United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park, NC 27711

EPA-456/R-01-002
September 2001
www.epa.gov/ttn/atw/pulp/pulppg.html

EPA

Pulping and Bleaching System NESHAP for the Pulp and Paper Industry: A Plain English Description

Office of Air Quality

EPA/456/R-01/002

Disclaimer

The Office of Air Quality Planning and Standards of the U.S. Environmental Protection Agency has approved this document for publication.

When using this document, remember that it is not legally binding and does not replace the *National Emission Standard for Hazardous Air Pollutants (NESHAP) for Source Category: Pulp and Paper Production* (April 15, 1998, 63 FR 18504) for purposes of application of the rule to any specific mill.

This document is not intended, nor can it be relied upon, to create any rights enforceable by any party in litigation with the United States. The EPA may change this document at any time without public notice.

Amendments to the Cluster Rule have been promulgated and are posted on the Technology Transfer Network (TTN) at **www.epa.gov/ttn/atw/pulp/pulppg.html**. You should periodically check this website for amendments and/or other relevant information.

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Chapter 1 - Introduction

Subpart MM establishes emission limits for gaseous organic and metal HAP for chemical recovery processes that involve the combustion of spent pulping liquor at kraft, soda, sulfite, and semi-chemical pulp mills.

The U.S. Environmental Protection Agency (EPA) has published two National Emission Standards for Hazardous Air Pollutants (NESHAP) for the Pulp and Paper Industry:

- 40 CFR 63, Subpart S was published on April 15, 1998, and applies to the pulping and bleaching systems at all chemical pulping mills and bleaching systems at mechanical pulping, non-wood fiber, and secondary fiber mills.

- 40 CFR 63, Subpart MM was published on January 12, 2001 and applies to chemical recovery processes that involve the combustion of spent pulping liquor.

These NESHAP require affected sources to control hazardous air pollutant (HAP) emissions using the maximum achievable control technology (MACT).

Subpart S was published as part of the Pulp and Paper Cluster Rules and affects the pulping and bleaching systems at major sources that chemically and nonchemically pulp wood and non-wood fibers for pulp and paper production. The Cluster Rules also revised the effluent limitations guidelines and standards under the Clean Water Act for pulp mills that make bleached papergrade products.

1.1 What does this document do?

This document does NOT replace the NESHAP for purposes of making legal interpretations!

This document focuses on the pulping and bleaching system NESHAP (Subpart S) and describes:

- the pulping and bleaching processes

- the requirements of the NESHAP

- the scope of effluent limitations guidelines and standards revisions

- additional references and sources of information about pulp and paper mills

1.2 Why do I need this document?

You need this document because it will help you understand the NESHAP. Implementation of the pulp and paper NESHAP is complex for both affected mills and regulators because:

- There is a tremendous amount of variability in the pulp and paper industry with respect to processes, equipment, and products. For example, the task of turning wood into pulp is performed by different processes using different equipment and different chemicals at kraft mills, sulfite mills, and mechanical pulping mills. As a result, different emission points must be controlled at each type of mill.

- The NESHAP allows for a significant amount of flexibility in the control strategies used to reach compliance.

- The timelines for compliance vary for different parts of the mill.

- More stringent control requirements apply to some new sources.

- Technical requirements for some of the available control strategies will be specified on a mill-by-mill basis by the implementing agency.

1.3 How should I use this document?

If you are familiar with the pulping and bleaching processes, there is no need to read Chapter 2. You should skip ahead to Chapter 3. Everyone should read Chapter 3 as it provides the overview of the NESHAP. After reading Chapter 3, you should decide what other sections of the document you need.

If You Need the Following Information...	Then Read...
A description of the Cluster Rules	Chapter 1
A description of pulping and bleaching processes	Chapter 2
An overview of the NESHAP	Chapter 3
A description of how new source requirements apply	Chapter 3
NESHAP requirements for kraft mills	Chapter 4
NESHAP requirements for soda and semi-chemical mills	Chapter 5
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NESHAP requirements for mechanical, secondary fiber, and non-wood fiber pulp mills	Chapter 7
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A timeline of compliance milestones	Appendix H
Summary of effluent limitations guidelines and standards for bleached papergrade kraft mills	Appendix I

1.4 What are the Pulp and Paper "Cluster Rules"?

Stay informed about new or revised requirements by visiting "What's New" pages of the OECA and Air Toxics Websites:

http://es.epa.gov/oeca/wn2.html *and* ***http://www.epa.gov/ttn/atw/atwnew.html***

The Cluster Rules are a simultaneous publication of Federal air and water pollution control regulations. They are an example of the EPA's efforts to simplify compliance by coordinating the regulation of multimedia industrial pollution and will reduce both air and water pollutant discharges. You can get an electronic copy of the Cluster Rules from the Federal Register website at **http://www.access.gpo.gov/su_docs/aces/aces140.html** or the EPA Air Toxics website at **http://www.epa.gov/ttn/atw** on the Rules and Implementation Page.

The goals of this coordinated regulatory approach are to:

- provide greater protection of human health and the environment
- reduce the overall cost of complying with wastewater regulations and air emissions controls
- promote and facilitate coordinated compliance planning by the industry
- promote and facilitate pollution prevention
- emphasize the multimedia nature of pollution control

Figure 1 identifies the mill types covered under the Cluster Rules. Appendix A lists the mills potentially affected by the Cluster Rules by facility name and location.

Figure 1.

Types of Mills Covered Under the Cluster Rules

	Then it is Subject to These Parts of the Cluster Rules...	
If the Mill is this Type...	**NESHAP**	**Revised Effluent Limitations Guidelines and Standards**
Kraft	X	Bleached Papergrade only
Soda	X	Bleached Papergrade only
Sulfite	X	Papergrade only
Semi-Chemical	X	
Mechanical	X	
Non-Wood Fiber	X	
Secondary Fiber	X	

The features of the NESHAP are:
- *Alternative emission limits*
- *Varying compliance periods (3-8 years)*
- *New and existing source controls*
- *Flexibility for evolving technologies*
- *Compliance dates coordinated with effluent limitations guidelines and standards*

The Cluster Rules consist of the following two components:

(1) ***National Emission Standards for Hazardous Air Pollutants (NESHAP) from the Pulp and Paper Industry (40 CFR 63, Subpart S).*** The pulp and paper NESHAP specifies emission standards for pulping and bleaching systems at all chemical pulping mills and bleaching systems at mechanical pulping, non-wood fiber, and secondary fiber mills.

The air emissions control standards require mills to reduce hazardous air pollutant emissions through the use of thermal oxidizers, boilers, lime kilns, recovery furnaces, caustic scrubbers, or other control devices, or process modifications. In general, the NESHAP requires mills to:

- collect and incinerate pulping process vent emissions
- collect and control bleaching process vent emissions with a caustic scrubber
- eliminate the use of certain bleaching chemicals
- collect and treat process condensate streams to remove HAPs (kraft mills only)

The NESHAP is written to encourage pollution prevention techniques. See Appendix B for a copy of the NESHAP and Appendix C for a flowchart summary of the NESHAP.

This NESHAP does **NOT** address emissions from chemical recovery process combustion sources. Emissions from these sources are covered by 40 CFR 63, Subpart MM, which was promulgated on January 12, 2001 (66 FR 3180).

Stay informed about new or revised requirements by visiting the EPA Office of Water's Pulp and Paper Website: ***http://www.epa.gov/ost/pulppaper/***

(2) ***Effluent Limitations Guidelines and Standards, Pretreatment Standards, and New Source Performance Standards for the Pulp, Paper, and Paperboard Category (40 CFR 430, Subparts A-L).*** These regulations control discharge of pollutants in wastewaters generated at pulp and paper mills. The pretreatment standards apply to mills that discharge wastewater to a municipal wastewater treatment facility (i.e., Publicly Owned Treatment Works or POTW). The effluent limitations guidelines and standards are applied to the mills that directly discharge into receiving water via the National Pollution Discharge Elimination System (NPDES) permit program. In addition, the effluent limitations guidelines and standards portion of the Cluster Rules:

- Includes best management practices (BMP) regulations for a portion of the pulp, paper, and paperboard industry. The BMP rules are designed to prevent or contain leaks and spills of pulping liquor, soap, and turpentine, and to control any intentional diversions of these substances.

- Specifies new analytical methods for twelve chlorinated phenolic pollutants and for adsorbable organic halides (AOX).

- Revises the subcategorization scheme for existing effluent limitations guidelines and standards for the pulp and paper industry (shown in Figure 2) and revises the effluent limitations guidelines and standards for Bleached Papergrade Kraft and Soda subcategory (Subpart B) and the Papergrade Sulfite subcategory (Subpart E). The EPA revised the subcategorization scheme to better define the processes typically found in U.S. mills.

- Includes the Voluntary Advanced Technology Incentives Program which is designed to encourage direct discharging bleached papergrade kraft mills to install more pollution prevention technology than required by the regulations.

Figure 2.

Comparison of the Revised Final Subcategories with Previous Subcategories

Final Codified Subpart	Final Subcategorization Scheme	Previous Subcategorization Scheme with Previous 40 CFR 430 Subparts Noted in Parentheses
A	Dissolving Kraft	Dissolving Kraft (F)
B[a]	Bleached Papergrade Kraft and Soda	Market Bleached Kraft (G) BCT Bleached Kraft (H) Fine Bleached Kraft (I) Soda (P)
C	Unbleached Kraft	Unbleached Kraft (A) - Linerboard - Bag and Other Products Unbleached Kraft and Semi-Chemical (D, V)
D	Dissolving Sulfite	Dissolving Sulfite (K) - Nitration - Viscose - Cellophane - Acetate
E[a]	Papergrade Sulfite	Papergrade Sulfite (J,U) - Blow Pit Wash - Drum Wash
F	Semi-Chemical	Semi-Chemical (B) - Ammonia - Sodium
G	Mechanical Pulp	GW-Thermo-Mechanical (M) GW-Coarse, Molded, News (N) GW-Fine Papers (O) GW-Chemical-Mechanical (L)
H	Non-Wood Chemical Pulp	Miscellaneous mills not covered by a specific subpart
I	Secondary Fiber Deink	Deink Secondary Fiber (Q) - Fine Papers - Tissue Papers - Newsprint
J	Secondary Fiber Non-Deink	Tissue from Wastepaper (T) Paperboard from Wastepaper (E) - Corrugating Medium - Non-Corrugating Medium Wastepaper-Molded Products (W) Builders' Paper and Roofing Felt (40 CFR Part 431 Subpart A)
K	Fine and Lightweight Papers from Purchased Pulp	Non-Integrated Fine Papers (R) - Wood Fiber Furnish - Cotton Fiber Furnish Lightweight Papers (X) - Lightweight Papers - Lightweight Electrical Papers
L	Tissue, Filter, Non-Woven, and Paperboard from Purchased Pulp	Non-Integrated - Tissue Paper (S) - Filter and Non-Woven (Y) - Paperboard (Z)

[a] Revised under the Cluster Rules.

1.5 What is the purpose of the Pulp and Paper NESHAP?

The purpose of this NESHAP is to reduce HAP emissions from the pulp and paper industry, thus reducing public health hazards. The EPA regulated this industry because pulp and paper mills are major sources of HAP emissions listed in Section 112 of the Clean Air Act (CAA). Section 112(d) of the CAA directs EPA to set maximum achievable control technology (MACT) standards for major stationary sources. MACT standards are technology-based emission limitations that require the maximum degree of emission limitations that is achievable considering cost, human health, environmental, and energy impacts.

A major source is a stationary source that has the potential to emit 10 tons per year of any one HAP or 25 tons per year of total HAPs.

Pulp and paper mills emit 240,000 tons of HAPs annually that impact both air quality and public health. The pulp and paper NESHAP will reduce 1996 emissions of HAPs from pulp and paper facilities by 153,000 tons per year (a 64 percent reduction). Figure 3 lists the HAPs emitted in the largest quantities from pulp and paper mills.

Figure 3.

Highest Emitted Hazardous Air Pollutants from Pulp and Paper Mills

Hazardous Air Pollutants	
Acrolein	Methanol
Acetaldehyde	Methylene chloride
o-Cresol	Methyl ethyl ketone
Carbon tetrachloride	Phenol
Chloroform	Propionaldehyde
Cumene	1,2,4-Trichlorobenzene
Formaldehyde	o-Xylene

The control techniques used to reduce HAP emissions will also reduce emissions of other pollutants. For example, the NESHAP will reduce volatile organic compound (VOC) emissions by 450,000 tons per year. Volatile organic compounds cause a variety of adverse health effects and are precursors to the formation of tropospheric (ground level) ozone.

Emissions of total reduced sulfur (TRS) compounds cause the odors commonly associated with pulp and paper production. Exposure to TRS emissions has been linked to symptoms including headaches, watery eyes, nasal problems, and breathing difficulties. Total reduced sulfur emissions are regulated by new source performance standards (NSPS) under Section 111 of the CAA. Although not specifically regulated by the NESHAP, the NESHAP will result in a reduction of TRS emissions by 87,000 tons per year.

1.6 How many sources does the NESHAP affect?

Figure 4 shows the location of the pulp and paper facilities in the United States that are potentially affected by the pulp and paper NESHAP. Appendix A lists the pulp and paper mills (including facility name, and location by city and state) that were identified as potentially affected sources at the time the NESHAP was published.

The list of mills in Appendix A is provided for information only. The list is not necessarily complete, nor does it represent an EPA determination that any specific mill is subject to the rules.

Figure 4.

Location of Pulp and Paper Mills

State	Mills	State	Mills	State	Mills
Alabama	19	Kansas	2	New Mexico	1
Arkansas	8	Kentucky	5	New York	49
Arizona	2	Louisiana	13	Ohio	30
California	34	Massachusetts	38	Oklahoma	6
Colorado	1	Maryland	3	Oregon	12
Connecticut	10	Maine	18	Pennsylvania	31
Delaware	2	Michigan	33	South Carolina	9
Florida	11	Minnesota	9	Tennessee	15
Georgia	24	Missouri	3	Texas	17
Iowa	2	Mississippi	10	Virginia	17
Idaho	1	Montana	1	Vermont	7
Illinois	10	North Carolina	17	Washington	22
Indiana	12	New Hampshire	12	Wisconsin	46
		New Jersey	14	West Virginia	2
				Total	**564**

Source: Lockwood-Post Directory, 1996.

1.7 What if I have questions?

Identify your State and local contacts using the Membership Directory at the STAPPA/ALAPCO website at ***http://www.4cleanair.org***

If you are the owner or operator of a pulp and paper mill, you can get additional information from:

- your State or local air pollution control agency
- trade associations, such as Technical Association of the Pulp & Paper Industry (TAPPI) at **http://www.tappi.org** or American Forest and Paper Association (AF&PA) at **http://www.afandpa.org**

STAPPA/ALAPCO *= State and Territorial Air Pollution Program Administrators/ Association of Local Air Pollution Control Officials*

If you work for a State or local regulatory agency and have questions regarding the implementation of this NESHAP, you should contact your EPA Regional Office. A list of EPA Regional Office contacts is included in Appendix D.

1.8 How do I get additional copies of this document?

You can get copies of this document from:

- EPA's Technology Transfer Network (TTN) on the world wide web at **http://www.epa.gov/ttn/atw/pulp/pulppg.html**

Copies are available free of charge from the EPA library.

- Library Services Office (MD-35)
  U.S. Environmental Protection Agency
  Research Triangle Park, North Carolina 27711
  Telephone: (919) 541-2777

- National Technical Information Services (NTIS)
  Technology Administrations
  5285 Port Royal Road
  Springfield, Virginia 22161
  Telephone: (703) 605-6000
  Fax: (703) 321-8547

  Note: NTIS will charge a fee for each document requested.

1.9 Where can I find additional information about this NESHAP?

You can find information about the basis and purpose of this NESHAP in the Federal Register notices and background information documents. The background information documents are:

- Pulp, Paper, Paperboard Industry - Background Information for Proposed Air Emissions Standards for Manufacturing Processes at Kraft, Sulfite, Soda, and Semi-chemical Mills. Publication No. EPA-453/R-93-050a. October 1993

- Pulp, Paper, Paperboard Industry - Background Information for Promulgated Air Emissions Standards for Manufacturing Processes at Kraft, Sulfite, Soda, and Semi-Chemical, Mechanical, and Secondary and Non-wood Fiber Mills. Publication No. EPA-453/R-93-050b. October 1997

An overview of this NESHAP is available on a 40 minute video tape. You can view this tape at your State or local air pollution control office.

Federal Register notices pertaining to the NESHAP are:

- Proposed NESHAP: published December 17, 1993 (58 FR 66078)

- Correction notice to the proposed NESHAP: published March 17, 1994 (59 FR 12567)

- Notice of Data Availability (NODA): published February 22, 1995 (60 FR 9813)

- Supplemental Notice: published March 8, 1996 (61 FR 9383)

- Promulgated NESHAP: published April 15, 1998 (63 FR 18504)

- Correction of minor errors on the April 15, 1998 Notice: published August 7, 1998 (63 FR 42238)

- Interpretation and Technical Amendment published September 16, 1998 (63 FR 49455)

Check the ATW for correction notices and amendments.

- Proposed amendments regarding the interim MACT standard (63 FR 71408) and direct final rule, December 28, 1998 (63 FR 71385)

- Direct Final Amendment: Addresses nine technical issues raised by the industry. April 12, 1999 (64 FR 17555)

- Proposed amendments to add testing and monitoring alternatives (65 FR 3907), published January 25, 2000

- Final Rule Amendments: Adds alternatives to the testing and monitoring of boilers and open biological treatment units December 22, 2000 (65 FR 80755)

- Final Rule Amendments: Includes amendments to Appendix C. January 22, 2001 (66 FR 6922)

You can get these documents and other relevant documents from:

- EPA's Air Toxics website (ATW) at **http://www.epa.gov/ttn/atw** or **http://www.epa.gov/ttn/atw/pulp/pulppg.html**. These sites contain background documents, preambles, regulations, guidance documents, and policy memos

- "What's New" page of the ATW at **http://www.epa.gov/ttn/atw/atwnew** for the most current information

- The Air Dockets (A-92-40 and A-95-31) which are available for public inspection between 8 a.m. and 4 p.m., Monday through Friday, except for Federal holidays. The address for the dockets can be found at **http://www.epa.gov/ttn/atw/pulp/pulppg.html.**

1.10 Where can I find additional information on the pulp and paper industry?

You can get additional information from:

- Biermann, C.J. 1993. Essentials of Pulping and Papermaking. San Diego, CA: Academic Press, Inc.

- Burgess, T. 1995. The Basics of Foul Condensate Stripping. 1995 Kraft Recovery Short Course. Atlanta, GA: TAPPI PRESS.

- EPA. 1998. Permit Guidance Document for Pulp, Paper and Paperboard Manufacturing Point Source Category. 40 CFR Part 430, draft. Office of Water, Washington, DC.

- EPA. 1995. Office of Compliance Sector Notebook Project: Profile of the Pulp and Paper Industry. Publication No. EPA/310-R-95-015. **http://es.epa.gov/oeca/sector/index.html#pulp** Office of Enforcement and Compliance Assurance, Washington, DC.

- EPA. 1999. Kraft Pulp Mill Compliance Assessment Guide. Publication No. EPA/310-B-99-001. Office of Enforcement and Compliance Assurance, Washington, DC.

- How Paper is Made: An Overview of Pulping and Papermaking from Woodyard to Finished Product. 1997. Available on CD-ROM, Atlanta, GA: TAPPI PRESS.

- Kocurek, M.J. and Stevens, C.F.B., eds. 1983. Pulp and Paper Manufacture. Third Edition. Joint Textbook Committee of the Paper Industry.

- Mimms, A., Kocurek, M., Pyatte, J. and Wright, E. eds. 1993. Kraft Pulping. Atlanta, GA: TAPPI PRESS.

- Smook, G.A. 1992. Handbook for Pulp and Paper Technologists. Second Edition. Bellingham, WA: Angus Wilde Publications.

The Kraft Pulp Mill Compliance Assessment Guide covers the Cluster Rules as well as NSPS and other rules affecting kraft mills.

Chapter 2 - Description of the Pulping and Bleaching Processes

Three major types of fibers are used to make pulp and paper products: wood; secondary fibers (recycled fibers); and non-wood fibers (e.g., cotton, flax, hemp). However, the majority of pulp and paper products are made from wood, and most wood mills use the kraft pulping process.

If you are already familiar with pulping and bleaching processes, you can move ahead to Chapter 3.

Because kraft mills represent the majority of the industry, this chapter describes the processes at kraft mills using wood. A general process overview for each of the other types of mills is also provided. This chapter does not explain each individual process, but rather focuses on the main activities affected by the NESHAP. For further information about the pulp and paper industry and process operations, please refer to the list of materials provided in Chapter 1.

2.1 What distinguishes the types of mills that manufacture pulp and paper?

The types of pulp mills are:
- *kraft*
- *soda*
- *sulfite*
- *semi-chemical*
- *mechanical*
- *secondary fiber*
- *non-wood fibers*

Kraft, soda, and sulfite mills all use chemicals in their pulping processes. These processes differ primarily in the chemicals used for digesting wood chips. Mechanical pulping involves shredding or grinding wood chips without the use of chemicals and semi-chemical pulping combines chemical and mechanical methods. Secondary fiber mills mechanically separate pulp from waste paper products. Non-wood fiber mills can use mechanical and chemical pulping processes. Figure 5 summarizes the characteristics of the different types of chemical pulping processes.

Figure 5.

Chemical Pulping Process Differences

Pulping Process Type	Typical Pulp Produced	Chemicals Used	Typical Pulp Yield Percent	Type of Wood Used	Typical Pulp Uses
Kraft	Kraft	NaOH, Na_2S	40-50	Softwood and hardwood	Writing paper; paper bags; cardboard; specialty products such as rayon, acetate, and cellophane
Soda	Soda	NaOH	45-55	Hardwood	Writing paper; specialty products such as rayon, acetate, and cellophane
Sulfite	Acid sulfite	H_2SO_3, $M(HSO_3)$ (M=Ca, Mg, Na, NH_4)	45-55	Softwood and hardwood	Writing paper; specialty products such as rayon, acetate, and cellophane
Semi-chemical	Neutral Sulfite Semi-chemical	Na_2SO_3 Na_2CO_3	65-80	Hardwood	Corrugated containers

Source: Smook, 1992.

2.2 What is the kraft pulping process?

The pulping process converts raw materials into a fibrous mass that can be formed into paper or cardboard. Wood contains both cellulose fibers and lignin; the objective of the kraft pulping process is to dissolve the lignin and leave most of the cellulose fibers intact.

The main operations performed in the kraft pulping process are:

- digestion of wood to form pulp
- pulp processing to recover spent cooking chemicals and to remove impurities and uncooked wood chips (deknotting, pulp washing, pulp screening)
- concentration of used pulping liquor for chemical recovery

Figure 6 depicts a typical overview of a kraft pulp and paper mill. More detailed diagrams for each equipment system in the pulping process are provided in Appendix E.

