
- What are the costs of the control options?
- Should we subcategorize and for what purpose would we subcategorize? Does it make a difference on the control options or a floor determination?

CURRENT INDUSTRY PRACTICES

Based on industry information, control practices for mechanical pulping and wastewater emissions are as follows:

- Mechanical pulping emissions (based on 21 mills responding to survey)
 - 100% of reporting mills have stone grinder vents directly vented to the atmosphere.
 - 89% of reporting mills have refiner vents directly vented to the atmosphere.
 - 67% of reporting mills are venting chip steaming vessel emissions directly to the atmosphere.
 - 67% of reporting mills are venting chip cooker emissions directly to the atmosphere.
 - 56% of reporting mills are venting emissions from screens to the atmosphere, and 50% are venting them directly into a building.
 - 76% of reporting mills are venting decker emissions directly to the atmosphere, and 37% are venting them directly into a building.

(No data were requested for other emission points.)

- Paper Machines Wastewater Emissions (based on 31 mills that fall under MACT III or are collocated with mills that fall under MACT III)
 - 66% of selected reporting mills are routing their machine whitewater to a sewer.
 - 34% of selected reporting mills are recycling their machine whitewater.

CURRENT INDUSTRY PRACTICES- QUESTIONS

- Are these representative of practices industry-wide?
- What are the controls in use by these mills?
- For the mechanical mills, are these representative of chemical or nonchemical pulping?
- How are the other MACT III mills controlling air emissions?
- Is wastewater recycled directly, or is it treated first and some/all of the HAPs removed and then the wastewater is recycled?

PRESUMPTIVE MACT IS...

- An estimate of what MACT would be based on a review of available information
- To assist State and local agencies in making case-by-case MACT determinations
- Not a regulation - offered only for guidance
- The starting point for the standard development process

THE PRESUMPTIVE MACT PROCESS

1. Initial Scoping Meeting with State and local agencies (July 18, 1995)
2. State and local agencies gather information to help determine preliminary Presumptive MACT
3. Meeting to discuss data and preliminary Presumptive MACT with Roundtable Group (industry, environmental groups, State and local agencies, EPA)
4. Presumptive MACT Meeting with State and local agencies (August 7, 1995) to:

- Determine preliminary Presumptive MACT
- Obtain input on best method to develop the standard

Traditional EPA rulemaking process
Adopt-A-MACT
Share-A-MACT
Propose Presumptive MACT as the standard
Other

- Identify questions to be addressed in developing MACT
- Determine a strategy for the Roundtable Meeting

5. Roundtable Meeting with trade organizations and environmental groups
6. EPA finalizes Presumptive MACT and selects methods for standards development (late September)

PRELIMINARY PRESUMPTIVE MACT SUGGESTION

- Determine applicability cutoffs.
- Determine to whom rule applies with applicability cutoffs.
- For mills that exceed the cutoff, control specific HAP emissions to achieve a given % reduction.