Kraft digesting process

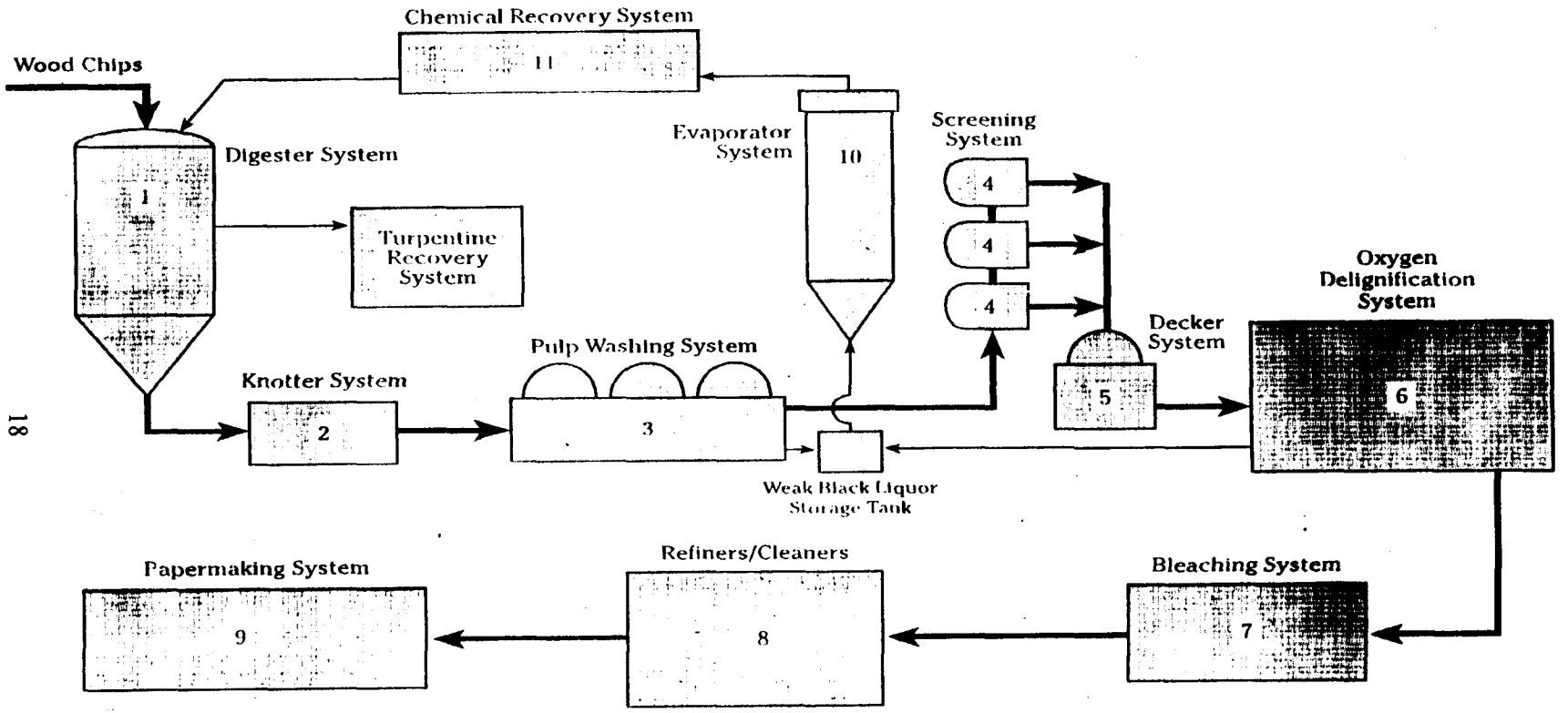
Kraft pulping entails cooking, or digesting, wood chips at elevated temperature and pressure in an alkaline pulping liquor that contains sodium sulfide (Na_2S) and sodium hydroxide (NaOH). Cooking may be performed in either batch digester or continuous digester systems. For mills that use softwood feedstock (e.g., pine), the digester system generally will include a turpentine recovery system. The turpentine is recovered from digester relief vent gases.

The pulping liquor and elevated temperature and pressure promote breakdown of the bonds in the lignin compounds. Depending on pulping conditions, as much as 90-95 percent of the lignin can be removed from wood in kraft pulping.

The NESHAP has the same emission limits for papergrade and dissolving grade pulp production.

Two types of pulp are produced:

- papergrade (for making paper, paperboard, tissue)
- dissolving grade (for making rayon, cellophane, acetate, food additives)



1–Cooking liquor added to wood chips to dissolve lignin.
2–Removal of uncooked chips and knots
3–Weak black liquor washed from pulp
4–Fiber bundles and contaminants screened from pulp
5–Pulp thickened for oxygen delignification
6–Oxygen Delignification System for further delignification.
7–Pulp bleached to increase whiteness.
8–Pulp is cleaned and prepared for papermaking.
9–Paper sheet formed through dewatering.
10–Evaporator System removes excess water from the weak black liquor.
11–Chemical recovery system converts the concentrated liquor into cooking liquor for use in the digester system.

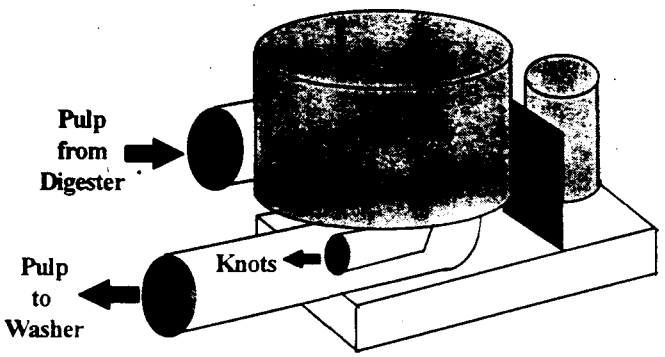
Figure 6.

Example Overview of a Kraft Pulping Mill with a Papermaking System

Kraft pulp processing steps

Kraft mills remove impurities from the raw pulp prior to bleaching or papermaking. The primary pulp cleaning operations include **deknotting** (in the knotter), **brown stock washing** (in the pulp washing system), and **pulp screening** (in the screening system).

Deknotting removes knots and other portions of uncooked wood from the pulp slurry. Kraft mills burn the knots and uncooked wood for energy recovery, dispose of them as waste, or recycle them for repulping. The diagram to the right shows a typical knotter.



Weak black liquor consists of dissolved wood compounds and spent cooking chemicals.

Brown stock washing recovers spent cooking liquor (weak black liquor) for reuse in the pulping process. Efficient washing is critical to maximize the return of cooking liquor to chemical recovery and to minimize carryover of cooking liquor (known as brown stock washing loss) into the bleach plant. A variety of brown stock washing technologies are used; the most common technology is a series of two to four rotary vacuum washers. In each washer, wash water is applied to displace cooking liquor in the pulp; countercurrent washing is generally used to reduce fresh water requirements. Other common washer types are diffusion washers, rotary pressure washers, horizontal belt filters, wash presses, and dilution/extraction washers. Figure 7 shows a typical rotary vacuum washer system.

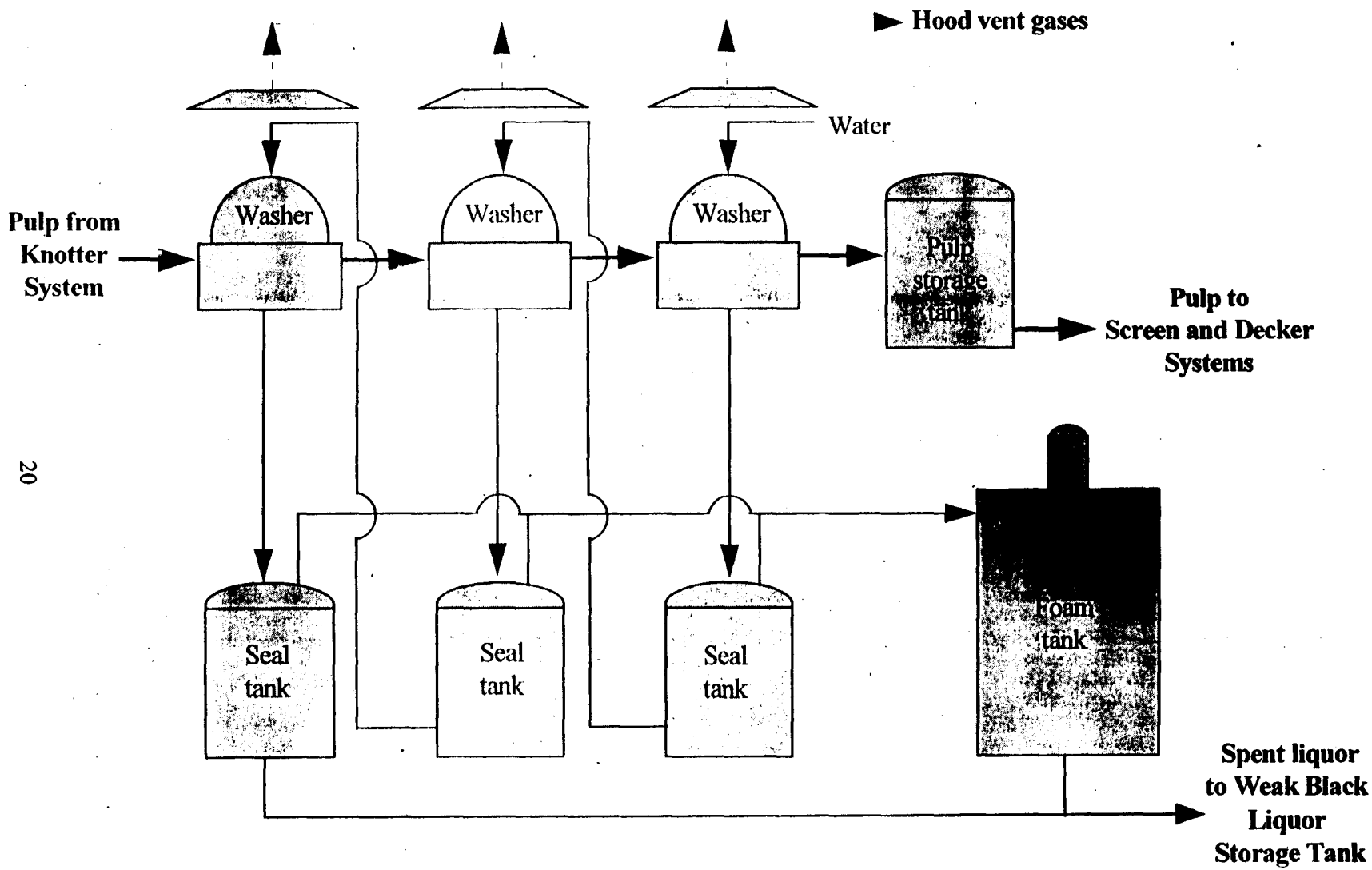


Figure 7.

Brown Stock Washing System (Rotary Vacuum)

A screen system removes oversized particles from the pulp slurry prior to the bleaching or papermaking system.

A decker is used to thicken the pulp for storage after screening or subsequent delignification steps.

Pulp screening removes the remaining oversized particles (fiber bundles and contaminants) from washed pulp. The pulp is diluted to low percent solids, then passed through a perforated screen, and rejects are continuously removed from the screen. Methods for removing rejects are shaking and vibration, hydraulic sweeping action, back-flushing, or pulsing the flow through the openings with various moving foils, paddles, and bumps. Mills may operate open, partially closed, or closed screen rooms. In open screen rooms, wastewater from the screening process is discharged to wastewater treatment. In closed screen rooms, wastewater is reused in brown stock washing or other pulping operations and ultimately enters the chemical recovery system.

A **decker system** is all of the equipment used to thicken the pulp slurry after the pulp washing system. It includes decker vents, filtrate tanks, and vacuum pumps.

Evaporator system

Weak black liquor collected from the pulp washers goes into a weak black liquor storage tank. The weak black liquor is sent to the multiple effect evaporator (MEE) to evaporate water and concentrate the weak black liquor in order to increase solids content. Typically, weak black liquor recovered from the brown stock washers contains between 13 and 17 percent solids. The weak black liquor is then concentrated to 60-80 percent solids, which is required for efficient combustion in the recovery boiler. An MEE will include four to seven effects, or bodies, arranged in series. At pulp mills using soft wood, a tall oil recovery system is generally incorporated into the evaporator system to recover tall oil from the black liquor. Tall oil is sold for use in manufacturing cosmetics.

Oxygen delignification system

Some mills that produce bleached pulp may also have an oxygen delignification stage either in the pulping area or as a prebleaching stage. The oxygen delignification process reduces the lignin content without reducing pulp strength or yield. High efficiency oxygen delignification minimizes the amount of bleaching chemicals needed to achieve adequate pulp brightness.

There are currently two types of oxygen delignification systems available: high consistency and medium consistency. Medium consistency systems are more popular due to safer operation and lower capital costs. Design and placement of these systems vary from mill to mill. Oxygen delignification systems of the two-stage design are most often employed in the U.S. for new installations. Figure 8 shows a typical oxygen delignification system.

Gas collection systems

Gas collection systems, or noncondensible gas (NCG) systems, are used to collect gases from the various pulping processes and transport them to an appropriate air pollution control device. There are two basic categories of NCGs: low volume, high concentration (LVHC); and high volume, low concentration (HVLC).

Low volume, high concentration (LVHC) systems typically collect gases from the following systems:

- digester system
- turpentine recovery system
- evaporator system
- steam stripper system
- any other system serving one of these functions

High volume, low concentration (HVLC) systems typically collect gases from the following systems:

- knotter system
- pulp washing system
- screen system
- oxygen delignification system
- weak liquor storage tanks
- any other equipment serving one of these functions

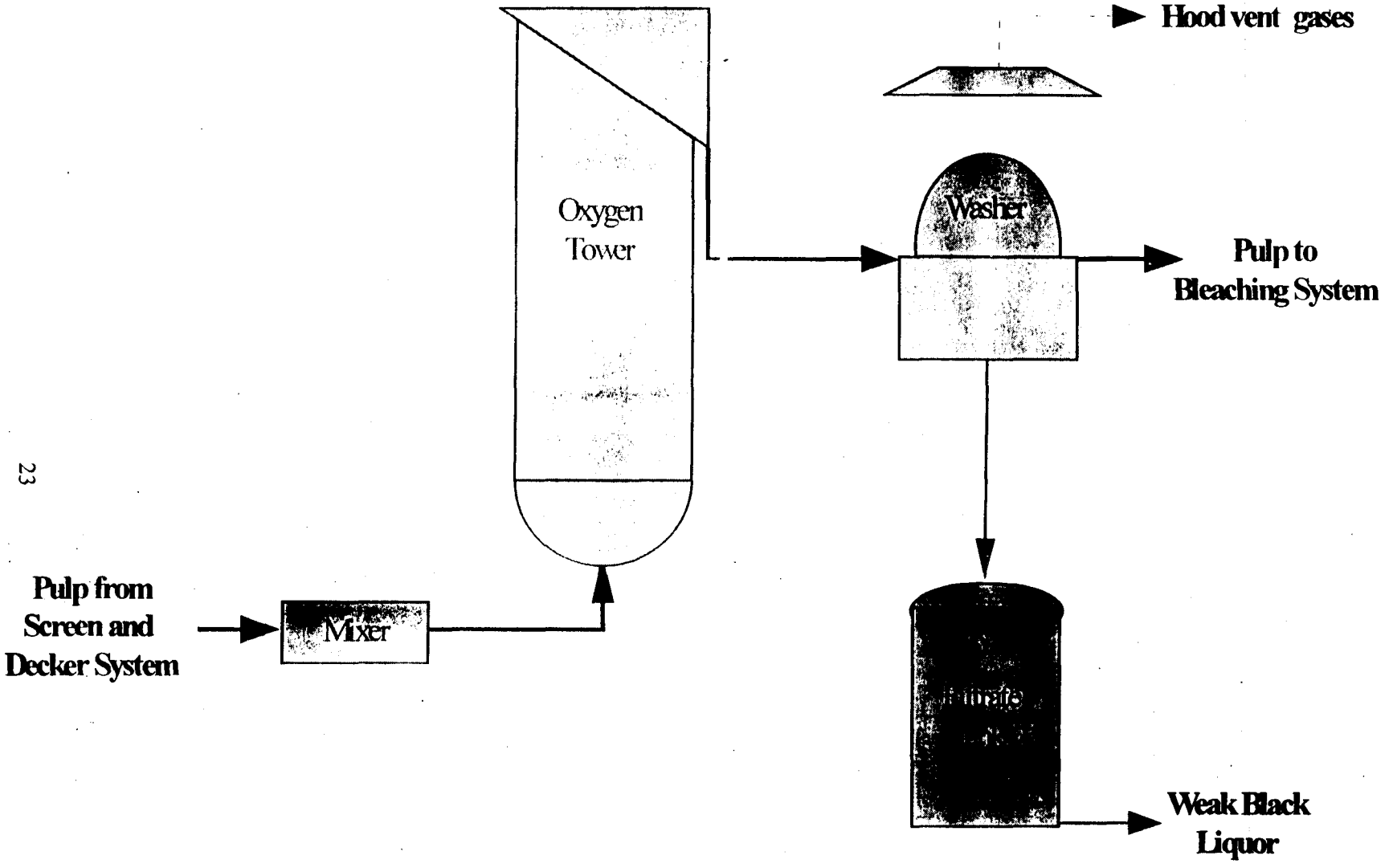


Figure 8.

Typical Oxygen Delignification System (Medium Consistency)

Historically, most LVHC gases have been controlled, while a smaller portion of the HVLC gases have been controlled.

Steam stripper systems were historically installed to control TRS odor.

A number of mills use a dedicated incinerator to control NCG emissions, but most mills use process combustion sources such as the lime kiln, power boilers, or a recovery boiler.

Condensate stripping

The pulping process equipment may include a steam stripper system to remove organics and total reduced sulfur (TRS) compounds from various liquid process condensate streams. Steam stripping is a multistage distillation separation process that uses direct steam as the heat source. The pulping process condensate streams most often stripped are the turpentine decanter underflow, blow steam condensates, and certain evaporator condensates. The stripped condensates may then be used as hot process water.

Kraft pulping process condensates originate from the following systems:

- digester system
- turpentine recovery system
- evaporator system

2.3 What is bleaching?

Each bleaching stage performs three functions:
- *mixing of pulp and bleaching chemicals*
- *reaction of bleaching chemicals with the pulp*
- *washing the chemicals out of the pulp*

Bleaching brightens the pulp in a series of chemical operations that are together called a bleaching line. A bleaching line typically consists of a sequence of three to six bleaching stages. The number of stages varies depending on the brightness requirements of the pulp and the specific design of the mill. Typically, the stages are sequenced as an alternating series of bleaching and extraction stages. In a bleaching stage, the pulp is treated with chemical bleaching agents. In an extraction stage, chemicals (usually sodium hydroxide) are added to neutralize the chemical reactions and the acidity of the pulp prior to the next bleaching stage. An extraction stage is not required in all cases.

Each bleaching stage consists of three steps: mixing of pulp and bleaching chemical (and in some cases steam); reaction of the chemical with the pulp in a retention tower; and washing the chemical out of the pulp. Thus, the equipment considered part of a stage includes chemical and steam mixers, retention (bleaching or extraction) towers, and the washers and their associated seal (filtrate) tanks and/or vacuum pumps.

Figure 9 depicts the major equipment found in a typical three-stage bleaching plant. The function of these equipment systems and a brief description follow.

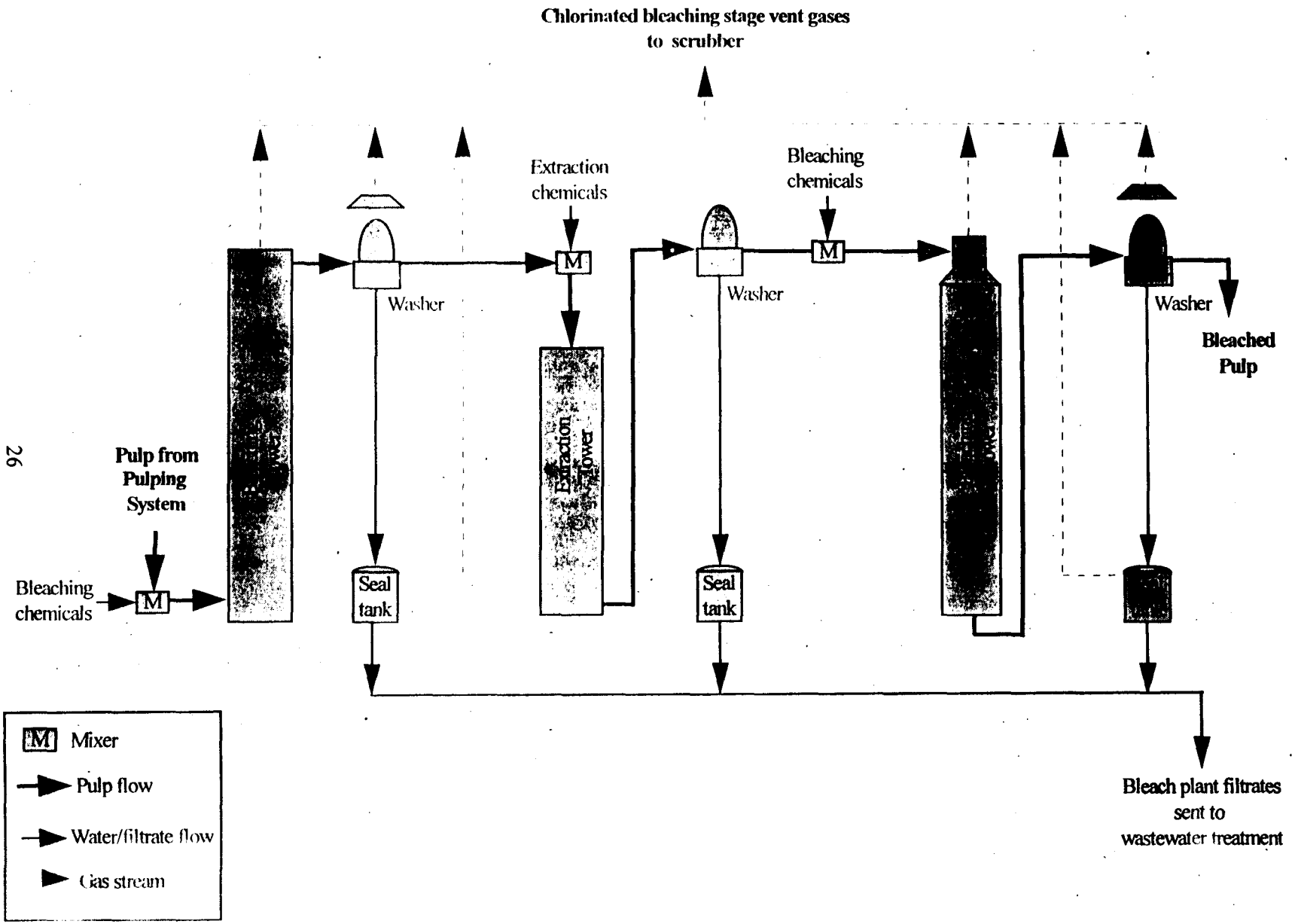


Figure 9.

Example Bleaching Line

Bleaching chemicals

Almost any oxidant could be used as a bleaching agent. However, for bleaching pulp, the chemical must be both powerful and inexpensive to produce or purchase. There are a variety of chemicals that meet these criteria. Both chlorinated and non-chlorinated chemicals are used for bleaching. The chemicals and their common bleaching stage abbreviations are shown below. These bleaching chemicals are grouped into two categories: chlorinated and non-chlorinated.

Bleaching stage means all process equipment associated with a discrete step of a chemical application and removal in the bleaching process.

Bleaching line means a group of bleaching stages arranged in series such that bleaching of the pulp progresses as the pulp moves from one stage to the next.

Chemicals	Abbreviation
Chlorinated Bleach Chemicals	
Elemental chlorine	C
Hypochlorite	H
Chlorine dioxide	D
Chlorine with chlorine dioxide substitution	(CD), (C+D)
Non-chlorinated Bleach Chemicals	
Oxygen	O
Peroxide	P
Ozone	Z

Chlorinated bleaching chemicals. There are three chlorinated chemicals commonly used for bleaching pulp: elemental chlorine (C), chlorine dioxide (D), and hypochlorite (H). Since elemental chlorine is a good delignifying agent, it performs best when used in the first bleaching stage.

Non-chlorinated bleach chemicals. Common examples of non-chlorinated bleaching chemicals include: oxygen (O); peroxide (P); and ozone (Z). Bleach stages that use various combinations of alkali, oxygen, and peroxide are common in many bleach plants.

The NESHAP requires collection and control of HAP emissions from the chlorinated bleaching stages only!

Bleaching mixers

Bleaching chemicals must be thoroughly mixed with the pulp to ensure pulp quality, to minimize chemical waste, and to minimize the generation of bleaching contaminants such as chlorinated dioxins and furans. Enclosed rotary high-shear mixers or static in-the-pipe mixers are used to mix the pulp and bleaching chemicals.

Bleaching retention towers

Retention towers are used to maintain bleaching conditions for the pulp as it passes through each bleaching stage. For complete bleaching chemical reaction, it is necessary to maintain a certain temperature, time, consistency, pressure, and pH for each bleach stage. Conditions vary with the bleaching chemical used (e.g., chlorine, chlorine dioxide, hydrogen peroxide). In many bleaching systems, the retention towers are named by the bleach chemical used or the function of that particular bleaching stage (e.g., chlorination tower).

There are two primary types of retention towers: the upflow tower: and the downflow tower. The choice of tower design depends on the particular conditions desired for the bleach stage. As a general rule, chlorinated bleaching stages use an upflow tower design or a similar design. See diagram number 29 in Appendix E.

Bleached pulp washers

To minimize chemical usage and equipment corrosion, it is important to remove as much bleaching chemical as possible from the pulp before it enters the next bleaching stage. Bleached pulp washing is performed in the same type of equipment that washes the brown stock. See discussion on brown stock washers on page 19.

More detailed diagrams on the air and water discharges of each system are provided in Appendix E.

What is pulp preparation and papermaking?

The final stages at a pulp and paper mill include the preparation of pulp for papermaking and the actual papermaking process. In the pulp preparation area, the pulp fibers are cleaned to remove unwanted particles (such as dirt and sand) from the pulp stock. The cleaned fibers will then undergo some level of refining. In the refining process, the pulp fibers are subjected to mechanical action to develop their optimal papermaking properties with respect to the product being made.

In the papermaking process, the pulp stock is converted into paper. This process begins when the pulp stock is distributed across the forming table. On the forming table, the paper sheet formation starts as the excess water contained in the pulp stock drains from the pulp fibers. The newly formed paper sheet is removed from the forming table and is conveyed through a series of presses to remove additional water and to continue the sheet forming process. The remaining water contained in the paper sheet is removed as the sheet travels around a series of steam-heated cylinders. After the paper sheet leaves the dryers, it may undergo several other processes, depending on the final paper product. These additional processes include: calendering (where the sheet is pressed to reduce thickness and smooth the surface), winding (where the sheet is wound onto a reel), and coating (where various chemical or dyes are applied to the paper sheet).

2.4 Soda mills

The soda pulping process was the first chemical pulping method and was the precursor to the kraft pulping process.

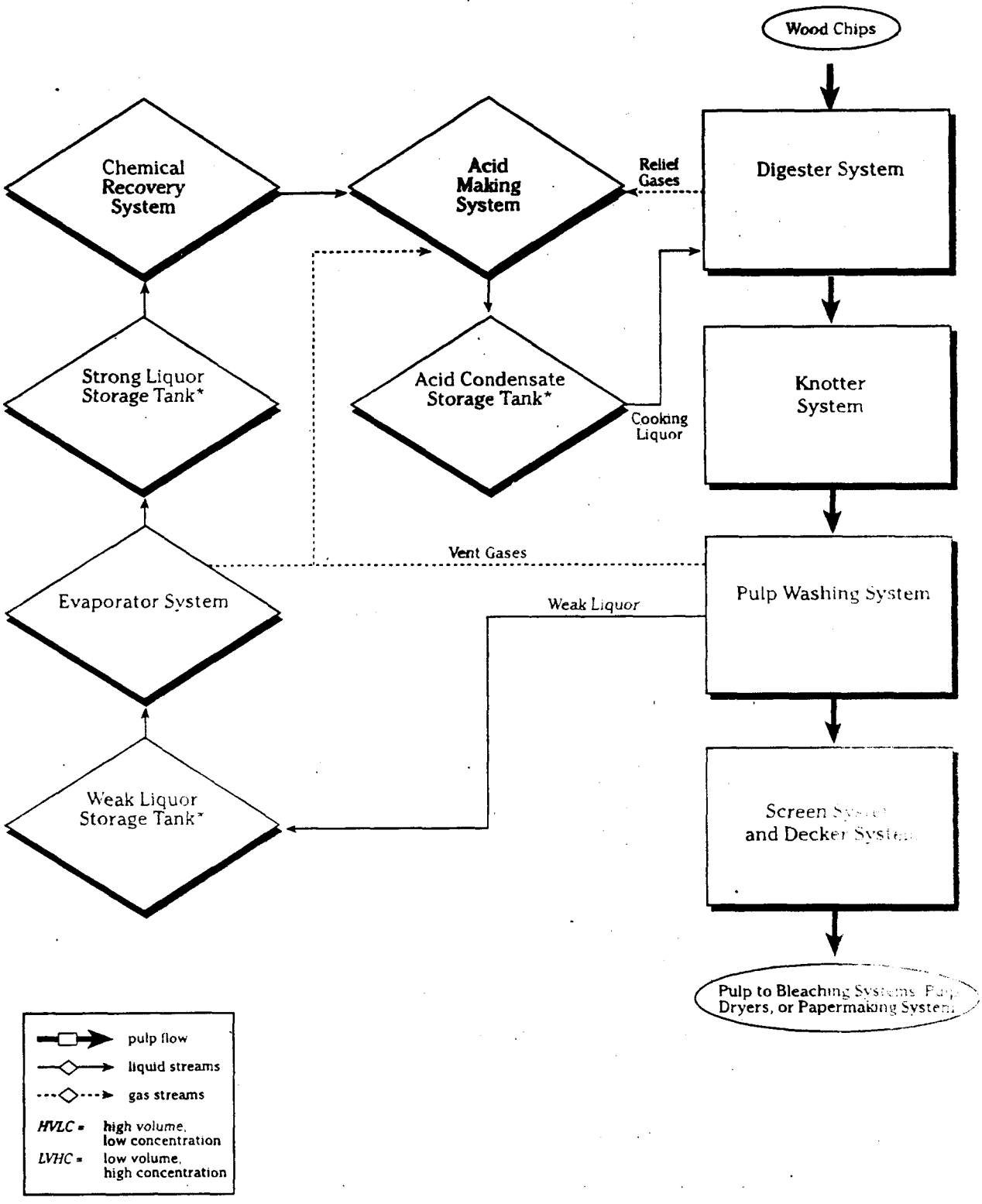
The soda pulping process utilizes an alkaline liquor with sodium hydroxide as the only active chemical. Except for the difference in chemicals used, this process is the same as that described for the kraft mill.

2.5 Sulfite mills

The sulfite pulping process uses acid solutions of sulfurous acid (H_2SO_3) and bisulfite ions (HSO_3^-).

The sulfite pulping process uses an acid solution of sulfurous acid (H_2SO_3) and bisulfite ion (HSO_3^-) to break the lignin bonds between wood fibers, while kraft mills use an alkaline solution. Because the sulfite cooking process is an oxidizing reaction, sulfur dioxide is generated instead of the reduced sulfur compounds generated by the kraft process (a reducing reaction). Thus, the chemical recovery processes at sulfite mills are different than at kraft mills. Otherwise, the process is similar to the kraft process.

Sulfite pulp has less color than kraft pulp and can be more easily bleached, although the sulfite pulp is not as strong as kraft pulp. Figure 10 depicts an overview of a typical sulfite pulping system.



*Affected source only at new sources

Figure 10.

Example Sulfite Pulping System

2.6 Semi-chemical mills

Semi-chemical pulp is generally not bleached.

Semi-chemical pulping involves partial digestion of wood chips in a weak chemical solution such as sodium sulfite (Na_2SO_3) and sodium carbonate (Na_2CO_3) followed by mechanical refining for fiber separation. Semi-chemical pulp is very stiff, making this process common in corrugated container manufacture. Figure 11 shows an overview of a typical semi-chemical pulping system.

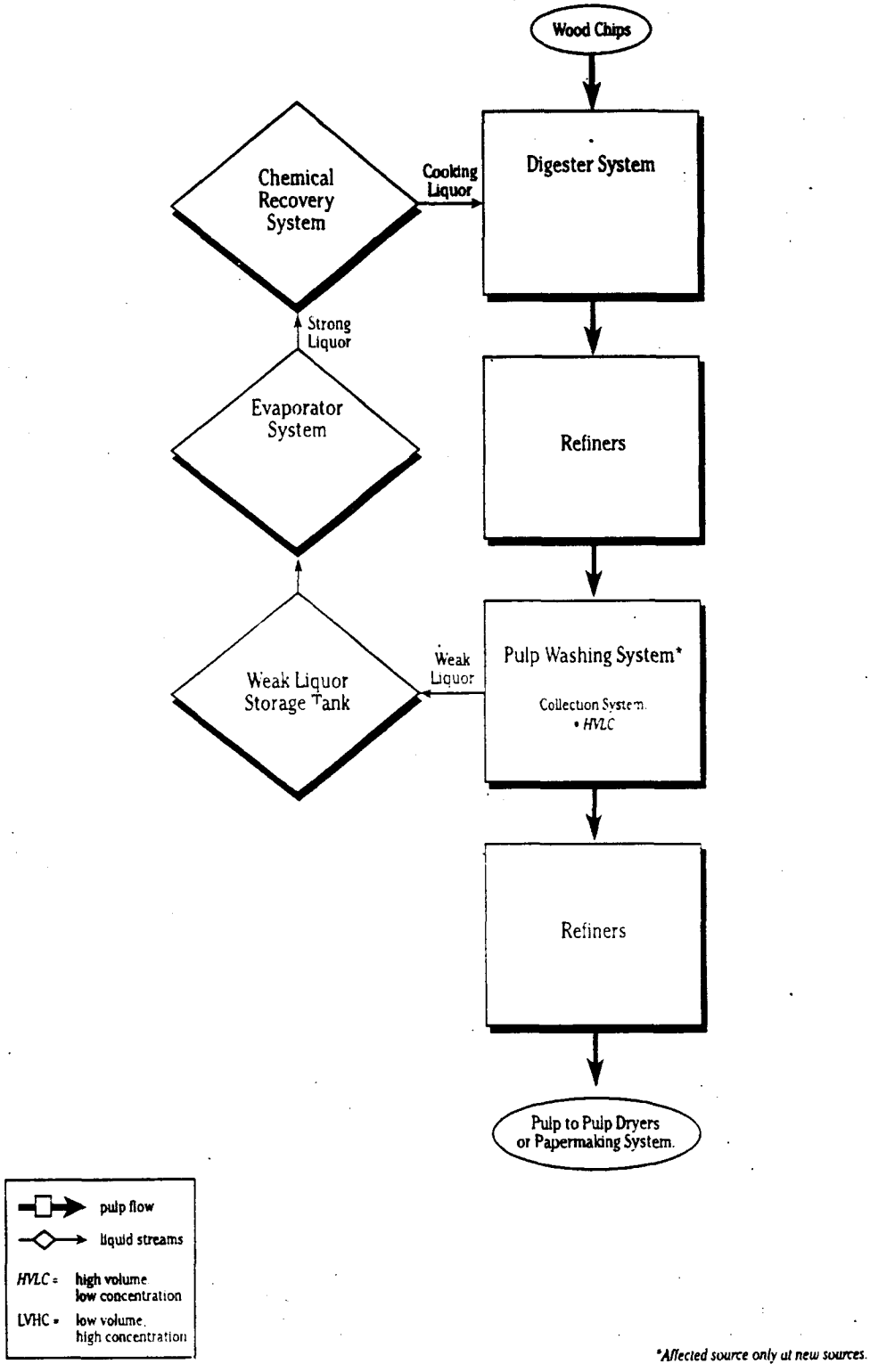


Figure 11.

Example Semi-chemical Pulping System

2.7 Mechanical, secondary fiber, and non-wood fiber pulp mills

Mechanical pulping

***Bleaching systems that use chlorine or chlorine dioxide** are **the only** emission sources at mechanical, **secondary** fiber, and **non-wood** fiber mills affected by the pulp and paper NESHAP.*

Mechanical pulping uses physical pressure instead of chemicals to separate wood fibers. Mechanical pulping processes have the advantage of converting up to 95 percent of the dry weight of the fiber source into pulp, but require an enormous amount of energy relative to chemical pulping. Mechanically produced pulp is of lower strength than chemically produced pulp and is used principally for newsprint and other non-permanent paper goods.

Mechanical pulps are brightened with hydrogen peroxide (H_2O_2) and/or sodium sulfite (Na_2SO_3). The brightening chemicals are applied during the pulp processing stage (e.g., in-line brightening), or in chemical application towers. These chemicals only brighten the pulp and do not permanently bleach the pulp. Typically, bleaching of mechanical pulps using chlorine or chlorine dioxide is not practiced because of the high cost of bleaching chemicals and negative impact on pulp yield.

Secondary fiber pulping

Secondary fiber mills make pulp from recycled paper and other products.

Secondary fibers include any fibrous material that has undergone a manufacturing process and is being recycled as the raw material for another manufactured product. Secondary fibers have less strength and bonding potential than virgin fibers. The fibrous material is dropped into a large tank, or pulper, and mixed by a rotor. The pulper may contain either hot water or pulping chemicals to promote dissolution of the paper matrix. Debris and impurities are removed by "raggers"(wires that are circulated in the secondary fiber slurry so that debris accumulates on the wire) and "junkers" (bucket elevators that collect heavy debris pulled to the side of the pulper by centrifugal force).

Non-wood fiber pulping

The NESHAP does not apply to mills that rewater purchased pulp (e.g., dried bales or sheets of pulp being made into a slurry).

Non-wood pulping is the production of pulp from fiber sources other than trees. Non-wood fibers used for papermaking include straws and grasses (e.g., flax, rice), bagasse (sugar cane), hemp, linen, ramie, kenaf, cotton, and leaf fibers. Pulping of these fibers may be performed by mechanical means at high temperatures or using a modified kraft or soda process. Non-wood fiber pulp production is not common in the U.S.

2.8 References for Chapter 2

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Chapter 3 - Overview of the Pulp and Paper NESHAP

3.1 Which mills are subject to the NESHAP?

A copy of the April 15, 1998 NESHAP is in Appendix B. Refer to the ATW for correction notices and amendments.

The NESHAP does NOT apply to paper mills unless they also produce pulp.

Find a list of HAPs at http://www.epa.gov/ttn/atw/pollsour.html

The pulp and paper NESHAP applies to existing and new major sources that produce pulp, paper, or paperboard, **and** use any of these pulping processes:

- kraft using wood
- soda using wood
- sulfite using wood
- semi-chemical using wood
- mechanical using wood
- processes using secondary fibers or non-wood fibers

A major source is any mill that emits or has the potential to emit (considering Federally enforceable controls) 10 tons per year (tpy) or more of any HAP or 25 tpy or more of any combination of HAPs.

3.2 What processes and equipment systems must be controlled?

The NESHAP has separate emission limits for pulping system vents, pulping process condensate streams, and bleaching systems. The applicability of these standards varies depending on the type of mill.

General Requirements of the NESHAP:
- *vent control on pulping systems*
- *treatment of condensates from kraft pulping systems only*
- *vent control on bleaching systems*
- *elimination of certain bleaching chemicals*
- *no control of papermaking systems*

	Then the NESHAP Covers These Processes...		
If the Mill is This Type...	**Pulping System Vents**	**Pulping Condensates**	**Bleaching Systems That Use the Following Compounds**
Kraft	X	X	Chlorine or any chlorinated compound
Sulfite	X		Chlorine or any chlorinated compound
Semi-chemical	X		Chlorine or any chlorinated compound
Soda	X		Chlorine or any chlorinated compound
Mechanical			Chlorine or chlorine dioxide
Secondary Fiber			Chlorine or chlorine dioxide
Non-Wood Fiber			Chlorine or chlorine dioxide

In addition, the specific pulping process vents covered by the standards vary depending on the type of mill and the classification of the pulping system as a new or existing source. See Figure 12. The applicability and control requirements of each type of mill are explained in detail in Chapters 4 through 7.

For purposes of this NESHAP, LVHC systems are:
- *digester system*
- *turpentine recovery system*
- *evaporator system*
- *steam stripper system*
- *any other system serving one of these functions*

Systems that are not regulated:
- *wood yards*
- *pulping systems at mechanical, non-wood, and secondary fiber pulp mills*
- *tall oil recovery systems*
- *causticizing systems*
- *papermaking systems*

Figure 12.

Equipment Systems Covered by the Pulping Vent Standards

If the Mill is This Type...	Then These Equipment Systems[a] are Covered at Existing Sources...	And These Equipment Systems are Covered at New Sources[b]...
Kraft	• LVHC systems • Pulp washing system • Oxygen delignification system • Decker systems that use any process water other than fresh water or paper machine white water or any process water with total HAPs concentration > 400 ppmw • Knotter systems with HAP emissions greater than 0.05 kg/Mg oven-dried pulp • Screen systems with HAP emissions greater than 0.1 kg/Mg oven-dried pulp • Combined knotter and screen systems with HAP emissions greater than 0.15 kg/Mg oven-dried pulp	Same as existing sources plus all... • Decker systems • Screen systems • Knotter systems • Weak liquor storage tanks
Soda	LVHC systems	Same as existing sources plus all... • Pulp washing systems
Sulfite	• Digester system • Evaporator system • Pulp washing systems	Same as existing sources plus all... • Weak liquor storage tanks • Strong liquor storage tanks • Acid condensate storage tanks
Semi-chemical	LVHC systems	Same as existing sources plus all... • Pulp washing systems

[a] See Appendix F for a list of specific equipment within each system.
[b] See page 49 for the definition of a new source.

3.3 What are the emission control requirements?

The NESHAP provides several alternative emission limits for the pulping vent standard, pulping condensates standard, and bleaching system standard. For each regulated emission point, a mill can choose the emission limit with which to comply and can use any emission control technology to achieve compliance.

The NESHAP has one alternative emission limit for pulping system vents, pulping condensates, and bleaching systems that does not require testing and monitoring.

The format (e.g., percent reduction or outlet concentration) of the alternative emission limits varies depending on the type of mill (Figure 13). For ease of explanation, Figure 13 provides only the formats of the alternative limits, since the actual emission limits vary depending on the type of mill. The emission limits for each type of mill are presented in Chapters 4 through 7 and are summarized in Appendix G.

Where two or more pulping processes share a piece of equipment, that piece of equipment is considered a part of the pulping process type with the more stringent NESHAP requirements for that piece of equipment.

Figure 13.

Alternative Emission Limits

For the Following Standards...	The Regulated Pollutant is...	And a Mill Can Choose One of the Following Emission Limits[a]...
Pulping system vents • Kraft • Soda • Semi-chemical	Total HAPs	• Percent reduction • Outlet concentration (parts per million by volume) for thermal oxidizer • Design specification for thermal oxidizer • Duct vents to a boiler, recovery furnace, or lime kiln[b]
Pulping system vents • Sulfite	Total HAPs	• Percent reduction[c] • Mass emission limit (lb/ton oven-dried pulp)[c]
Pulping system condensates • Kraft	Total HAPs	• Recycling to equipment subject to pulping standards • Percent reduction (HAP mass in the condensates) • Mass removal (lb/ton oven-dried pulp) • Outlet concentration (parts per million by weight) (option not available for biological treatment systems)
Bleaching system • Kraft • Soda • Sulfite	Chlorinated HAPs (other than chloroform)	• Percent reduction • Outlet concentration (ppmv) from the treatment device • Mass emission limit (lb/ton oven-dried pulp)[d] • Eliminate use of chlorinated compounds
	Chloroform	• Eliminate use of hypochlorite and chlorine • Effluent (water) limitations

[a] Emission limits vary for different types of pulping systems and control devices. A mill will likely use several closed-vent systems and each one can comply with any of these alternative emission limits.

[b] The vent stream must be introduced with the primary fuel or into the flame zone. For boilers and recovery furnaces with heat input capacities of 150 MMBtu/hr of more, the vent stream can be introduced with the combustion air.

[c] Percent reduction and mass emission limits apply to sulfite pulping system vents, and any emissions from vents, wastewater, and condensate streams from the control device.

[d] Mass emission limit applies to total emission from all regulated bleaching stages in the bleaching system.

3.4 What control systems will mills typically use to meet the emission limits?

The control systems that most mills are likely to use to meet the emission limits shown in Figure 13 are listed below:

- Pulping system vents
  - thermal oxidizers
  - power boilers, lime kilns, recovery furnaces
- Pulping process condensates
  - steam strippers
  - biological treatment
  - recycling to pulping equipment that is controlled by the NESHAP
- Bleaching system vents
  - caustic scrubbers (for chlorinated HAPs, other than chloroform)
  - process modifications to eliminate the use of chlorine and hypochlorite

3.5 How do mills demonstrate initial and continuous compliance?

- In general, mills must conduct an initial performance test and then continuously monitor a set of control device or process operating parameters. Exceeding a monitoring parameter will constitute a violation of the standard.

Figure 14 explains in general how mills must demonstrate compliance with the NESHAP.

Initial performance test. A performance test is required for most sources regulated by this NESHAP. The performance test serves two purposes:

(1) To demonstrate that the control device complies with the emission limit (Figure 14 explains the pollutants that must be measured and the allowable surrogates that a mill may choose to measure as an alternative)

(2) To establish the process operating parameter values (e.g., fire box temperature for thermal oxidizers) that must be monitored to demonstrate continuous compliance with the standard

Administrator means an authorized representative of the EPA (e.g., a State that has been delegated the authority to implement and enforce this NESHAP).

The NESHAP specifies the required monitoring parameters for most control devices. If a mill uses a control device for which the monitoring parameters are not specified, then the mill must propose and demonstrate, to the satisfaction of the Administrator, a set of monitoring parameters that can prove continuous compliance with the NESHAP. During the performance test, mills must test simultaneously for emissions and monitor the appropriate operating parameters to establish the parameter values (e.g., the specific fire box temperature) that constitute continuous compliance.

The NESHAP generally requires continuous monitoring of operating parameters (not emissions) to demonstrate compliance.

Continuous monitoring. Continuous monitoring is used to demonstrate that a mill is in compliance with the NESHAP at all times. Mills must continuously monitor operating parameters and report all instances where the values deviate from the maximum or minimum values established during the initial performance test. As an alternative, mills may install a continuous emissions monitor.

Recordkeeping and reporting requirements. Mills must comply with the recordkeeping and reporting requirements of the NESHAP General Provisions (40 CFR 63) and those of the pulp and paper NESHAP. These requirements include initial notifications, retaining records of performance tests and monitoring data, and periodic reporting of periods of excess emissions. Table 1 of Appendix B identifies which sections of the General Provision requirements apply and which are overridden by this NESHAP.

In addition, the pulp and paper NESHAP requires some mills to submit a control strategy report. The control strategy report must be submitted with the initial notification (by April 15, 1999) and updated every 2 years until compliance is achieved. The report must include the following:

- description of emission controls or process modifications selected for compliance
- compliance schedule
- a report on the progress of installing the emission controls or process modifications during the past 2-year period.

The control strategy report is required only if a mill uses one of the following strategies that provide either additional compliance time or compliance flexibility:

- Bleaching systems that comply with the Voluntary Technology Advanced Incentives Program (see page 70)
- HVLC system vents that comply after April 16, 2001
- HVLC system vents that comply with the Clean Condensate Alternative (see page 75)

Figure 14.

What Pollutants or Surrogates Must Be Measured?

If These Systems are Covered by the NESHAP...	Then the Regulated Pollutant is...	And a Performance Test is Required at this Frequency[a]...	And a Mill May Choose to Test[b] for this Surrogate Pollutant...	And These Parameters Must be Continuously Monitored
Pulping	Total HAPs	Initially	Methanol	Operating parameters or methanol outlet concentration
Bleaching	Chlorinated HAPs (excluding chloroform)	Initially	Chlorine	Operating parameters or chlorine outlet concentration
	Chloroform	None[c]	--	None[c]
Condensates				
Biological treatment	Total HAPs (in condensates)	Quarterly[d]	Methanol[d]	Operating parameters (daily)
Steam stripping	Total HAPs (in condensates)	Initially	Methanol	Operating parameters or methanol outlet concentration

[a] The U.S. EPA or the delegated authority may require an owner or operator to conduct performance tests at the affected facility at any other time when the action is authorized under Section 114 of the CAA (40 CFR subsection 63.7(a)(3)).

[b] Compliance tests are conducted using the following methods:

Compound(s)	Test method
Total HAPs; methanol	M308
Chlorinated HAPs	Any method approved by the Administrator
Chlorine	M26A
Total HAPs; methanol in condensates	M305
Methanol in condensates	NCASI GC/FID[e]

[c] A mill can comply by eliminating the use of chlorine and hypochlorite or by complying with the numerical limits of the effluent limitations guidelines and standards for water in 40 CFR 430.

[d] The initial performance test and annual 1st quarter tests must be performed for acetaldehyde, methanol, methyl ethyl ketone, and propionaldehyde. However, if the ratio between the four HAPs and methanol is established in the 1st quarter, methanol can be used as a surrogate for total HAPs in the 2nd, 3rd, and 4th quarter tests instead of performing the tests for the four HAPs.

[e] The National Council of the Paper Industry for Air and Stream Improvement (NCASI) direct injection gas chromatography/flame ionization (GC/FID) method may be used as an alternative to EPA Method 305.

3.6 When must mills comply?

The major compliance milestones for affected sources are shown below. This information presents only a portion of the requirements faced by owners and operators of pulp and paper mills. Appendix H provides the detailed milestone compliance timeline for existing sources.

For purposes of this NESHAP, HVLC systems are:
- *knotter system*
- *pulp washing system*
- *screen system*
- *oxygen delignification system*
- *weak liquor storage tanks*

Affected Sources Must Comply by April 16, 2001...	
Except for the Following...	**Which Must Comply...**
New sources	At startup or by June 15, 1998, whichever is later
HVLC system vents at kraft mills[a]	Within 8 years (April 17, 2006)
Dissolving grade bleaching systems at kraft or sulfite pulping mills[b]	Within 3 years of publication of the revised effluent limitations guidelines and standards
Bleaching system at any mill choosing to implement the Voluntary Advanced Technology Incentives Program[c] for effluent limitations guidelines and standards	Within 6 years (April 15, 2004)

[a] LVHC systems must still meet the April 16, 2001 compliance date (see page 55).
[b] Dissolving grade bleaching systems are similar to bleaching systems at bleached kraft or sulfite mills but usually contain six to eight bleach stages for maximum delignification and pulp cleanliness. The April 15, 1998 Cluster Rules did not publish effluent limitations guidelines and standards for these subcategories. Development of these revised rules is underway.
[c] Refer to page 70.

Also, by April 15, 1999, the following is due:

- Initial notification
- Initial control strategy report

3.7 What additional requirements apply to new sources?

For new sources, the emission limits are the same as existing sources.

- New sources at pulp and paper mills have more stringent compliance requirements than existing sources. These include:

  - ***More emission points must be controlled.*** For pulping systems, the emission limits (see Figure 12) for new and existing processes are the same, but more emission points must be controlled at new sources. For bleaching systems and pulping condensates, the emission limits and emission points that must be controlled for new and existing sources are identical.

  - ***Earlier compliance dates.*** New sources must comply at the date of startup or on June 15, 1998, whichever is later.

  - ***Preconstruction approval.*** The owner or operator of mills subject to the pulp and paper NESHAP must submit an application to EPA for approval to construct any new source that is subject to this rule. The preconstruction approval process applies only if two conditions are met:

    - if the construction or reconstruction is a "new source" as defined in Section 3.8

    - the new or reconstructed source in and of itself is a major source

See page 49 for the definition of a new source.

Construction must not commence until the EPA Administrator approves the application. The EPA Administrator will approve the application after determining that the source, if properly constructed, will not cause a violation of the NESHAP. The requirements for the submission and approval of construction applications are contained in 40 CFR 63.5 (e) and (f).

3.8 What is a new source?

The definition of a new source is different under the Clean Water Act. See 40 CFR 122.2 and 40 CFR 430.01(j) for the definition of a new source for effluent limitations guidelines and standards, and pretreatment standards.

What constitutes a new or reconstructed source for each mill type that is subject to this NESHAP is defined below.

A New Source at a ...	Using...	Is the Construction of Any One of the Following...	Or the Reconstruction[a] of Any One of the Following...	That Commences After...
Kraft mill, Soda mill, Semi-chemical mill, or Sulfite mill.	Wood	• A new mill • New pulping system • New bleaching system • Additional pulping line • Additional bleaching line	• Pulping system • Bleaching system	12/17/93
Mechanical pulping mill	Wood	• Bleaching system • Bleaching line	Bleaching system	03/08/96
Other mills	Secondary or non-wood fibers	• Bleaching system • Bleaching line	Bleaching system	03/08/96

[a] Reconstruction means replacement of components to the extent that the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source. (40 CFR 63.2 Subpart A).

What is an "Additional Line?" An additional line means a line that adds capacity to an existing pulping or bleaching system. For example, consider a mill with two existing pulping lines. The construction of a third line would constitute an additional line and would be subject to new source controls. On the other hand, a like-kind replacement of one of the lines would not be considered an additional line. However, the replacement of one of the lines with a new line that increases the capacity of the pulping system would be considered an additional line that is subject to the new source requirements.

Upon reconstruction, an existing source immediately becomes subject to the new source requirements!

What Does "Reconstruction" Mean? Reconstruction means the replacement of components to the extent that the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source. If this condition is met, upon construction, an existing source immediately becomes subject to the MACT standards for new sources irrespective of any change in emissions of HAPs. See 40 CFR 63.2 and 63.5.

The pulp and paper NESHAP defines either the entire pulping system or bleaching system as the equipment to which the 50 percent criterion is applied. For example, consider a mill that is refurbishing one of its two pulping lines by replacing worn out equipment or components. To determine if reconstruction occurs, the replacement costs would be compared to the construction costs for replacing the entire pulping system (e.g., both lines). If the replacement cost is less than 50 percent, the line is treated as an existing source. However, if the cost exceeds 50 percent, then the replacement/construction project would be deemed as a reconstruction of the pulping system, and **both** lines would become subject to the new source provisions, even if emissions after the reconstruction are the same or decrease.

Chapter 4 - NESHAP Requirements for Kraft Mills

Systems that are not regulated:
- *wood yards*
- *tall oil recovery systems*
- *causticizing systems*
- *papermaking systems*

The CCA focuses on reducing HAP emissions throughout the mill by reducing the HAP mass in process water streams that are recycled to various process areas in the mill.

For kraft mills, the NESHAP contains emission standards for pulping system vents, pulping process condensates, and bleaching system vents.

There are several alternative emission limits for each process covered. Compliance times will vary based on the process and emission limit selected, even within the same mill. This designed flexibility promotes and encourages new technologies, particularly joint air/water controls and pollution prevention technologies.

The NESHAP also includes an option called the Clean Condensate Alternative (CCA). The CCA applies only to kraft pulping system vent standards for the HVLC system and features both pollution prevention and emission averaging. The CCA is described on page 75.

If You Need the Following Information...	Then Read...
Standards for kraft pulping system vents	Section 4.1
Standards for kraft pulping process condensates	Section 4.2
Standards for kraft bleaching system vents	Section 4.3
Description of the clean condensate alternative	Section 4.4
Comparison of requirements for the NESHAP and the NSPS	Section 4.5

4.1 Standards for kraft pulping system vents

The NESHAP requires the pulping system emission points to be enclosed, collected in a closed-vent system, and then vented to a control device. This section describes the emission points that must be controlled, the five alternative emission limits, and the compliance requirements.

*For purposes of this NESHAP, the **LVHC system** includes all vents from:*
- *digester system*
- *turpentine recovery system*
- *evaporator system*
- *steam stripper system*

and

*The **HVLC system** includes all vents from:*
- *pulp washing system*
- *knotter system*
- *screen system*
- *decker system*
- *oxygen delignification system*
- *weak liquor storage tanks*

The combined knotter and screen system limit applies only if the mill is unable to differentiate emissions between the two systems.

What kraft pulping system vents must be controlled?

The NESHAP specifies that vents from the mill systems must be controlled. All the vents from the LVHC system must be controlled. The HVLC vents requiring control vary based on the quantity of emissions and whether the source is new or existing.

The Following Pulping Systems Must be Controlled[a] ...
Existing Sources
• LVHC system
• Pulp washing system
• Oxygen delignification system
• Decker systems that use any process water other than fresh water or paper machine white water, or process water with a concentration of HAPs greater than 400 parts per million by weight (ppmw)
• Knotter systems with HAP emissions equal to or greater than 0.1 pounds per ton oven-dried pulp
• Screen systems with HAP emissions equal to or greater than 0.2 pounds per ton oven-dried pulp
• Combined knotter and screen systems with HAP emissions equal to or greater than 0.3 pounds per ton oven-dried pulp
New Sources
• Same as existing sources plus... .
• All decker systems
• All screen systems
• All knotter systems
• All weak liquor storage tank vents

[a] Each equipment system has multiple emission points. For example, the evaporator system comprises pre-evaporators, multi-effect evaporators, concentrators, vacuum systems, associated condensers, hot wells, and condensate streams. A complete list of the emission points in each equipment system is provided in Appendix F.

What are the emission limits for kraft pulping system vents?

The emissions from kraft pulping system vents must meet one of five alternative emission limits, as shown below. These emission limits apply to each control device used to control HAP emissions. A mill will likely use several closed-vent systems and control devices (including both add-on control devices and existing combustion devices) and each can comply with any of these five alternative emission limits. These emission limits apply to both new and existing sources.

*These emission limits apply to **each** control device.*

Pulping System Vent Gases Must be Collected in a Closed-vent System and Routed to One of These Five Control Devices...	
1.	A boiler, lime kiln, or recovery furnace in which the HAP gas stream is introduced with the primary fuel or into the flame zone
2.	A boiler, lime kiln, or recovery furnace with a heat input capacity of at least 150 MMBtu/hr in which the HAP gas stream is introduced with the combustion air.
3.	A thermal oxidizer operated at a minimum temperature of 1,600°F and a minimum residence time of 0.75 seconds
4.	A thermal oxidizer that reduces the total HAP concentration at the outlet to ≤ 20 ppmv corrected to 10% O_2 on a dry basis, measured as total HAPs or methanol
5.	Any control device that reduces total HAP emissions by ≥98% by weight, measured as total HAPs or methanol

A sixth alternative is available for kraft HVLC system vents only. See Section 4.4 for an explanation of the Clean Condensate Alternative.

What does the NESHAP require for enclosures and closed-vent systems?

A closed-vent system means a system that is not open to the atmosphere and comprises piping, ductwork, connections, and if necessary, flow-inducing devices that transport gas or vapor from an emission point to a control device.

All regulated equipment system vents must be enclosed and routed through a closed-vent system to the control device that is selected for compliance. The requirements for enclosures and closed-vent systems are presented below. The requirements are intended to prevent leaks and ensure that process openings (e.g., sampling ports on a brown stock washer enclosure) are closed while the mill is in operation.

This Equipment....	Must Meet These Requirements....
Enclosures, openings, and hoods	Maintain negative pressure **and** If closed during the initial performance test, must be closed during operation except for sampling, inspection, maintenance, or repairs
Components operated at positive pressure	Operate with no detectable leaks (500 parts per million by volume [ppmv] VOC above background)
Bypass lines that could divert vent stream containing HAPs to the atmosphere	Seal and secure the opening so that the valve or closure mechanism cannot be opened without breaking the seal **or** If computer controlled, monitor for presence of gas stream flow at least once every 15 minutes

When must mills comply with the kraft pulping vent standards?

Compliance Dates:

LVHC system: April 16, 2001

HVLC system: April 17, 2006

HVLC systems that comply before April 16, 2001 are not required to submit a compliance strategy report.

The LVHC system sources at kraft mills must comply with the NESHAP by April 16, 2001, while the HVLC system sources must comply by April 17, 2006.

For HVLC system vents complying after April 16, 2001, a non-binding compliance strategy report must be submitted initially and updated every 2 years until compliance is achieved. The compliance strategy report must contain, among other information, a description of the emission controls or process modifications selected for compliance and a compliance schedule indicating when each step toward compliance will be reached.

For safety purposes, kraft mills typically separate pulping vent streams into two groups: low volume, high concentration (LVHC) vent streams and high volume, low concentration (HVLC) vent streams. The NESHAP does not specify which vents must be routed to the LVHC and HVLC collection systems. Each mill makes this decision. However, compliance dates are based on EPA's definition of LVHC and HVLC system equipment, and these compliance dates do not change based on how a mill chooses to collect their system vents. For example, a mill could control an evaporator vent (LVHC source) along with a group of HVLC vents. In such cases, the emissions from this closed-vent system would have to comply by April 2001, because 2001 is the compliance date specified for the LVHC system source.

How does a mill demonstrate initial compliance with the kraft pulping system vent standards?

A mill must demonstrate compliance through an initial performance test for each closed-vent system and control device. However, the rule contains three alternative emissions limits for which an initial performance test of the control device is not required. If a mill complies with the pulping system vent standards by venting the gases to a boiler, lime kiln, or recovery furnace, the mill must demonstrate only that the gases are being introduced with the primary fuel or into the flame zone (or with the combustion air if the heat input rate of the boiler, lime kiln, or recovery furnace is at least 150 MMBtu/hr). Also, if a mill complies with the pulping system vents standards by venting the gases to a thermal oxidizer operating at the minimum design specifications, the mill must demonstrate only that the gases are being properly introduced into the thermal oxidizer.

The initial performance test has three objectives:

(1) **To demonstrate that each control device complies with the emission limit**. Refer to Figure 15.

(2) **To demonstrate that the closed-vent system captures and contains all HAP emissions**. Refer to Figure 16.

(3) **To establish the process operating parameter values that must be monitored to demonstrate continuous compliance**. For example, the test would establish the minimum fire box temperature of the thermal oxidizer that indicates 98 percent by weight reduction of total HAPs.

The test method specified is used to determine pollutant concentration. Additional calculations or formulas are specified in the NESHAP to convert the concentration values into the appropriate format to demonstrate compliance with a particular emission limit.

Figure 15.

How Does a Mill Demonstrate Initial Compliance with the Kraft Pulping System Vent Emission Limits?

To Demonstrate Initial Compliance With This Emission Limit...	Conduct an Initial Performance Test Following This Method...	To Measure These Parameters...
Introduce HAP emission stream with the primary fuel, into the flame zone, or with the combustion air	None required. Demonstrate that gases are properly introduced.	None required
Operate at a minimum temperature of 1,600°F and a minimum residence time of 0.75 seconds	None required	None required
Reduce the total HAP concentration at the outlet to ≤ 20 ppmv corrected to 10% O_2 on a dry basis	Method 308	Total HAP or methanol concentration at the outlet of the thermal oxidizer
Reduce total HAP emissions by ≥98% by weight	Method 308	Total HAP or methanol mass at the control device inlet and outlet

How does a mill demonstrate continuous compliance with the kraft pulping system vent standards?

Continuous monitors are required except for vent streams that are combusted in a lime kiln, recovery furnace, or boiler.

Mills must install a continuous monitoring system to measure either HAP concentration or control device operating parameters. Figure 17 presents the monitoring, reporting, and recordkeeping requirements for each alternative emission limit.

In addition, a mill must periodically inspect and maintain all enclosures and closed-vent systems. These requirements are explained in Figure 16. The mill must maintain a site-specific inspection plan for the enclosures and closed-vent system. Records of all inspection results and repairs must also be kept according to the specifications of 40 CFR 63.454.

Figure 16.

How Does a Mill Demonstrate Initial and Continuous Compliance with the Closed-Vent Systems Standard?

These same tests are required as part of the initial performance test.

If the System has...	Then Inspect...	And Report...	And Keep Records of...
Enclosure opening	Visually inspect every 30 days to ensure closed and sealed	Any exceedences of the closed-vent standard in quarterly reports. If no exceedences occur, submit semi-annual reports.	All visual checks and any repairs
	Annually demonstrate negative pressure	Same as above	All pressure tests
Closed-vent system	Visually inspect every 30 days for visible defects	Same as above	All visual checks and repairs
Positive pressure closed-vent system	Annually demonstrate no detectable leaks (less than 500 ppmv)	Same as above	All leak tests
Bypass line valve	Inspect every 30 days to ensure valve is in a closed position and vent stream is not diverted through bypass line	Same as above	All visual checks and repairs

Figure 17.

How Does a Mill Demonstrate Continuous Compliance with the Kraft Pulping System Vent Emission Limits?

If a Mill Chooses This Alternative Emission Limit...	Then Continuously Monitor These Parameters...	And Report This Information...	And Keep These Records for 5 Years...
Introduce HAP emission stream with the primary fuel, into the flame zone, or with the combustion air	None required	None required	None required
Operate at a minimum temperature of 1,600°F and a minimum residence time of 0.75 seconds	Fire box temperature	• Certify in the performance test report that the minimum residence time is achieved • Semi-annual emissions and continuous monitoring performance report • If exceedences occur, then quarterly reports are required (40 CFR 63.10(e))	Fire box temperature
Reduce the total HAP[a] concentration at the outlet to ≤ 20 ppmv corrected to 10% O_2 on a dry basis	Fire box temperature or	• Semi-annual emissions and continuous monitoring performance report • If exceedences occur, then quarterly reports are required (40 CFR 63.10(e))	Fire box temperature
	Total HAP concentration[a]	Same as above	Total HAP concentration[a]
Reduce total HAP[a] emissions by ≥98% by weight	When using a thermal oxidizer, monitor fire box temperature	Same as above	Fire box temperature
	When using a control device other than a thermal oxidizer or incineration, operating parameters must be established during the initial performance test and approved by the Administrator[b]	Same as above	Parameters approved by the Administrator

[a] Methanol may be used as a surrogate for total HAPs.
[b] Administrator means an authorized representative of the EPA (e.g., a State that has been delegated the authority to implement and enforce this NESHAP).

Must a mill comply at all times?

For pulping system vents, the NESHAP establishes an allowable percent of operating time during which HAP emission levels in excess of the established limit shall not be considered to be a violation of the standard. Periods of excess emissions include when the control device is inoperable and when the operating parameter values established during the initial performance test cannot be maintained at the appropriate level. The allowance is in addition to excused periods under the startup, shutdown or malfunction provisions, and is calculated by dividing the time of excess emissions by the total process operating time in a semi-annual reporting period.

The excess emissions allowances are:

- 1 percent of operating time for control devices used for LVHC system vents
- 4 percent of operating time for control devices used for HVLC system vents
- 4 percent of operating time for control devices used for combined LVHC and HVLC system vents (i.e., controlled by the same device)

Even though periods of excess HAP emissions may be exempt under the MACT requirements, these periods of excess emissions must still comply with NSPS total reduced sulfur (TRS) requirements, and any applicable State requirements.

The NESHAP does not specify rigid averaging times, but rather allows State permitting authorities flexibility in establishing mill-specific times. Check the ATW periodically for additional information concerning averaging times.

To calculate the percent of periods of excess emissions in a semi-annual period, divide the number of hours in the reporting period during which the control device was not operating or parameter deviations occurred by the total number of process operating hours and multiply by 100 percent. For example, to calculate the semi-annual excess emissions for an LVHC system control device where the device down time was 25 hours and the total process operating time was 4,250 hours:

$$\frac{\text{Control device down time}}{\text{Total process operating time}} \times 100\%$$

$$\frac{25 \text{ hours}}{4{,}250 \text{ hours}} \times 100\% = 0.59\%$$

4.2 Standards for kraft pulping process condensates

The condensate streams subject to control and the alternative emission limits are the same for new and existing sources.

The NESHAP requires condensate streams from the pulping system to be collected in a closed collection system and treated. The NESHAP provides five alternative emission limits (shown on page 61). This section describes the condensates that must be controlled and the alternative emission limits.

What is a condensate and why control it?

Kraft pulping condensates are HAP-containing liquids that are condensed from pulping system vent streams. These HAP-containing liquids result from the contact of water with organic compounds in the pulping process. In absence of this rule, most condensates would be discharged into open collection systems and transported to either the wastewater treatment plant or a publicly owned wastewater treatment plant. The emissions of concern are the HAPs that volatilize as the condensates travel through these open systems.

What kraft pulping condensates must be controlled?

*Liquid streams intended for byproduct recovery, such as the combined turpentine/water streams prior to the turpentine decanter or concentrated black liquor, are **not** considered process condensate streams subject to the control requirements of this regulation.*

The NESHAP requires control of condensates from all of the equipment in the following systems:

- digester system
- turpentine recovery system
- evaporator system (condensates from weak liquor feed stage vapors and vacuum systems only).
- LVHC collection system
- HVLC collection system

The LVHC and HVLC collection system condensates means those condensates generated by the condensation of moisture in the closed-vent collection systems that convey the LVHC and HVLC system vent gases to a control device.

Does the mill have to collect all those streams?

No. A mill may choose to collect and control all the condensate streams from the equipment systems listed on page 60. Alternatively, the NESHAP contains two options for minimizing the volume of condensate that must be treated (referred to as volume reduction options). These options are summarized below.

By segregating condensate streams containing the greatest amount of HAP and treating only these streams, an equivalent emission reduction can be achieved at a lower cost.

A Mill Must Collect and Control One of the Following Combinations of Streams...
• All condensate streams
• Volume reduction option 1: Treat all LVHC and HVLC collection system streams plus streams that contain 65% of the total HAP mass from the digester system, turpentine recovery system, and evaporator system (only condensates from weak liquor feed stage vapors and vacuum systems)
• Volume reduction option 2: Treat any subset of the regulated streams that contain in total 7.2 lbs HAP per ton of oven-dried pulp at mills that do not perform bleaching or 11.1 lbs HAP per ton of oven-dried pulp at mills that perform bleaching

What are the control requirements?

The NESHAP provides five alternative emission limits for condensate streams as shown below. The three strategies expected to be used by most mills are: recycling, biological treatment, and steam stripping.

Most mills are expected to use steam stripping for alternative emission limits 4 and 5.

Kraft Pulping Process Condensates Must be Collected in a Closed-collection System and Treated to Meet One of These Five Alternative Emission Limits...	
1.	Recycle the condensate to a piece of equipment that meets the control standards for pulping system vents (see page 53)
2.	Use a biological treatment system to reduce or destroy the total HAPs[a] to meet the emission limits in alternatives 3 or 4
3.	Treat the condensates to reduce or destroy the total HAPs[b] by ≥92% by weight
4.	Treat the condensates to remove 10.2 pounds HAPs[b] per ton of oven-dried pulp at mills performing bleaching or 6.6 pounds HAPs[b] per ton of oven-dried pulp at mills that do not perform bleaching
5.	Treat the condensates to achieve a total HAP[b] concentration of ≤330 ppmw at the outlet of the control device at mills that perform bleaching or ≤210 ppmw at the outlet of the control device at mills that do not perform bleaching

[a] Measured acetaldehyde, methanol, methyl ethyl ketone, propionaldehyde
[b] Measured as either the sum of acetaldehyde, methanol, methyl ethyl ketone, and propionaldehyde, or as methanol.

What does the NESHAP require for condensate closed collection systems?

Regardless of the emission limit selected, the condensates subject to control must be transported in a closed collection system such that no emissions occur. The NESHAP requirements for closed collection systems are presented below.

This Equipment....	Must Meet ALL of These Requirements....
Closed collection systems used to transport pulping process condensates containing HAPs	All of the individual drain system requirements specified in §63.960, 63.961, and 63.962 of Subpart RR[a] and any air vents in the collection system must meet standards of §63.443 (c) and (d) for the closed-vent systems and HAP reductions for kraft pulping system vent emissions
Condensate tanks used in the closed collection system	Operate with no detectable leaks (500 ppmv VOC above background) **and** Vent emissions to a closed-vent system (see page 54) and route to a control device (see page 53) **and** When the tank contains pulping process condensates or any HAP removed from the pulping condensate stream, all openings must be kept in a closed, sealed position - except during sampling, inspection, maintenance, or repair operations

*The condensate tank requirement applies only to tanks used to store or handle the regulated condensates, **not** tanks used to store weak liquor.*

[a] Subpart RR of 40 CFR 63 (National Emission Standards for Individual Drain Systems) establishes design, operating, inspection, and monitoring requirement standards for controlling air emissions from individual drain systems. The standards control emissions from individual drain systems using covers or seals, or hard-piping. Subpart RR also requires inspections of water seals and closure devices for defects or damage initially and establishes repair requirements for individual drain systems. The NESHAP requires inspection every 30 days.

The mill can meet the closed collection system requirements in two ways:

- Hardpiping
- Use existing drains, but cover all openings and route all open vents through a closed-vent collection system to a control device meeting the NESHAP requirements for pulping system vents.

If there are air vents off the closed collection system, these vents must be routed to a closed-vent system. These air vents must comply with the kraft pulping system standards for closed-vent systems and HAP emissions (see pages 53 and 54).

When must a mill be in compliance?

Mills must achieve compliance with the pulping process condensate requirements by April 16, 2001.

How does a mill demonstrate initial compliance for kraft pulping process condensate standards?

Mills must conduct a performance test to demonstrate initial compliance. A performance test is required for each closed collection system and treatment option.

With respect to pulping condensates, the performance test serves four purposes:

For demonstrating initial compliance for the kraft pulping process condensate standards, total HAPs are measured as acetaldehyde, methanol, methyl ethyl ketone, and propionaldehyde

(1) **To demonstrate that the appropriate condensate streams are being collected and treated**. The options for determining the streams to be collected and controlled are presented on page 61. If a mill uses one of the volume reduction options, the NESHAP requires documentation to support the choice. For example, if a mill opts to control condensate streams based on mass of total HAPs, the mill must present test results to support that a complying mass of the total HAPs is collected. Even in the case where a mill chooses to collect and treat all pulping condensate streams, the mill must demonstrate that **all** of the condensate streams have been identified and collected.

(2) **To demonstrate that the closed collection system does not allow any emissions to occur**. Refer to page 62.

(3) **To demonstrate that the control device complies with the emission limit**. For all alternative emission limits except biological treatment, the mill can measure either total HAPs or methanol concentration to document compliance with the emission limits. For biological treatment, total HAP concentrations must be measured. See Figure 18.

(4) **To establish the process operating parameter values that must be continuously monitored**. During the performance test, the mill must measure the parameter values that the mill will monitor to indicate continuous compliance. For example, the values of steam feed rate, condensate feed rate, and temperature are specified as the monitoring parameters for steam strippers.

Figure 18.

How Does a Mill Demonstrate Initial Compliance with Kraft Pulping Condensate Emission Limits?

To Demonstrate Initial Compliance With This Emission Limit...	Conduct an Initial Performance Test Following This Method...	To Measure These Parameters...
Recycle the condensate to controlled equipment	None required	None required
Use a biological treatment system to meet 92% reduction or to meet mass limits	Method 305[a] **and**	Total HAPs[b] **and**
	Part 63, Appendix C	Fraction of total HAPs[b] removed (f_{bio})
Treat condensates to meet ≥92% reduction	Method 305[a]	Total HAP[b] or methanol mass at the control device inlet and outlet
Treat the condensates to meet mass limits	Method 305[a]	Total HAP[b] or methanol mass at the control device inlet and outlet
Treat the condensates to meet concentration limits	Method 305[a]	Total HAP[b] or methanol concentration at the control device outlet

[a] The National Council of the Paper Industry for Air Stream Improvement (NCASI) direct injection gas chromotography/flame ionization detection (GC/FID), may be used as an alternative to EPA Method 305 for measuring methanol.

[b] Measured as acetaldehyde, methanol, methyl ethyl ketone, and propionaldehyde.

For the recycle treatment option, the performance test would consist only of verifying that no leaks were present in the closed collection system and confirming closed-vent system and control device requirements.

The test method specified is used to determine liquid stream pollutant concentration. Additional calculations or formulas are specified in the NESHAP to convert the concentration values into the format appropriate to demonstrate compliance with a particular emission limit.

How does a mill demonstrate continuous compliance with pulping process condensate standards?

Mills must install continuous monitors to measure control device operating parameters, except when recycling condensates to controlled process equipment. In addition, quarterly testing is required if a mill chooses to comply using biological treatment. The monitoring requirements depend on the alternative emission limit selected. Figure 19 summarizes the monitoring, reporting, and recordkeeping requirements for each alternative emission limit.

The closed collection system must be visually inspected every 30 days according to the following requirements:

- National Emission Standards for Individual Drain Systems (63.964 subpart RR) requires inspection and monitoring

Figure 19.

How Does a Mill Demonstrate Continuous Compliance with Kraft Pulping Process Condensate Emission Limits?

If a Mill Chooses to Comply With Alternative Emission Limits Using This Technique...	Then Continuously Monitor All of These Parameters...	And Report This Information...	And Keep These Records for 5 Years...
Recycle the condensate to controlled equipment	None required	None required	None required
Steam stripper (percent reduction, concentration, or mass limits)	Process wastewater feed rate	• Semi-annual emissions and continuous monitoring performance report • If exceedences occur, then quarterly reports are required (40 CFR 63.10(e))	Process wastewater feed rate
	Steam feed rate	Same as above	Steam feed rate
	Process wastewater column feed temperature	Same as above	Process wastewater column feed temperature
Steam stripper (concentration)	Steam stripper outlet concentration	Same as above	Steam stripper outlet concentration
Biological treatment system	Quarterly test of HAP percent reduction or mass removal[a]	Same as above	HAP percent reduction or mass removal
	Outlet soluble BOD5[b]	Same as above	Outlet soluble BOD_5
	Mixed liquor volatile suspended solids[b]	Same as above	Mixed liquor volatile suspended solids
	Horsepower of aerator units[b]	Same as above	Horsepower of aerator units
	Inlet liquid flow[b]	Same as above	Inlet liquid flow
	Liquid temperature[b]	Same as above	Liquid temperature
Other device	Operating parameters demonstrated to the Administrator's satisfaction	Same as above	Parameters approved by the Administrator
Volume reduction options	Same as above	Same as above	Same as above

[a] The initial performance test and annual 1st quarter mass removal or percent reduction tests must be performed for acetaldehyde, methanol, methyl ethyl ketone, and propionaldehyde. However, if the ratio between the four HAPs and methanol is established in the 1st quarter, methanol can be used in the 2nd, 3rd, and 4th quarter tests instead of performing the test for the four HAPs.

[b] Site-specific monitoring parameters may be used instead of those parameters specified in the NESHAP.

- Subpart S requires reporting and recordkeeping of all visual inspection results. Semi-annual reports must be submitted. If exceedences occur, then quarterly reports are required.

Although there are no explicit back-up control requirements as part of the NESHAP, back-up controls may be necessary for mills that are concerned that the excess emission allowance is inconsistent with expected control device operating experience.

Must a mill comply at all times?

The NESHAP provides a 10 percent excess emissions allowance for all control devices other than biological treatment systems (63 FR 49455). For example, the allowance would include steam stripper tray damage or plugging, efficiency losses in the stripper due to contamination of condensate with fiber or black liquor, steam supply downtime, and combustion control device downtime.

Unlike the pulping standard, the 10 percent allowance for condensates includes excused periods of excess emissions associated with the startup, shutdown, and malfunction.

4.3 Standards for the kraft bleaching system vents

***Bleaching** is the brightening of pulp by the addition of oxidizing or reducing chemicals.*

At kraft mills, the emission limits apply to bleaching systems that use chlorine or chlorinated compounds. The rules have emission limits for both chloroform and chlorinated HAP (excluding chloroform). Kraft mills must comply with both of these requirements. This section describes the emission points that must be controlled, the alternative emission limits, and compliance requirements.

What bleaching emission points must be controlled?

*A **bleaching line** is a group of bleaching stages arranged in a series such that bleaching of the pulp progresses as the pulp moves from one stage to the next. Typically a bleaching line contains 3-5 stages.*

The NESHAP applies only to bleaching lines that use chlorinated compounds and only to the bleaching stages where chlorine or chlorinated compounds are introduced. Extraction stages are not covered. All vents in a regulated stage must be controlled. A stage consists of the following equipment:

- retention towers
- washers
- seal tanks
- chemical and steam mixers (if vented to the atmosphere)
- vacuum pumps (if present)

Are there any exemptions to the bleaching requirements?

Yes. Any bleaching system that does **not** use chlorine or any chlorinated HAP is exempt from **all** NESHAP requirements for bleaching.

What are the control requirements for chlorinated HAPs?

The requirements for enclosures and closed-vent systems are the same as for the pulping system vent standards (page 54).

The equipment at each bleaching stage where chlorinated compounds are introduced must be enclosed and routed via a closed-vent collection system to a control device. The rules provide three alternative emission limits for demonstrating compliance, as shown below. Most mills are expected to use caustic scrubbers to comply.

Bleaching System Gases Must be Collected in a Closed-vent System and Meet One of These Three Alternative Emission Limits[a]...
1. Reduce chlorinated HAP[b] emissions by 99% by weight
2. Achieve a total outlet mass emission rate ≤ 0.002 pounds chlorinated HAPs[b] per ton oven-dried pulp for all subject stages
3. Achieve an outlet concentration of ≤ 10 ppmv chlorinated HAPs[b]

[a] Some mills may be able to meet the outlet concentration or mass limits through use of process modifications (i.e., 100 percent chlorine dioxide substitution). In these cases, enclosures and closed-vent systems are not required.

[b] Chlorinated HAPs (excluding chloroform) may be measured as total chlorinated HAP or as chlorine.

What are the control requirements for chloroform?

The rules provide two alternative emission limits for chloroform control. Both of these options (shown below) require process modifications. A mill can comply by eliminating the use of chlorine and hypochlorite or by complying with the numerical limits of the effluent limitations guidelines and standards for water. If the compliance date for the effluent limitations guidelines and standards is later than for the NESHAP, the earlier NESHAP compliance dates must be met.

To Reduce Chloroform Emissions From the Bleaching Process, Use One of These Two Options...
1. Eliminate the use of chlorine and hypochlorite
2. Comply with applicable Effluent Limitations Guidelines and Standards (40 CFR 430)[a]

[a] Refer to Appendix I for a summary of the wastewater regulations for bleached papergrade kraft mills.

When must bleaching systems comply?

Bleaching Systems Compliance Dates:

Most mills: April 16, 2001

Mills enrolled in VATIP: April 15, 2004

Bleaching systems must comply by April 16, 2001 with two exceptions.

- Mills enrolled in the Voluntary Advanced Technology Incentives Program (VATIP)
- Dissolving grade kraft mills

Voluntary Advanced Technology Incentives Program (VATIP). Under the Effluent Limitations Guidelines and Standards (40 CFR Part 430.24), a mill may choose to enroll one or more of its bleach lines in the Voluntary Advanced Technology Incentives Program. The program provides extended compliance with the water pollution control requirements for bleached papergrade kraft and soda mills in exchange for achieving greater water pollutant reductions than the regulatory baseline. Mills electing this program receive a 3-year extension for complying with the NESHAP bleaching standards (i.e., must comply by April 15, 2004). Three conditions must be met to qualify for the extension.

VATIP is available only to papergrade kraft and papergrade soda mills that discharge directly to receiving waters.

(1) Comply with the interim MACT standard for chloroform emissions by either:

No increase the application rates of either chlorine or hypochlorite (in kg per Mg oven-dried pulp) in the bleaching system beyond the average daily rates used over the three months prior to June 15, 1998,

or

Comply with the enforceable effluent limitations guidelines for 2,3,7,8 - tetrachloro-dibenzo-p-dioxin and adsorbable organic halides at least as stringent as the BAT levels set out in 40 CFR 430.24(a)(1) as expeditiously as possible, but no later than by April 16, 2001.

The application rate limitation and the dioxin and adsorbable organic halide limits are provided to prevent a bleaching system from "backsliding" (i.e., increasing chlorinated bleaching chemical use during the extended compliance period).

(2) Submit a control strategy report by April 1999 (see 63.445(b)).

(3) Submit an updated control strategy report every two years under 63.455(b) until compliance is achieved. The report must contain milestones and status reports for achieving compliance.

The compliance date for dissolving grade kraft mills is not specified in the NESHAP, but is anticipated between 2003-2005.

Dissolving grade kraft mills must comply within 3 years after publication of revised effluent limitations guidelines and standards under 40 CFR 430.14 through 430.17 and 40 CFR 430.44 through 430.47. These rules are scheduled to be revised sometime between 2000 and 2002.

How does a mill demonstrate initial compliance with the bleaching standards?

Chlorinated HAPs. Mills must demonstrate initial compliance with chlorinated HAP standards by conducting an initial performance test for each bleaching stage where chlorine or chlorinated compounds are introduced.

The initial performance test has two objectives:

(1) **To demonstrate that the control device complies with the emission limit.**

(2) **To demonstrate that the closed-vent system captures and contains all HAP emissions.** Refer to Figure 16.

(3) **To establish the process operating parameter values that must be monitored to demonstrate continuous compliance.**

At the option of the mill, compliance may be demonstrated by measuring either total chlorinated HAPs (including chloroform) or chlorine concentration. The following methods must be used:

Chlorinated HAPs	-	Any method that has been demonstrated to the Administrator's satisfaction.
Chlorine	-	Method 26A, as modified by 63.457(b)(5) of the rules.

Chloroform. No initial performance test is required if the mill chooses to eliminate use of chlorine and chlorinated HAPs. The mill must demonstrate in the initial notification that is not using these chemicals. Alternatively, if a mill chooses to comply with the Effluent Limitations Guidelines and Standards, then all compliance demonstration requirements of 40 CFR 430 apply.

How does a kraft mill demonstrate continuous compliance with the bleaching standards?

Continuous monitoring is required unless a mill complies by eliminating all use of chlorine or chlorinated compounds as bleaching agents.

For chlorinated HAPs, mills must install a continuous monitoring system to measure either emissions, or control device or process operating parameters. The monitoring, reporting, and recordkeeping requirements are summarized in Figure 20.

In addition, the mill must conduct periodic inspection and maintenance of all enclosures and closed-vent systems. These requirements are explained below. The mill must maintain a site-specific inspection plan for the enclosures and closed-vent system. Records of repairs based on the inspections must also be kept.

These same demonstrations are required as part of the initial performance test.

If the System has...	Then Inspect...	And Report...	And Keep Records of...
Enclosure opening	Visually inspect every 30 days to ensure closed and sealed	Any exceedences of the closed-vent standard in quarterly reports. If no exceedences occur, submit semi-annual reports.	All visual checks and any repairs
	Annually demonstrate negative pressure	Same as above	All pressure tests
Closed-vent system	Visually inspect every 30 days for visible defects	Same as above	All visual checks and repairs
Positive pressure closed-vent system	Annually demonstrate no detectable leaks (less than 500 ppmv)	Same as above	All leak tests
Bypass line valve	Inspect every 30 days to ensure valve is in a closed position and vent stream is not diverted through bypass line	Same as above	All visual checks and repairs

Note: This is the same table as the one presented on page 57.

For chloroform, if the mill chooses to eliminate the use of hypochlorite and chlorine, then no parametric monitoring is required to show continuous compliance. If the mill chooses not to eliminate the use of hypochlorite and chlorine, then the mill must comply with the effluent limitations guidelines and standards.

Figure 20.

How Does a Kraft Mill Demonstrate Continuous Compliance with Emission Limits for Chlorinated HAPs?

If a Mill Chooses This Technique to Comply With This Alternative Emission Limit...	Continuously Monitor These Parameters...	Report This Information...	And Keep These Records for 5 Years...
Gas scrubber to reduce chlorinated HAP emissions by 99% by weight or to achieve an outlet mass emission rate ≤ 0.002 pounds chlorinated HAPs per ton oven-dried pulp	pH or oxidation/reduction potential of effluent	• Semi-annual emissions and continuous monitoring performance report • If exceedences occur, then quarterly reports are required (40 CFR 63.10(e))	pH or oxidation/reduction potential of effluent
	Vent gas inlet flow rate	Same as above	Vent gas inlet flow rate
	Scrubber liquid influent flow rate	Same as above	Scrubber liquid influent flow rate
Gas scrubber to achieve an outlet concentration of chlorinated HAPs ≤ 10 ppmv	Chlorine concentration at the outlet or measure all three of the following parameters	Same as above	Chlorine concentration or all of the following
	pH or oxidation/reduction potential of effluent	Same as above	pH or oxidation/reduction potential of effluent
	Vent gas inlet flow rate	Same as above	Vent gas inlet flow
	Scrubber liquid influent flow rate	Same as above	Scrubber liquid influent flow rate
Any control device other than a gas scrubber or process modifications	Determine appropriate monitoring parameter values during the initial performance test[a]	Same as above	Parameters approved by the Administrator

[a] As specified in 40 CFR Part 63.453(n)

Mills in the voluntary advanced technology incentives program must monitor compliance in the interim!

If a mill chooses the "no backsliding" alternative to comply with the interim MACT standard for chloroform emissions, the NESHAP specifies monitoring, reporting, and recordkeeping requirements. These requirements, which are summarized in the figure below, apply from June 1998 up to the time that the mill demonstrates compliance with all the applicable bleaching system emission limits. The NESHAP does not specify monitoring, reporting, and recordkeeping requirements for mills that choose to comply with the BAT levels for 2,3,7,8, - tetrachloro-dibenzo-p-dioxin and adsorbable organic halides instead of the "no backsliding" alternative.

If a Mill Chooses This Interim Emission Limit...	Then Continuously Monitor These Parameters...	And Report This Information...	And Keep These Records for 5 Years...
No increase in the use of hypochlorite and chlorine	Chlorine and hypochlorite application rates in lb/ton oven-dried pulp (daily average)	An initial control strategy report by April 1999 that meets the requirements of 63.455. Updated control strategy report every 2 years. and Daily application rates of chlorine and hypochlorite must be reported every six months	Daily application rates
Comply with the BAT levels for 2,3,7,8 - tetrachloro-dibenzo-p-dioxin and adsorbable organic halides	None[a]	None[a]	None[a]

[a]Comply with any monitoring, reporting, and recordkeeping requirements of the BAT permit.

4.4 Clean condensate alternative for HVLC vents

The CCA applies only to the kraft HVLC system:
- *washers*
- *knotters and screens*
- *deckers*
- *oxygen delignification*

The clean condensate alternative (CCA) is a pollution prevention alternative emission limit for pulping vents that is available only to kraft HVLC systems. The CCA allows mills to meet the HVLC emission limits by reducing the HAP concentration in the process waters that are recycled to other pieces of process equipment. This approach allows mills to control HAP emissions by reducing the amount of HAPs that are volatilized from selected process equipment instead of using combustion devices to control HVLC system vent streams. By reducing the HAP concentration in process water, the amounts of volatilized HAPs are also reduced.

To achieve compliance, the facility must demonstrate that the HAP emission reductions using the CCA technology are equal to or greater than those emission reductions that would have been achieved through compliance with the HVLC system requirements.

For example, a mill could use a stand-alone biological treatment device to reduce the total HAP concentration in pulping process condensates. The effluent from the stand-alone biological treatment device could be used as process water in the pulping washing system and causticizing system. In this scenario, initial compliance using the CCA would be demonstrated by showing that the reduction of emissions from both the pulping washing system and causticizing system is equal to or greater than the reductions that would have been achieved by applying the pulping vent standards to the pulp washing system vent emissions.

Which equipment systems can be used to generate the emission reductions?

The CCA is similar to emission averaging.

Process condensates are recycled throughout the mill. The CCA allows mills to take credit for emission reductions achieved in several systems through the use of CCA technologies.

Sources From Which Emission Reductions Can be Credited...
• Pulping systems (HVLC) • Bleaching systems • Causticizing systems • Papermaking systems

What emission reductions are creditable?

A CCA technology must achieve the emission reductions by removing HAPs from condensate streams. The CCA emission reductions are generated by either of two methods:

The concept of the CCA is the reduction of HAP emissions through reduction of HAP concentration in process water.

- control of condensates that are not regulated under the kraft pulping condensate standard
- control beyond the levels required by the condensate standard

Emission reductions from add-on controls on vent streams do not count.

Can a mill use the CCA for only part of the emission reduction requirement for the HVLC system?

The CCA can be used by both new and existing sources.

Yes. The HAP emission reductions resulting from the CCA can be used as partial or complete fulfilment of the emission reductions required for the HVLC pulping standard. For example, a mill may elect to use the CCA in lieu of vent controls for the washer system, but comply by using vent controls for the rest of the HVLC system.

How does a mill use the CCA?

A mill must follow these steps to implement the CCA:

All CCA emission reductions must be based on actual test data.

(1) Determine baseline emissions. Baseline emissions are to be measured after compliance has been achieved with all of the following:

- Kraft pulping process condensate standards
- All effluent limitations guidelines and standards in 40 CFR subpart B
- Emission reductions attributable to control technology required by local, State, or Federal agencies

Furthermore, baseline emissions must include any control equipment installed and operated before December 17, 1993.

(2) Calculate emission reductions that would have been achieved through compliance with the kraft pulping HVLC system standards.

(3) Measure emissions reductions achieved by the CCA.

$$\text{Emission reductions achieved by the CCA} = \text{Baseline emissions} - \text{Emission levels after the CCA has been implemented}$$

(4) Demonstrate compliance through the CCA by documenting that emission reductions achieved through the CCA are greater than or equal to emission reductions that would have been achieved through compliance with the kraft pulping HVLC system standards.

How does a mill demonstrate initial compliance?

A mill must conduct a performance test before and after CCA implementation. Baseline emission levels and all CCA emission reductions must be based on actual test data.

How does a mill demonstrate continuous compliance?

The control strategy using the CCA will vary among mills, depending on mill configuration and emission points selected. Thus, the monitoring and reporting requirements for the CCA are not specified in the rules. Each mill must propose monitoring, reporting, and recordkeeping requirements for the Administrator's approval.

What approvals are required to use the CCA?

Since the CCA applies only to the HVLC system, the compliance date for existing sources is April 17, 2006.

Mills that opt to use the CCA must submit a CCA control strategy report along with the initial notification. Updates are required every 2 years. The requirements of the control strategy report are specified at 40 CFR 63.455(b) and 40 CFR 63.447(g).

The mill must report to the Administrator by the final compliance date the rationale, calculations, test procedures, and data used to demonstrate compliance. The Administrator will make the final compliance determination.

4.5 How do the requirements for the NSPS and the NESHAP compare?

In addition to TRS, the NSPS limits particulate matter from recovery furnaces, smelt dissolving tanks, and lime kilns

The kraft NSPS (40 CFR 60, subpart B) contains TRS emission limits for the following sources: the digester system, brown stock washer system, evaporator system, recovery furnace, smelt dissolving tank, lime kiln, and condensate stripper system. The kraft NSPS applies to equipment that was constructed, modified, or reconstructed after September 24, 1976. Because the pulp and paper NESHAP (subpart S) does not cover recovery furnaces, smelt dissolving tanks, or lime kilns, the only equipment systems that have overlapping NSPS and the NESHAP requirements are the digester, brown stock washer, evaporator, and condensate stripper systems.

To demonstrate compliance with the NSPS and NESHAP (subpart S), it is possible that the same device could be used to control emissions from these equipment systems. Figure 21 compares the NSPS and NESHAP emissions limits for the control devices that are likely to be used to comply with both of these regulations. Note that only one control option (the thermal oxidizer design requirement of 1600°F for 0.75 seconds) automatically satisfies both the NESHAP and NSPS requirements. For all of the other potential control devices mills must demonstrate compliance with both the NSPS and the NESHAP.

The MACT control technologies can be used to comply with the NSPS limits for TRS, but mills still must demonstrate that the NSPS emission limits for TRS are being met.

A thermal oxidizer is the only option where meeting the NESHAP automatically meets the NSPS for TRS.

Figure 21.

Comparison of NESHAP (Subpart S) and NSPS (TRS) Emission Limit Requirements

If a Mill Uses This Control Option...	The NSPS Requires...	And the NESHAP Requires...	Does NESHAP Compliance Ensure NSPS Compliance?
Lime Kiln[a]	A maximum TRS outlet concentration of 8 ppmv corrected to 10% oxygen	Vent streams be introduced with primary fuel or into the flame zone	No
Recovery Furnace[a]	Straight recovery: A maximum TRS outlet concentration of 5 ppmv corrected at 8% oxygen	Vent streams be introduced with primary fuel, into the flame zone, or with the combustion air	No
	Cross recovery: A maximum TRS outlet concentration of 25 ppmv corrected to 8% oxygen	Same as above	No
Power Boiler	1200°F for 0.5 second	Vent streams be introduced with primary fuel, into the flame zone, or with the combustion air	No
Thermal Oxidizer or other combustion device[b]	1200°F for 0.5 second	1600°F for 0.75 second	Yes
		or	
		20 ppmv total HAPs or methanol at 10% oxygen	No
		or	
		98% reduction by weight of total HAPs or methanol	No
Other noncombustion devices	5 ppmv TRS at actual oxygen content of untreated stream	20 ppmv total HAPs or methanol at 10% oxygen	No
		or	
		98% reduction by weight of total HAPs or methanol	No

a The NSPS requirements are only for those devices that are subject to the NSPS.

b The gases are combusted with other waste gases in an incinerator or other device, or combusted in a lime kiln or recovery furnace not subject to the NSPS (60.283 (a)(1)(iii)).

Chapter 5 - NESHAP Requirements for Semi-Chemical and Soda Mills

For semi-chemical and soda mills, the NESHAP contains emission standards for pulping system vents and bleaching system vents. There are several alternative emission limits for both processes, and mills can choose the emission limits with which to comply.

*The NESHAP requirements for **semi-chemical and soda mills** are similar to the requirements for kraft mills except that pulping process condensates are not **regulated** at semi-chemical and soda mills.*

The requirements in the NESHAP for semi-chemical and soda mills are described in this chapter.

If You Need the Following Information...	Then Read...
Standards for semi-chemical and soda pulping system vents	Section 5.1
Standards for semi-chemical and soda bleaching system vents	Section 5.2

5.1 Standards for semi-chemical and soda pulping system vent standards

What pulping system vents must be controlled?

For purposes of this NESHAP, the LVHC system includes all vents from:
- *digester system*
- *turpentine recovery system*
- *evaporator system*

For semi-chemical and soda mills, the NESHAP does not apply to existing HVLC systems.

The NESHAP requires certain equipment in the pulping systems at semi-chemical and soda mills to be enclosed, collected in a closed-vent system, and then vented to a control device.

The Following Pulping System Vents Must be Controlled...
Existing Sources
• LVHC system
New Sources
• LVHC system
• Pulp washing system

Each equipment system has multiple emission points. For example, the pulp washing system can include vacuum drum washers, diffusion washers, rotary pressure washers, horizontal belt filters, intermediate stock chests, associated vacuum pumps, filtrate tanks, and foam breakers. A complete list of the emission points in each equipment system is provided in Appendix F.

What are the emission limits for semi-chemical and soda pulping system vents?

The NESHAP does not provide the Clean Condensate Alternative to semi-chemical and soda pulping systems because the Clean Condensate Alternative was provided to kraft mills as an option for meeting the HVLC system emission limits.

HVLC systems at existing semi-chemical and soda mills are not regulated by the NESHAP.

The emissions from semi-chemical and soda pulping system vents must meet one of five alternative emission limits, as shown below. These emission limits apply to each control device used to control HAP emissions. A mill will likely use several closed-vent systems and control devices (including both add-on control devices and existing combustion devices) and each can comply with any of these five alternative emission limits. These emission limits apply to both new and existing sources.

Pulping System Vent Gases Must be Collected in a Closed-vent System and Routed to One of These Five Control Devices...	
1.	Any control device that reduces total HAP emissions by ≥98% by weight, measured as total HAPs or methanol
2.	A boiler, lime kiln, or recovery furnace with a heat input capacity of at least 150 MMBtu/hr in which the HAP gas stream is introduced with the combustion air
3.	A boiler, lime kiln, or recovery furnace in which the HAP gas stream is introduced with the primary fuel or into the flame zone
4.	A thermal oxidizer operated at a minimum temperature of 1,600°F and a minimum residence time of 0.75 seconds
5.	A thermal oxidizer that reduces the total HAP concentration at the outlet to ≤ 20 ppmv corrected to 10% O_2 on a dry basis, measured as total HAPs or methanol

Note: These emission limits are the same as for kraft mills (see page 53).

What does the NESHAP require for enclosures and closed-vent systems at semi-chemical and soda mills?

All regulated equipment system vents must be enclosed and routed through a closed-vent system to the control device that is selected for compliance. The requirements for enclosures and closed-vent systems are presented below. The requirements are intended to prevent leaks and ensure that process openings (e.g., sampling ports on a brown stock washer enclosure) are closed while the mill is in operation.

*A closed-vent **system** means a system that is not open to the atmosphere and comprises piping, ductwork, connections, and if necessary, flow-inducing devices that transport gas or vapor from an emission point to a control device.*

This Equipment....	Must Meet These Requirements....
Enclosures, openings, and hoods	Maintain negative pressure **and** If closed during the initial performance test, must be closed during operation except for sampling, inspection, maintenance, or repairs
Components operated at positive pressure	Operate with no detectable leaks (500 ppmv VOC above background)
Bypass lines that could divert vent stream containing HAPs to the atmosphere	Seal and secure the opening so that the valve or closure mechanism cannot be opened without breaking the seal **or** If computer controlled, monitor for presence of gas stream flow at least once every 15 minutes

Note: These requirements are the same as for kraft mills (presented on page 54).

When must mills comply with the semi-chemical and soda pulping process standards?

Because semi-chemical and soda mills are not affected by the Effluent Limitations Guidelines and Standards, the NESHAP does not allow these mills any extended compliance times.

Pulping systems at semi-chemical and soda mills must comply with the MACT standards by April 16, 2001.

How does a mill demonstrate initial and continuous compliance with the pulping system vent standards?

A mill must demonstrate compliance through an initial performance test and then continuously monitor a set of control device operating parameters for each closed-vent system and control device. When complying by venting gases to a boiler, lime kiln, or recovery furnace, the initial performance test must demonstrate that the gases are being introduced with the primary fuel or into the flame zone. If the boiler, lime kiln, or recovery furnace has a heat input capacity of at least 150 MMBtu/hr, the initial performance test must demonstrate that the HAP gases are introduced with the combustion air.

The initial and continuous compliance requirements for semi-chemical and soda mills are identical to those for kraft mills. Please read pages 56 through 59 of this document.

Must a mill comply at all times?

The excess emission allowances are the same for kraft, semi-chemical, and soda mills. Refer to page 59 for additional details.

For pulping system vents, the NESHAP establishes an allowable percent of operating time during which HAP emission levels in excess of the established limit shall not be considered to be a violation of the standard.

For soda and semi-chemical mills, the excess emission allowances are:

- 1 percent of operating time for control devices used for LVHC system vents
- 4 percent of operating time for control devices used for pulp washing systems (HVLC)
- 4 percent of operating time for control devices used for combined LVHC and pulp washing system vents (i.e., controlled by the same device)

5.2 Standards for bleaching system vents at semi-chemical and soda mills

Semi-chemical mills

Generally, semi-chemical mills in the United States do not have bleaching systems and therefore are not subject to bleaching standards. Technically, the rule would apply if a semi-chemical mill installed a bleaching system using chlorine. While this is not expected to occur, such a mill would have to comply with the emission standards for chlorinated HAPs (excluding chloroform) from bleaching vents. The rule would not apply to bleaching systems using chlorinated compounds other than chlorine. Refer to Section 4.3 for information about bleaching standards, excluding the chloroform standard.

Soda mills

Currently, there is only one soda mill operating in the U.S.

At soda mills, emission limits apply to bleaching systems that use chlorine or chlorinated compounds. The emission standards and compliance demonstration requirements for soda mills are the same as for kraft mills (presented in Section 4.3) and are not repeated in this chapter. Refer to the following pages for specific information.

- Emission points to be controlled—page 68
- Control requirements for chlorinated HAPs and chloroform—page 69
- How to demonstrate initial compliance—page 71
- How to demonstrate continuous compliance—page 72.

Chapter 6 - NESHAP Requirements for Sulfite Mills

For sulfite mills, the NESHAP contains emission standards for pulping system vents and bleaching system vents.

The NESHAP contains two alternative emission limits for pulping system vents. A mill can choose to comply with either limit. Different numerical emission limits are specified for calcium- and sodium-based pulping systems than for magnesium- and ammonium-based pulping systems.

The NESHAP also contains several alternative emission limits for bleaching process system vents. The NESHAP does not regulate pulping process condensates at sulfite mills.

If You Need the Following Information...	Then Read...
Standards for sulfite pulping system vents	Section 6.1
Standards for sulfite bleaching system vents	Section 6.2

6.1 Standards for sulfite pulping system vents

The NESHAP requires the pulping systems to be enclosed, collected in a closed-vent system, and then vented to a control device. This section describes the emission points that must be controlled, the two alternative emission limits, and the compliance requirements.

What sulfite pulping system vents must be controlled?

The emission limits are the same for existing and new sources.

The NESHAP specifies that all the vents from the digester system, evaporator system, and pulp washing systems must be controlled. Additional equipment must be controlled at new sources. These pulping system vents are identified below.

Appendix C contains a flowchart summary of the NESHAP.

The Following Pulping System Vents Must be Controlled...
Existing Sources
• Digester system
• Evaporator system
• Pulp washing system
New Sources
• Same as existing sources plus...
• All weak liquor storage tanks
• All strong liquor storage tanks
• All acid condensate storage tanks

Each equipment system has multiple emission points. For example, the evaporator system comprises pre-evaporators, multi-effect evaporators, concentrators, vacuum systems, associated condensers, hot wells, and condensate streams. A complete list of the emission points in each equipment system is provided in Appendix F.

What are the emission limits for sulfite pulping system vents?

These emission limits apply to the entire source, not to individual pieces of equipment as do the emission limits for pulping system vents at other mills.

The sulfite pulping system vents must meet either a percent reduction or mass emission limit identified for the specific type of sulfite pulping process (i.e., calcium- and sodium-based or magnesium- and ammonium-based pulping processes). The emission limits apply to the combined emissions from both the regulated equipment and any vents, wastewater, and condensate streams generated from any control device used to reduce the HAP emissions. Therefore, a mill must choose either the percent reduction or the mass emission format and demonstrate compliance with the emission limit using the combined emissions from the entire pool of regulated equipment. Compliance may not be demonstrated at individual pieces of equipment or individual closed-vent systems.

Outlet emission level and percent reduction requirements must account for HAP releases from vents, condensates, and wastewater from control devices used to reduce HAP emissions.

If the Sulfite Pulping System is This Type...	Then Choose One of the Following Emission Limits...
Calcium-based and Sodium-based	Reduce total HAP concentration to ≤0.89 lb/ton oven-dried pulp, measured as total HAPs or methanol **or** Reduce total HAP emissions by ≥92% by weight, measured as total HAPs or methanol
Ammonium-based and Magnesium-based	Reduce total HAP concentration to ≤2.2 lb/ton oven-dried pulp, measured as total HAPs or methanol **or** Reduce total HAP emissions by ≥87% by weight, measured as total HAPs or methanol

What does the NESHAP require for enclosures and closed-vent systems?

All regulated equipment systems must be enclosed and routed through a closed-vent system to the control device that is selected for compliance. The requirements for enclosures and closed-vent systems are presented below. The requirements are intended to prevent leaks and ensure that process openings (e.g., sampling ports on a brown stock washer enclosure) are closed while the mill is in operation.

*A closed-vent **system** means a system that is not open to the atmosphere and comprises piping, ductwork, connections, and if necessary, flow-inducing devices that transport gas or vapor from an emission point to a control device.*

This Equipment....	Must Meet These Requirements....
Enclosures, openings, and hoods	Maintain negative pressure **and** If closed during the initial performance test, must be closed during operation except for sampling, inspection, maintenance, or repairs
Components operated at positive pressure	Operate with no detectable leaks (500 ppmv VOC above background)
Bypass lines that could divert vent stream containing HAPs to the atmosphere	Seal and secure the opening so that the valve or closure mechanism cannot be opened without breaking the seal **or** If computer controlled, monitor for presence of gas stream flow at least once every 15 minutes

Note: These requirements are the same as for kraft mills (presented on page 54).

When must mills comply with the sulfite pulping process requirements?

Affected sources at sulfite mills must comply with the NESHAP by April 16, 2001.

How does a mill demonstrate initial compliance with the sulfite pulping system vent standards?

A mill must demonstrate compliance through an initial performance test. Total HAP may be measured as methanol using Method 308.

The initial performance test has three objectives:

(1) **To demonstrate that the control device complies with the emission limit.**

(2) **To demonstrate that the closed-vent system captures and contains all HAP emissions.** Refer to Figure 23.

(3) **To establish the process operating parameter values that must be monitored to demonstrate continuous compliance.** For example, at a calcium-based and sodium-based sulfite mill, the vent gas flow rate, scrubbing media flow rate, and pH of the scrubber effluent that indicate 92 percent reduction by weight of total HAPs or methanol using Method 308.

How does a mill demonstrate continuous compliance with the sulfite pulping system vent standards?

The excess emissions allowance (for kraft, semi-chemical, and soda mills) does NOT apply to sulfite mills.

Mills must install a continuous monitoring system to measure either control device or process operating parameters. Control device (other than gas scrubbers) or process parameters to be monitored are determined by the facility (i.e., site-specific). Continuous monitors for the selected parameters are required to demonstrate continuous compliance. Figure 24 presents the continuous compliance monitoring requirements.

In addition, the mill must comply with the requirements for periodic inspection and maintenance of all enclosures and closed-vent systems. These requirements are explained in Figure 23. The mill must maintain a site-specific inspection plan for the enclosures and closed-vent system. Records of repairs based on the inspections must also be kept.

Figure 23.

How Does a Mill Demonstrate Initial and Continuous Compliance with the Closed-Vent Systems Standard?

These same tests are required as part of the initial performance test.

If the System has...	Then Inspect...	And Report...	And Keep Records of...
Enclosure opening	Visually inspect every 30 days to ensure closed and sealed	Any exceedences of the closed-vent standard in quarterly reports. If no exceedences occur, submit semi-annual reports	All visual checks and any repairs
	Annually demonstrate negative pressure	Same as above	All pressure tests
Closed-vent system	Visually inspect every 30 days for visible defects	Same as above	All visual checks and repairs
Positive pressure closed-vent system	Annually demonstrate no detectable leaks (less than 500 ppmv)	Same as above	All leak tests
Bypass line valve	Inspect every 30 days to ensure valve is in a closed position and vent stream is not diverted through bypass line	Same as above	All visual checks and repairs

Note: These are the same requirements as for kraft mills (presented on page 57).

Figure 24.

How Does a Mill Demonstrate Continuous Compliance with the Sulfite Pulping System Vent Standards?

If the Sulfite Pulping System is This Type...	And the Mill Chooses This Alternative Emission Limit...	And the Mill Chooses This Technique...	Continuously Monitor These Parameters...	And Report This Information...	And Keep These Records for 5 Years...
Calcium-based and Sodium-based	Reduce total HAP[a] concentration at the outlet to ≤0.89 lb/ton or reduce total HAP[a] emissions by ≥92% by weight	Gas scrubber	pH or oxidation/reduction potential of effluent Vent gas inlet flow rate Scrubber liquid influent flow rate	• Semi-annual emissions and continuous monitoring performance report • If exceedences occur, then quarterly reports are required (40 CFR 63.10(e))	pH or oxidation/ reduction potential of effluent Vent gas inlet flow rate Scrubber liquid influent flow rate
		Site-specific parameters	Determine appropriate monitoring parameter values during the initial performance test[b]	Same as above	Parameters approved by the Administrator
Ammonium-based and Magnesium-based	Reduce total HAP[a] concentration at the outlet to ≤2.2 lb/ton or reduce total HAP[a] emissions by ≥87% by weight	Same as above	Same as above	Same as above	Same as above

[a] Methanol may be used as a surrogate for total HAPs.
[b] As specified in 40 CFR Part 63.453(a).

6.2 Standards for sulfite bleaching system vents

At sulfite mills the emission limits apply to bleaching systems that use chlorine or chlorinated compounds. The NESHAP has emission limits for both chloroform and chlorinated HAP. Sulfite mills must comply with both of these requirements. The emission standards and compliance demonstration requirements for sulfite mills are the same as for kraft mills (presented in Section 4.3) and are not repeated in this chapter. Refer to the following pages for specific information.

- Emission points to be controlled—page 68
- Control requirements for chlorinated HAPs and chloroform—page 69
- How to demonstrate initial compliance—page 71
- How to demonstrate continuous compliance—page 72.

When must sulfite bleaching systems comply?

Bleaching systems must comply by April 16, 2001 with one exception.

The compliance date for dissolving grade sulfite mills is not specified in the NESHAP, but is anticipated between 2003-2005.

- **Dissolving grade sulfite mills** must comply within 3 years after publication of revised effluent limitations guidelines and standards under 40 CFR 430.14 through 430.17 and 40 CFR 430.44 through 430.47. These rules are scheduled to be revised sometime between 2001 and 2002.

Chapter 7 - NESHAP Requirements for Mechanical, Secondary Fiber, and Non-wood Fiber Pulp Mills

***Secondary fiber** means recycled fiber.*

The NESHAP regulates bleaching system vents for mechanical pulping, secondary fiber, and non-wood fiber pulp mills. The NESHAP applies to bleaching systems that use chlorine or chlorine dioxide, and has identical requirements for mechanical, secondary fiber, and non-wood fiber processes.

The pulping process system vents and condensates are not regulated at these mills.

7.1 Standards for bleaching system vents

The chloroform control requirements of the NESHAP do not apply to bleaching systems at these types of mills.

At mechanical, secondary fiber, and non-wood fiber pulp mills the NESHAP regulates chlorinated HAPs (excluding chloroform). The emission limits apply to bleaching systems that use chlorine or chlorine dioxide. However, if a bleaching system for one of these processes also accepts pulp from a kraft, semi-chemical, soda, or sulfite process, then more stringent bleaching system requirements will apply (i.e., the bleaching system also must meet the chloroform control requirements).

What mechanical, secondary fiber, and non-wood fiber bleaching system emission points must be controlled?

Typically, a bleaching line contains 3-5 stages.

The NESHAP applies only to bleaching stages that use chlorine or chlorine dioxide. Extraction stages are not covered. All vents in a regulated stage must be controlled. A stage consists of the following equipment:

- retention towers
- washers
- seal tanks
- chemical and steam mixers (if vented to the atmosphere)
- vacuum pumps (if present)

Are there any exemptions to the bleaching requirements?

Yes. Any bleaching system that does **not** use chlorine or chlorine dioxide is exempt from **all** NESHAP requirements for bleaching.

What are the control requirements for chlorinated HAPs?

There are no control requirements for chloroform at these other types of mills.

The equipment at each bleaching stage where chlorinated compounds are introduced must be enclosed and routed via a closed-vent collection system to a control device. The rule provides three alternative emission limits for demonstrating compliance, as shown below. Most mills are expected to use caustic scrubbers to comply.

The requirements for enclosures and closed-vent systems are the same as for the pulping system vent standards (page 54).

Bleaching System Gases Must be Collected in a Closed-vent System and Meet One of These Three Alternative Emission Limits[a] ...	
1.	Reduce chlorinated HAP[b] emissions by 99% by weight
2.	Achieve a total outlet mass emission rate ≤ 0.002 pounds chlorinated HAPs[b] per ton oven-dried pulp for all subject stages
3.	Achieve an outlet concentration of chlorinated HAPs[b] ≤ 10 ppmv

[a] Some mills may be able to meet the outlet concentration or mass limits through use of process modifications (i.e., 100 percent chlorine dioxide substitution). In these cases, enclosures and closed-vent systems are not required.

[b] Chlorinated HAPs (excluding chloroform) may be measured as total chlorinated HAP or as chlorine.

Note: These emission limits are the same for kraft mills (presented on page 69).

When must mechanical, secondary fiber, and non-wood fiber bleaching systems comply?

All mechanical, secondary fiber, and non-wood fiber processes must comply with the chlorinated HAP control requirements by April 16, 2001

How does a mill demonstrate initial compliance with the bleaching standards?

Chlorinated HAPs. The mill must demonstrate initial compliance with chlorinated HAP standards by conducting an initial performance test for each bleaching stage where chlorine or chlorinated compounds are introduced.

The initial performance test has three objectives:

(1) **To demonstrate that the control device complies with the emission limit.**

(2) **To demonstrate that the closed-vent system captures and contains all HAP emissions.** Refer to Figure 16.

(3) **To establish the process operating parameters that must be monitored to demonstrate continuous compliance.**

At the option of the mill, compliance may be demonstrated by measuring either total chlorinated HAPs or chlorine concentration. The following methods must be used:

Chlorinated HAPs	-	Any method that has been demonstrated to the Administrator's satisfaction.
Chlorine	-	Method 26A, as modified by 63.457(b)(5) of the rule.

How does a mill demonstrate continuous compliance with the bleaching standards?

Continuous monitoring is required unless a mill complies by eliminating all use of chlorine or chlorinated compounds as bleaching agents.

For chlorinated HAPs, a continuous monitoring system must measure either emissions, or control device or process operating parameters. The monitoring, reporting, and recordkeeping requirements are summarized in Figure 25.

In addition, the mill must conduct periodic inspection and maintenance of all enclosures and closed-vent systems. These requirements are explained below. The mill must maintain a site-specific inspection plan for the enclosures and closed-vent system. Records of repairs based on the inspections must also be kept.

These same tests are required as part of the initial performance test.

If the System has...	Then Inspect...	And Report...	And Keep Records of...
Enclosure opening	Visually inspect every 30 days to ensure closed and sealed	Any exceedences of the closed-vent standard in quarterly reports. If no exceedences occur, submit semi-annual reports.	All visual checks and any repairs
	Annually demonstrate negative pressure	Same as above	All pressure tests
Closed-vent system	Visually inspect every 30 days for visible defects	Same as above	All visual checks and repairs
Positive pressure closed-vent system	Annually demonstrate no detectable leaks (less than 500 ppmv)	Same as above	All leak tests
Bypass line valve	Inspect every 30 days to ensure valve is in a closed position and vent stream is not diverted through bypass line	Same as above	All visual checks and repairs

Note: These are the same requirements as for kraft mills (presented on page 57).

Figure 25.

How Does a Kraft Mill Demonstrate Continuous Compliance with Emission Limits for Chlorinated HAPs?

If a Mill Chooses This Technique to Comply With This Alternative Emission Limit...	Continuously Monitor These Parameters...	Report This Information...	And Keep These Records for 5 Years...
Gas scrubber to reduce chlorinated HAP emissions by 99% by weight or to achieve an outlet mass emission rate ≤ 0.002 pounds chlorinated HAPs per ton oven-dried pulp	pH or oxidation/reduction potential of effluent	• Semi-annual emissions and continuous monitoring performance report • If exceedences occur, then quarterly reports are required (40 CFR 63.10(e))	pH or oxidation/reduction potential of effluent
	Vent gas inlet flow rate	Same as above	Vent gas inlet flow rate
	Scrubber liquid influent flow rate	Same as above	Scrubber liquid influent flow rate
Gas scrubber to achieve an outlet concentration of chlorinated HAPs ≤ 10 ppmv	Chlorine concentration at the outlet or measure **all** three of the following parameters	Same as above	Chlorine concentration or **all** of the following
	pH or oxidation/reduction potential of effluent	Same as above	pH or oxidation/reduction potential of effluent
	Vent gas inlet flow rate	Same as above	Vent gas inlet flow
	Scrubber liquid influent flow rate	Same as above	Scrubber liquid influent flow rate
Any control device other than a gas scrubber or process modifications	Determine appropriate monitoring parameter values during the initial performance test[a]	Same as above	Parameters approved by the Administrator

[a] As specified in 40 CFR Part 63.453(n)

Note: This is the same figure as the one presented on page 73.

Chapter 8 - Other Federal Regulations Affecting Pulp and Paper Mills

The Cluster Rules do not represent all of the air and water pollution regulation of the pulp and paper industry. Pulp and paper mills are subject to additional air requirements under the CAA; additional water requirements under the Clean Water Act; and other Federal, State and local laws not associated in any way with the Cluster Rules.

The Cluster Rules do NOT represent all of the air and water pollution regulation of the pulp and paper industry.

Federal regulations affecting the pulp and paper industry include:

- National Ambient Air Quality Standards (NAAQS)
- Kraft Mill New Source Performance Standards (NSPS) (40 CFR 60, Subparts B and BB)
- Industrial Boilers NSPS (40 CFR 60, Subparts D, Db, and Dc)
- Gas-Fired Turbines NSPS (40 CFR 60, Subpart GG)
- NESHAP (40 CFR 63, Subpart MM)
- Prevention of Significant Deterioration (PSD)/New Source Review (NSR)
- National Pollutant Discharge Elimination System (NPDES) Related Statutes and Regulations
- Spill Prevention Control and Countermeasure (SPCC) Plans (40 CFR 112)
- Notice of Discharge of Reportable Quantities of Hazardous Substances (40 CFR 116 and 117)
- Resource Conservation and Recovery Act (RCRA)
- Emergency Planning and Community Right-to-Know Act (EPCRA)/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)

8.1 What other Federal air regulations affect the pulp and paper industry?

Federal air regulations affecting the pulp and paper industry are shown below.

The Following Air Regulation...	Affects...	By...
NAAQS	Energy generation at pulp and paper mills	Controlling NO_x, PM, VOC,[a] and SO_2 as part of the state implementation plans
NSPS		
40 CFR 60, Subpart B	Kraft pulp mills	Controlling PM and TRS at existing sources under state regulations. State regulations are based on EPA guidelines.
40 CFR 60, Subpart BB	Kraft pulp mills	Controlling PM and TRS
40 CFR 60, Subpart D, Db, and Dc	Industrial boilers	Controlling PM, NO_x, SO_2
40 CFR 60, Subpart GG	Gas-fired turbines	Controlling PM, SO_2, NO_x
NESHAP	Chemical recovery processes at kraft, soda, sulfite, and standalone semi-chemical pulp mills	Controlling gaseous organic and metal HAP
PSD/NSR	Pulp and paper mills installing new or modified equipment	Requiring a pre-construction permit that imposes emission limitations based on BACT or LAER for criteria pollutants for which there is a significant emission increase.

BACT = best available control technology

LAER = lowest achievable emissions rate

National Ambient Air Quality Standards (NAAQS) have been established for six criteria pollutants. Pulp and paper mills are potential sources of particulate matter (PM), ozone precursors (volatile organic compounds [VOCs] and nitrogen oxides [NO_x]), and sulfur dioxide (SO_2). Each State must develop a State Implementation Plan (SIP) to identify sources of air pollution and to determine what actions are necessary to achieve attainment with the NAAQS for all criteria pollutants. The SIP contains emission regulations that may affect the pulp and paper industry, including emission limitations and standards and pre-construction permitting requirements (e.g., New Source Review [NSR], Prevention of Significant Deterioration [PSD]).

Kraft Mill New Source Performance Standards (NSPS) (40 CFR 60, Subpart BB). The majority of kraft mills in operation are currently regulated under the kraft mill NSPS (40 CFR Subpart BB) or State regulations for existing sources promulgated under Section 111(d) of the Act (40 CFR 60, Subpart B). The kraft mill NSPS sets emission limits for particulate matter and TRS for recovery furnaces, smelt dissolving tanks, lime kilns, digester systems, brown stock washer systems, multiple effect evaporators, black liquor oxidation systems, and condensate stripper systems. See page 79 for a more detailed discussion of the kraft mill NSPS, as this regulation applies to kraft mills only.

Industrial Boilers NSPS (40 CFR 60, Subparts D, Db, and Dc) and Gas-Fired Turbines NSPS (40 CFR 60, Subpart GG). Almost all pulp and paper facilities have boilers and turbines for generating electricity and steam. Newer combustion units may be subject to regulation under one of these rules which set emissions limits for particulate matter, nitrogen oxides, and sulfur dioxide.

National Emission Standards for Hazardous Air Pollutants (NESHAP) (40 CFR 63, Subpart MM). The NESHAP for chemical recovery combustion sources at kraft, soda, sulfite, and semi-chemical pulp mills (40 CFR 63, Subpart MM) establishes emission limits for gaseous organic and metal HAP. Subpart MM applies to all existing and new kraft, soda, sulfite, and stand-alone semi-chemical pulp mills with chemical recovery processes that involve the combustion of spent pulping liquor.

8.2 What other Federal water regulations affect the pulp and paper industry?

Federal water regulations affecting the pulp and paper industry are shown below:

NPDES = National Pollutant Discharge Elimination System

The Following Water Regulation...	Affects...	By...
NPDES: Technology and water quality-based limitations	Direct-discharging of pollutants into navigable waters	Setting effluent limitations on pollutants based on available technology and intended use of receiving waterbody; also sets monitoring and reporting requirements
Pretreatment program	Indirect-discharging of pollutants to publicly-owned treatment works (POTWs)	Setting pollutant discharge limits to POTWs
Storm water permit application	Any facility	Establishing pollution prevention plans and best management practices (BMP)
Section 110 of CWA (40 CFR 110)	Any facility	Prohibiting oil discharges
Spill Prevention Control and Countermeasure (SPCC) (40 CFR 112)	Oil storing/ consuming facilities	Requiring a spill prevention and control plan, reporting, plan updates, and training obligations
Notice of Discharge of Reportable Quantities of Hazardous Substances (40 CFR 116 and 117)	Any facility	Requiring reporting of designated hazardous substance discharges to U.S. government following the Department of Transportation regulations

National Pollutant Discharge Elimination System (NPDES) Program (Clean Water Act, Section 402). The NPDES program controls direct discharges into navigable waters. The scope of this program is quite broad, and most point source discharges associated with a pulp and paper mill will be subject to NPDES permitting requirements. The effluent limitations guidelines and standards and requirements for direct discharging mills are presented in the table below. The applicability of these standards is more fully explained in Figure 27.

The acronyms are defined on the next page in Figure 26.

The applicability of these standards is explained on page 106 in Figure 27.

For These Mill Types or Production Operations...	These Clean Water Act Standards Apply...		
	BAT, PSES, and PSNS	BPT, BCT, NSPS	BMP
Dissolving Kraft	X	X	X
Bleached Papergrade Kraft and Soda[a]	X	X	X
Unbleached Kraft	X	X	X
Dissolving Sulfite	X	X	X
Papergrade Sulfite[a]	X	X	X
Semi-chemical	X	X	X
Mechanical		X	
Non-wood Chemical		X	X
Secondary Fiber Deink		X	
Fine and Lightweight Papers from Purchased Pulp		X	
Tissue, Filter, Non-Woven, and Paperboard from Purchased Pulp		X	

[a] The effluent limitations guidelines and standards for these subcategories were revised in the Cluster Rules.

Figure 26.

A Guide to the Acronyms for Technology-Based Water Standards

Acronym	Definition	Description of Standard
PSES[a]	Pretreatment Standards for Existing Sources	Industry-by-industry pretreatment standards for existing sources that discharge their wastewater indirectly (i.e., to a POTW).
PSNS[a]	Pretreatment Standards for New Sources	Industry-by-industry pretreatment standards for new sources that discharge their wastewater indirectly (i.e., to a POTW).
BPT	Best Practical Control Technology Currently Available	A baseline standard, applicable in all circumstances.
BCT	Best Conventional Pollutant Control Technology	More stringent than BPT. Only applies if certain cost tests are met. Must be "cost-reasonable." See 51 FR 24,974-24,976 (July 9, 1986), for EPA's BCT methodology.
BAT	Best Available Technology Economically Achievable	A standard similar to BPT/BCT, but with cost concerns playing a lesser role. A "best of the best" standard.
BMP	Best Management Practices	Designed to prevent or contain leaks and spills of pulping liquor, soap, and turpentine, and to control any intentional diversions of these substances.
NSPS	New Source Performance Standards	Applicable to new direct discharge sources, as defined in 40 CFR 122.2.

[a] Although the categorical standards in 40 CFR Part 430 cover kraft pulp mills, most kraft pulp mills are direct dischargers subject to NPDES permit requirements and not the pretreatment standards.

Figure 27.

Applicability of Technology-Based Standards

If a Mill Discharges These Pollutants...	To These Direct Receivers	And the Mill is Classified as an...	Then the Required Standards That Apply are...
Conventional pollutants	Surface waters	Existing source	BPT or BCT
Toxic and conventional pollutants	Surface waters	Existing source	BAT
Any pollutants	Surface waters	New source	NSPS
Any pollutants	POTWs	Existing source	PSES
Any pollutants	POTWs	New Source	PSNS

Source: 40 CFR 125.3

Spill Prevention Control and Countermeasure (SPCC) Plans (40 CFR 112). This regulation applies to all facilities that store or use oil or oil products, and which because of their location, could reasonably be expected to discharge oil into navigable waters of the United States. Such facilities are required to prepare a SPCC plan.

Notice of Discharge of Reportable Quantities of Hazardous Substances (40 CFR 116 and 117). This regulation defines the discharges into navigable waters of the United States that must be reported to appropriate agencies of the U.S. Government. This requirement does NOT apply to discharges covered by a facility's NPDES permit.

8.3 What Federal hazardous wastes regulations affect the pulp and paper industry?

Federal hazardous wastes and emergency planning regulations affecting the pulp and paper industry are shown below:

TRI = Toxic Release Inventory

BIF = Boilers and Industrial Furnaces (40 CFR 266, Subpart H)

The Following Hazardous Waste Regulation...	Affects...	By...
RCRA	Black liquor at pulp mills	Requiring reclamation and reuse of black liquor
	Steam stripper systems	Exempting on-site combustion of concentrated methanol condensates derived from steam stripper overhead gases from the BIF regulation
EPCRA/CERCLA	Pulp mills	• Requiring annual reporting of discharges (TRI Form R reports) for certain pollutants • Requiring mills to provide information on chemicals used in the bleach plant • Requiring mills to report emergency spills or off-site releases (air, water, or solid wastes)

Resource Conservation and Recovery Act (RCRA). Most RCRA requirements are not industry specific but apply to any facility that transports, treats, stores, or disposes of hazardous wastes. The pulping process generally does not generate significant RCRA-related hazardous waste streams. However, handling of black liquor can create RCRA-related concerns. Black liquor is exempt from regulation as a solid waste under 40 CFR 261.2(e) and Table 1, 261.4(a)(6), but only if the black liquor is reclaimed in a recovery furnace and reused in the pulping process. Therefore, potential liquor spills that are not reused in the process, such as leaks from surface impoundments used to store black liquor prior to recovery will be an issue for RCRA compliance assessment.

Concentrated steam stripper condensates consist primarily of methanol which can be burned as a fuel.

RCRA/Boilers and Industrial Furnaces (BIF) regulation (40 CFR 266, Subpart H). One of the options for controlling emissions from kraft pulping process condensates is to steam strip HAPs from the condensate streams. The vent gas from the steam stripper is required to be sent to a combustion device for destruction. If the methanol in the steam stripper vent gas were concentrated, using a rectification column, the concentrated condensate could be burned as a fuel. However, the concentrated methanol condensate could be identified as hazardous waste under RCRA because it exhibits the ignitability characteristic. Boilers burning such a hazardous waste fuel would ordinarily be required to comply with the emission standards for boilers and industrial furnaces burning hazardous waste.

Because the rectification practice would save energy, not increase environmental risk, and would provide a cost savings, combustion sources at kraft mills that burn condensates derived from steam stripper overhead vent gases are excluded from RCRA. The exclusion applies only to the condensates generated from the steam stripper methanol rectification process and only to combustion units located at the facility generating the condensate stream.

Emergency Planning and Community Right-to-Know Act (EPCRA)/ Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Section 313 of EPCRA requires pulp mills to submit a Toxic Release Inventory (TRI) report to EPA each year. These reports, referred to as Form R, include the amounts of toxic chemicals that the facility releases into the environment (i.e., air, water, and land) both routinely and as a result of accidents. In general reported releases would include releases of toxic chemicals from pulp mill process vent air emissions and from mill wastewater discharges. Data must be provided for any of the more than 600 listed toxic chemicals that are manufactured, processed, or otherwise used above the reporting threshold.

8.4 What upcoming regulations will affect pulp and paper mills?

More regulations are coming!

Five NESHAP for combustion sources are scheduled for 2001.

Effluent limitations guidelines and standards scheduled for 2001-2002.

Pending regulations that will affect the pulp and paper industry include:

- ***NESHAP for Combustion Sources.*** EPA plans to publish several NESHAP that will affect power boilers, process heaters, gas turbines, reciprocating internal combustion engines, and incinerators.

- ***Effluent Limitations Guidelines and Standards.*** EPA plans to publish revised effluent limitations guidelines and standards for additional subcategories in the near future. These include: dissolving kraft; dissolving sulfite; unbleached kraft; semi-chemical; mechanical pulp; non-wood chemical pulp; secondary fiber deink; secondary fiber non-deink; fine and lightweight fibers from purchased pulp; and tissue, filter, non-woven, and paperboard from purchased pulp.

Pending water regulations consist of EPA proposing effluent limitations guidelines and standards for the pulp and paper industry subparts that were not included in the Cluster Rules. And finally, EPA is considering whether pulp mill wastewater treatment system sludges are to be considered a hazardous waste and subject to RCRA Subtitle C. Since the effluent guidelines address concerns about chlorine containing compounds, it is expected that there will be no change in the exemption of pulp mill sludges from being classified as a hazardous waste.

Appendix A

List of U.S. Pulp and Paper Mills

Source: Lockwood-Post Directory, 1996

Name	City	State	Mill Type	Bleached?
KETCHIKAN PULP CO.	KETCHIKAN	AK	sulfite	bleached
ALASKA PULP CORP.	SITKA	AK		
MACMILLAN BLOEDEL CORP.	PINE HILL	AL	co-semi	unbleached
KIMBERLY-CLARK CORP.	COOSA PINES	AL	kraft	bleached
BOISE CASCADE CORP.	JACKSON	AL	kraft	bleached
HAMMERMILL PAPERS GROUP	SELMA	AL	kraft	bleached
SCOTT PAPER CO.	MOBILE	AL	kraft	bleached
ALABAMA PINE RIVER	CLAIBORNE	AL	kraft	bleached
INTERNATIONAL PAPER CO.	MOBILE	AL	kraft	bleached
JAMES RIVER CORP.	PENNINGTON	AL	kraft	bleached
ALABAMA RIVER PULP CO.	PERDUE HILL	AL	kraft	bleached
CHAMPION INTERNATIONAL	COURTLAND	AL	kraft	bleached
CONTAINER CORP. OF AMERICA	BREWTON	AL	kraft	bleached
GULF STATES PAPER CORP.	DEMOPOLIS	AL	kraft	bleached
MEAD COATED BOARD INC.	MAHRT	AL	kraft	unbleached
UNION CAMP CORP.	PRATTVILLE	AL	kraft	unbleached
MEAD CORP.	STEVENSON	AL	semichem	unbleached
NATIONAL GYPSUM CO.	ANNISTON	AL		
GAF BUILDING MATERIALS CORP.	MOBILE	AL		
MOBILE PAPERBOARD CORP.	MOBILE	AL		
KEYES FIBER CO.	ALBERTVILLE	AL		
POTLATCH CORP.	MCGEHEE	AR	kraft	bleached
INTERNATIONAL PAPER CO.	PINE BLUFF	AR	kraft	bleached
GEORGIA-PACIFIC CORP.	ASHDOWN	AR	kraft	bleached
GEORGIA-PACIFIC CORP.	CROSSETT	AR	kraft	bleached
GREEN BAY PACKAGING INC.	MORRILTON	AR	kraft	unbleached
INTERNATIONAL PAPER CO.	CAMDEN	AR	kraft	unbleached
GAYLORD CONTAINER CORP.	PINE BLUFF	AR	kraft	unbleached
CELOTEX CORP.	CAMDEN	AR		
STONE CONTAINER CORP.	SNOWFLAKE	AZ	kraft	bleached
PONDEROSA PAPER PRODUCTS INC.	FLAGSTAFF	AZ		
LOUISIANA-PACIFIC CORP.	SAMOA	CA	kraft	bleached
SIMPSON PAPER CO.	ANDERSON	CA	kraft	bleached
B.J. FIBRES	SANTA ANA	CA		
CONTAINER CORP. OF AMERICA	SANTA CLARA	CA		

Name	City	State	Mill Type	Bleached?
CELLULO CO. INC.	FRESNO	CA		
LOS ANGELES PAPER BOX & BOARD	LOS ANGELES	CA		
LUNDAY-THAGARD ROOFING CO.	SOUTH GATE	CA		
USG INDUSTRIES PAPERBOARD CO.	SOUTH GATE	CA		
INLAND CONTAINER CORP.	NEWARK	CA		
LEATHERBACK INDUSTRIES	HOLLISTER	CA		
P & G PAPER PRODUCTS CO.	OXNARD	CA		
NEWARK PACIFIC PAPERBOARD CORP.	LOS ANGELES	CA		
NATIONAL GYPSUM CO.	STOCKTON	CA		
SPECIALTY PAPER MILLS INC.	SANTA FE SPRINGS	CA		
PABCO PAPER	VERNON	CA		
SIMPSON PAPER CO.	POMONA	CA		
SIMPSON PAPER CO.	FAIRHAVEN	CA		
KIMBERLY-CLARK	FULLERTON	CA		
KEYES FIBRE CO.	SACRAMENTO	CA		
WILLAMETTE INDUSTRIES INC.	OXNARD	CA		
DOMTAR GYPSUM	VERNON	CA		
SIERRA TISSUE INC.	PONOMA	CA		
FONTANA PAPER MILLS INC.	FONTANA	CA		
SIMPSON PAPER CO.	RIPON	CA		
DOMTAR GYPSUM	SAN LEANDRO	CA		
CONTAINER CORP. OF AMERICA	VERNON	CA		
GOLDEN STATE NEWSPRINT CO. INC	POMONA	CA		
CALIFORNIA PAPERBOARD CORP.	SANTA CLARA	CA		
INLAND CONTAINER CORP.	ONTARIO	CA		
SONOCO PRODUCTS CO.	CITY OF INDUSTRY	CA		
PACKAGING CO. OF CALIFORNIA	CITY OF INDUSTRY	CA		
REPROCELL	SUN VALLEY	CA		
PACKAGING CO. OF CALIFORNIA	RED BLUFF	CA		
PAPER-PAK PRODUCTS INC.	LA VERNE	CA		
REPUBLIC PAPERBOARD CO.	DENVER	CO		
KIMBERLY-CLARK CORP.	NEW MILFORD	CT		
STONE CONTAINER CORP.	UNCASVILLE	CT		
THE DEXTER CORP.	WINDSOR LOCKS	CT		
CELLU TISUE CORP.	EAST HARTFORD	CT		

Name	City	State	Mill Type	Bleached?
WINDSOR-STEVENS INC.	WINDSOR	CT		
RAND WHITNEY PAPERBOARD CORP.	MONTVILLE	CT		
FEDERAL PAPER BOARD CO.	VERSAILLES	CT		
ROGERS CORP.	MANCHESTER	CT		
SIMKINS INDUSTRIES INC.	NEW HAVEN	CT		
LYDALL INC.	MANCHESTER	CT		
JAMES RIVER CORP.	NEWARK	DE		
NVF CORP.	YORKLYN	DE		
CHAMPION INTERNATIONAL	CANTONMENT	FL	kraft	bleached
STONE CONTAINER CORP.	PANAMA CITY	FL	kraft	bleached
ST. JOE FOREST PRODUCTS CO.	PORT ST. JOE	FL	kraft	bleached
GEORGIA-PACIFIC CORP.	PALATKA	FL	kraft	bleached
BUCKEYE FL LIMITED PARTNERSHIP	PERRY	FL	kraft	bleached
CONTAINER CORP. OF AMERICA	FERNANDINA BEACH	FL	kraft	unbleached
JEFFERSON SMURFIT CORP.	JACKSONVILLE	FL	kraft	unbleached
ITT RAYONIER INC.	FERNANDINA BEACH	FL	sulfite	bleached
ATLAS TISSUE MILLS	HIALEAH	FL		
STONE CONTAINER CORP.	JACKSONVILLE	FL		
U.S. GYPSUM CORP.	JACKSONVILLE	FL		
FEDERAL PAPER BOARD CO.	AUGUSTA	GA	co-semi	bleached
GEORGIA-PACIFIC CORP.	CEDAR SPRINGS	GA	co-semi	unbleached
WEYERHAUSER PAPER CO.	OGLETHORPE	GA	kraft	bleached
GEORGIA-PACIFIC CORP.	BRUNSWICK	GA	kraft	bleached
GILMAN PAPER	ST. MARY'S	GA	kraft	bleached
STONE CONTAINER CORP.	PORT WENTWORTH	GA	kraft	bleached
INTERSTATE PAPER CORP.	RICEBORO	GA	kraft	unbleached
PACKAGING CORP. OF AMERICA	CLYATTSVILLE	GA	kraft	unbleached
RIVERWOOD INTERNATIONAL GA INC.	MACON	GA	kraft	unbleached
UNION CAMP CORP.	SAVANNAH	GA	kraft	unbleached
INLAND ROME INC.	ROME	GA	kraft	unbleached
ITT RAYONIER INC.	JESUP	GA	kraft	bleached
AUSTELL BOX BOARD CORP.	AUSTELL	GA		
P & G PAPER PRODUCTS CO.	ALBANY	GA		
HOLLINGSWORTH & VOSE CO.	HAWKINSVILLE	GA		
SONOCO PRODUCTS CO.	ATLANTA	GA		

Name	City	State	Mill Type	Bleached?
JEFFERSON SMURFIT CORP.	CEDARTOWN	GA		
FORT HOWARD CORP.	RINCON	GA		
PACKAGING CORP. OF AMERICA	MACON	GA		
AUGUSTA NEWSPRINT CO.	AUGUSTA	GA		
DEERFIELD SPECIALTY PAPERS INC.	NIXON	GA		
SOUTHEAST PAPER MFG. CO.	DUBLIN	GA		
PONDEROSA GEORGIA	AUGUSTA	GA		
SWEETWATER PAPER BOARD CO.	AUSTELL	GA		
CONSOLIDATED PACKAGING CORP.	FORT MADISON	IA	semichem	unbleached
PACKAGING CORP. OF AMERICA	TAMA	IA		
POTLATCH CORP.	LEWISTON	ID	kraft	bleached
JEFFERSON SMURFIT CORP.	ALTON	IL		
IVEX CORP.	JOLIET	IL		
CHICAGO PAPERBOARD CORP.	CHICAGO	IL		
QUAKER OATS CO.	PEKIN	IL		
SONOCO PRODUCTS CO.	ROCKTON	IL		
IVEX CORP.	PEORIA	IL		
CELOTEX CORP.	QUINCY	IL		
DAVEY CO.	AURORA	IL		
FSC PAPER CO.	ALDIP	IL		
GEORGIA-PACIFIC CORP.	TAYLORVILLE	IL		
WESTON PAPER AND MFG. CO.	TERRE HAUTE	IN	semichem	unbleached
KEYES FIBRE CO.	HAMMOND	IN		
PACKAGING CORP. OF AMERICA	GRIFFITH	IN		
INLAND CONTAINER CORP.	NEWPORT	IN		
KIEFFER PAPER MILLS INC.	BROWNSTOWN	IN		
FIBRE FORM CORP.	COLUMBIA CITY	IN		
JEFFERSON SMURFIT CORP.	LAFAYETTE	IN		
ROCK-TENN CO.	EATON	IN		
BRIDGEWATER PAPER CO. INC.	INDIANAPOLIS	IN		
GEORGIA-PACIFIC CORP.	GARY	IN		
CONTAINER CORP. OF AMERICA	CARTHAGE	IN		
CONTAINER CORP. OF AMERICA	WABASH	IN		
TAMKO ASPHAULT PRODUCTS	PHILLIPSBURG	KS		
REPUBLIC PAPERBOARD CO.	HUTCHINSON	KS		

Name	City	State	Mill Type	Bleached?
WESTVACO CORP.	WICKLIFFE	KY	kraft	bleached
WILLAMETTE INDUSTRIES INC. (25A)	HAWESVILLE	KY	kraft	bleached
WILLAMETTE INDUSTRIES (25B)	HAWESVILLE	KY	semichem	bleached
AHLSTROM FILTRATION INC.	MADISONVILLE	KY		
W.R. GRACE & CO.	OWENSBORO	KY		
STONE CONTAINER CORP.	HODGE	LA	co-semi	unbleached
RIVERWOOD INTERNATIONAL CORP.	WEST MONROE	LA	co-semi	unbleached
INTERNATIONAL PAPER CO.	MANSFIELD	LA	co-semi	unbleached
GEORGIA-PACIFIC CORP.	PORT HUDSON	LA	kraft	bleached
INTERNATIONAL PAPER CO.	BASTROP	LA	kraft	bleached
JAMES RIVER CORP.	ST. FRANCISVILLE	LA	kraft	bleached
BOISE CASCADE CORP.	DERIDDER	LA	kraft	bleached
WILLAMETTE INDUSTRIES INC.	CAMPTI	LA	kraft	unbleached
GAYLORD CONTAINER CORP.	BOGALUSA	LA	kraft	unbleached
INTERNATIONAL PAPER CO.	PINEVILLE	LA	kraft	unbleached
M.D. VALENTINE PAPER CO. INC.	LOCKPORT	LA		
CELOTEX CORP.	MARRERO	LA		
G. S. ROOFING PRODUCTS	SHREVEPORT	LA		
WESTFIELD RIVER PAPER CO. INC.	RUSSELL	MA		
STRATHMORE PAPER CO.	TURNERS FALLS	MA		
ESLEECK MANUFACTURING CO. INC.	TURNERS FALLS	MA		
CROCKER TECHNICAL PAPERS INC.	FITCHBURG	MA		
WESTFIELD RIVER PAPER CO. INC.	LEE	MA		
MERRIMAC PAPER CO. INC.	LAWRENCE	MA		
ERVING PAPER MILLS	ERVING	MA		
JAMES RIVER CORP.	FITCHBURG	MA		
MEAD CORP.	SOUTH LEE	MA		
HOLLINGSWORTH & VOSE CO.	EAST WALPOLE	MA		
	DALTON	MA		
JAMES RIVER CORP.	WEST SPRINGFIELD	MA		
MEAD CORP.	SOUTH LEE	MA		
	DALTON	MA		

Name	City	State	Mill Type	Bleached?
NEWARK ATLANTIC PAPERBOARD	LAWRENCE	MA		
JAMES RIVER CORP.	PEPPERELL	MA		
BYRON WESTON CO.	DALTON	MA		
	DALTON	MA		
STRATMORE PAPER CO.	RUSSELL	MA		
NVF CO.	HOLYOKE	MA		
TEXTON USA	RUSSELL	MA		
STRATHMORE PAPER CO.	WESTFIELD	MA		
	DALTON	MA		
SEAMAN PAPER CO. OF MASS. INC.	OTTER RIVER	MA		
KIMBERLY-CLARK CORP.	LEE	MA		
NATICK PAPERBOARD CORP.	NATICK	MA		
RISING PAPER DIV.	HOUSATONIC	MA		
CASCADES DIAMOND INC.	THORNDIKE	MA		
ROLAND-FITCHBURG PAPER INC.	FITCHBURG	MA		
STRATHMORE PAPER CO.	MILLERS FALLS	MA		
HAVERHILL PAPERBOARD CORP.	HAVERHILL	MA		
PERKIT FOLDING BOX CORP.	BOSTON	MA		
JAMES RIVER CORP.	ADAMS	MA		
SOUTHWORTH CO.	WEST SPRINGFIELD	MA		
HOLLINGSWORTH & VOSE CO.	WEST GROTON	MA		
BALDWINVILLE PRODUCTS INC.	ERVING	MA		
NEPONSET RIVER PAPER INC.	HYDE PARK	MA		
SONOCO PRODUCTS CO.	HOLYOKE	MA		
WESTVACO CORP.	LUKE	MD	kraft	bleached
SIMKINS INDUSTRIES INC.	CATONSVILLE	MD		
CHESAPEAKE PAPERBOARD CO.	BALTIMORE	MD		
S D WARREN CO.	WESTBROOK	ME	kraft	bleached
S.D. WARREN CO.	HINCKLEY	ME	kraft	bleached
GEORGIA-PACIFIC CORP.	WOODLAND	ME	kraft	bleached
BOISE CASCADE CORP.	RUMFORD	ME	kraft	bleached
INTERNATIONAL PAPER CO.	JAY	ME	kraft	bleached

Name	City	State	Mill Type	Bleached?
LINCOLN PULP & PAPER CO. INC.	LINCOLN	ME	kraft	bleached
JAMES RIVER CORP.	OLD TOWN	ME	kraft	bleached
GREAT NORTHERN PAPER INC.	MILLINOCKET	ME	sulfite	unbleached
CHAMPION INTERNATIONAL	BUCKSPORT	ME		
JAMES RIVER CORP.	LIVERMORE	ME		
EASTERN FINE PAPER INC.	BREWER	ME		
STATLER TISSUE CO.	AUGUSTA	ME		
YORKTOWNE PAPER MILLS CO.	GARDINER	ME		
SCOTT PAPER CO.	WINSLOW	ME		
FRASER PAPER LTD.	MADAWASKA	ME		
KEYES FIBRE CO.	WATERVILLE	ME		
GREAT NORTHERN PAPER CO.	EAST MILLINOCKET	ME		
MADISON PAPER INDUSTRIES	MADISON	ME		
MEAD CORP.	ESCANABA	MI	kraft	bleached
CHAMPION INTERNATIONAL	QUINNESEC	MI	kraft	bleached
S D WARREN CO.	MUSKEGON	MI	kraft	bleached
MENASHA CORP.	OTSEGO	MI	semichem	unbleached
PACKAGING CORP. OF AMERICA	FILER CITY	MI	semichem	unbleached
STONE CONTAINER CORP.	ONTONAGON	MI	semichem	unbleached
JEFFERSON SMURFIT CORP.	MONROE	MI		
PLAINWELL PAPER CO. INC	PLAINWELL	MI		
JAMES RIVER CORP.	PARCHMENT	MI		
MONROE PAPER CO.	MONROE	MI		
JAMES RIVER CORP.	ROCHESTER	MI		
KIMBERLY-CLARK CORP.	MUNISING	MI		
WHITE PIGEON PAPER CO.	WHITE PIGEON	MI		
ROCK-TENN CO.	OTSEGO	MI		
JAMES RIVER CORP.	YPSILANTI	MI		
FLETCHER PAPER CO.	ALPENA	MI		
SIMPSON PAPER CO.	VICKSBURG	MI		
SIMPLEX PRODUCTS GROUP	CONSTATINE	MI		
P & G PAPER PRODUCTS CO.	CHEBOYGAN	MI		
E. B. EDDY PAPER INC.	PORT HURON	MI		
BIG M PAPERBOARD	PALMYRA	MI		
JAMES RIVER CORP.	KALAMAZOO	MI		

Name	City	State	Mill Type	Bleached?
MANISTIQUE PAPERS INC.	MANISTIQUE	MI		
GEORGIA-PACIFIC CORP.	KALAMAZOO	MI		
AMERICAN FIBRIT CO.	BATTLE CREEK	MI		
WALDORF CORP.	BATTLE CREEK	MI		
DETROIT RIVER PAPER CO.	DETROIT	MI		
SIMPLICITY PATTERN CO. INC.	NILES	MI		
MENOMINEE PAPER CO. INC.	MENOMINEE	MI		
FRENCH PAPER CO.	NILES	MI		
JAMES RIVER CORP.	PORT HURON	MI		
CONVERTERS PAPERBOARD CO.	ROCKFORD	MI		
MICHIGAN PAPERBOARD	BATTLE CREEK	MI		
BOISE CASCADE CORP.	INTERNATIONAL FALLS	MN	kraft	bleached
POTLATCH CORP.	CLOQUET	MN	kraft	bleached
BLANDIN PAPER CO.	GRAND RAPIDS	MN		
CHAMPION INTERNATIONAL	SARTELL	MN		
CERTAINTEED CORP.	SHAKOPEE	MN		
POTLATCH CORP.	BRAINERD	MN		
LAKE SUPERIOR PAPER INDUSTRIES	DULUTH	MN		
HENNEPIN PAPER CO.	LITTLE FALLS	MN		
WALDORF CORP.	ST. PAUL	MN		
TAMKO ASPHAULT PRODUCTS INC.	JOPLIN	MO		
U.S. GYPSUM CORP.	N. KANSAS CITY	MO		
TALLMAN CONDUIT CO.	LOUISIANA	MO		
INTERNATIONAL PAPER CO.	MOSS POINT	MS	kraft	bleached
GEORGIA-PACIFIC CORP.	NEW AUGUSTA	MS	kraft	bleached
WEYERHAEUSER PAPER CO.	COLUMBUS	MS	kraft	bleached
INTERNATIONAL PAPER CO.	NATCHEZ	MS	kraft	bleached
GEORGIA-PACIFIC CORP.	MONTICELLO	MS	kraft	unbleached
INTERNATIONAL PAPER CO.	REDWOOD	MS	kraft	unbleached
BURROWS PAPER CORP.	PICKENS	MS		
JAMES RIVER CORP.	WIGGINS	MS		
NEWSPRINT SOUTH INC.	GRENADA	MS		
ATLAS ROOFING CO.	MARIDIAN	MS		
STONE CONTAINER CORP.	MISSOULA	MT	kraft	bleached
FEDERAL PAPER BOARD CO.	RIEGELWOOD	NC	kraft	bleached

Name	City	State	Mill Type	Bleached?
CHAMPION INTERNATIONAL	CANTON	NC	kraft	bleached
WEYERHAEUSER PAPER CO.	NEW BERN	NC	kraft	bleached
WEYERHAEUSER PAPER CO.	PLYMOUTH	NC	kraft	bleached
CHAMPION INTERNATIONAL	ROANOKE RAPIDS	NC	kraft	unbleached
U.S. PACKAGING INC.	MAXTON	NC		
ALPHA CELLULOSE CORP.	LUMBERTON	NC		
CAROLINA PAPER BOARD CORP.	CHARLOTTE	NC		
SEALED AIR	ROCKINGHAM	NC		
JACKSON PAPER MFG. CO.	SYLVA	NC		
CASCADES INDUSTRIES INC.	ROCKINGHAM	NC		
LAUREL HILL PAPER CO.	CORDOVA	NC		
LYDALL INC.	TROY	NC		
CELLU PRODUCTS	PATTERSON	NC		
CELOTEX CORP.	GOLDSBORO	NC		
P. H. GLATFELTER CO.	PISGAH FOREST	NC		
HALIFAX PAPERBOARD CO. INC.	ROANOKE RAPIDS	ND		
JAMES RIVER CORP.	BERLIN	NH	kraft	bleached
GROVETON PAPER BOARD INC.	GROVETON	NH	semichem	unbleached
CPM INC.	CLAREMONT	NH		
QUIN-T CORP. - NH	TILTON	NH		
LYDALL INC.	ROCHESTER	NH		
PAPER SERVICES LTD.	HINDALE	NH		
PENACOOK FIBRE CO.	PENACOOK	NH		
PAPERTECH CORP.	WEST HOPKINTON	NH		
ASHUELOT PAPER CO.	HINSDALE	NH		
COY PAPER CO.	CLAREMONT	NH		
MONADNOCK PAPER MILLS INC.	BENNINGTON	NH		
G.E. ROBERTSON & CO.	HINSDALE	NH		
CAMDEN PAPERBOARD	CAMDEN	NJ		
GEORGIA-PACIFIC CORP.	DELAIR	NJ		
HOMASOTE CO.	W. TRENTON	NJ		
U.S. GYPSUM CORP.	CLARK	NJ		
MILLEN INDUSTRIES	GARWOOD	NJ		
KIMBERLY-CLARK CORP.	SPOTSWOOD	NJ		
JAMES RIVER CO.	WARREN GLEN	NJ		

Name	City	State	Mill Type	Bleached?
JAMES RIVER CO.	MILFORD	NJ		
DAVEY CO.	JERSEY CITY	NJ		
JAMES RIVER CORP.	MILFORD	NJ		
NEWARK BOXBOARD CO.	NEWARK	NJ		
MARCAL PAPER MILLS INC.	ELMWOOD PARK	NJ		
GARDEN STATE PAPER CO.	GARFIELD	NJ		
LOWE PAPER CO.	RIDGEFIELD	NJ		
LEATHERBACK INDUSTRIES	ALBUQERQUE	NM		
INTERNATIONAL PAPER CO.	TICONDEROGA	NY	kraft	bleached
FINCH PRUYN & CO. INC.	GLENS FALLS	NY	sulfite	bleached
JAMES RIVER CORP.	GOUVERNEUR	NY		
U.S. GYPSUM CORP.	OAKFIELD	NY		
MCINTYRE PAPER CO. INC.	FAYETTEVILLE	NY		
EASTMAN KODAK	ROCHESTER	NY		
NORTH END PAPER CO.	FULTON	NY		
HOLLINGSWORTH & VOSE CO.	GREENWICH	NY		
CLIMAX MFG. CO.	CARTHAGE	NY		
SCHOELLER TECHNICAL PAPERS INC	PULASKI	NY		
COLUMBIA CORP.	WALLOOMSAC	NY		
SPAULDING COMPOSITES CO.	TONAWANDA	NY		
MOHAWK PAPER MILLS INC.	WATERFORD	NY		
COLUMBIA CORP.	CHATHAM	NY		
BURROWS PAPER CORP.	LITTLE FALLS	NY		
TAGSONS PAPERS INC	MECHANICVILLE	NY		
FORT ORANGE PAPER CO. INC.	CASTLETON-ON-HUDSON	NY		
RED HOOK PAPER CO.	RED HOOK	NY		
LEWIS MILL	BEAVER FALLS	NY		
C & A WALLCOVERINGS INC.	PLATTSBURGH	NY		
HAMMERMILL PAPERS BUSINESS	OSWEGO	NY		

Name	City	State	Mill Type	Bleached?
POTSDAM PAPER MILLS	POTSDAM	NY		
BURROWS PAPER CORP.	LITTLE FALLS	NY		
LYDALL INC.	HOOSICK FALLS	NY		
EASTMAN KODAK CO.	ROCHESTER	NY		
INTERNATIONAL PAPER CO.	CORINTH	NY		
CORNWALL PAPER MILLS	CORNWALL	NY		
COTTRELL PAPER CO. INC.	ROCK CITY FALLS	NY		
KIMBERLY-CLARK CORP.	ANCRAM	NY		
HOLLINGSWORTH & VOSE CO.	GREENWICH	NY		
STEVENS & THOMPSON PAPER CO.INC.	MIDDLE FALLS	NY		
LYONS FALLS PULP & PAPER INC.	LYONS FALLS	NY		
CHAMPION INTERNATIONAL	DEFERIET	NY		
KNOWLTON SPECIALTY PAPERS INC.	WATERTOWN	NY		
JAMES RIVER CORP.	SOUTH GLENS FALLS	NY		
JAMES RIVER CORP.	BROWNVILLE	NY		
MOHAWK PAPER MILLS INC	COHOES	NY		
PAPYRUS NEWTON FALLS INC.	NEWTON FALLS	NY		
SPECIALTY PAPER BOARD INC.	BEAVER FALLS	NY		
JAMES RIVER CORP.	CARTHAGE	NY		
SCOTT PAPER CO.	FORT EDWARD	NY		
SONOCO PRODUCTS CO	AMSTERDAM	NY		
FLOWER CITY TISSUE MILLS CO	ROCHESTER	NY		
NORFOLK PAPER CO.	NORFOLK	NY		
CASCADES NIAGARA FALLS INC.	NIAGARA FALLS	NY		
PACKAGING CORP. OF AMERICA	PLATTSBURGH	NY		
DOMTAR GYPSUM	LOCKPORT	NY		
MARTISCO PAPER CO. INC.	MARCELLUS	NY		
LYONS FALLS PULP & PAPER INC.	LYONS FALLS	NY		
MEAD PAPER	CHILLICOTHE	OH	kraft	bleached
STONE CONTAINER CORP.	COSHOCTON	OH	semichem	unbleached
CONTAINER CORP. OF AMERICA	CIRCLEVILLE	OH	semichem	unbleached
JEFFERSON SMURFIT CORP.	MIDDLETON	OH		
FRANKLIN BOXBOARD CO.	FRANKLIN	OH		
PACKAGING CORP. OF AMERICA	RITTMAN	OH		
JEFFERSON SMURFIT CORP.	LOCKLAND	OH		

Name	City	State	Mill Type	Bleached?
CLEANERS HANGER CO.	MASSILLON	OH		
CHASE PACKAGING CORP.	CHAGRIN FALLS	OH		
OHIO PULP MILLS INC.	CINCINNATI	OH		
MIAMI PAPER	WEST CARROLLTON	OH		
U.S. GYPSUM CORP.	GYPSUM	OH		
SORG PAPER CO.	MIDDLETON	OH		
DUPONT SPECIALTY IMAGING MEDIA	COLUMBUS	OH		
CRYSTAL TISSUE CO.	MIDDLETON	OH		
SONOCO PRODUCTS CO.	MUNROE FALLS	OH		
CHENEY PULP & PAPER CO.	FRANKLIN	OH		
BECKETT PAPER CO.	HAMILTON	OH		
GAYLORD CONTAINER CORP.	BALTIMORE	OH		
GEORGIA-PACIFIC CORP.	FRANKLIN	OH		
CHAMPION INTERNATIONAL	HAMILTON	OH		
CINCINNATI PAPERBOARD CORP.	CINCINNATI	OH		
ROCK-TENN CO.	CINCINNATI	OH		
GREIF BOARD CORP.	MASSILLON	OH		
APPLETON PAPERS INC.	WEST CARROLLTON	OH		
SONOCO PRODUCTS CO.	LANCASTER	OH		
HOWARD PAPER MILLS INC.	DAYTON	OH		
CERTAINTEED CORP.	MILAN	OH		
HOWARD PAPER MILLS INC.	URBANA	OH		
MIDDLETOWN PAPERBOARD INC.	MIDDLETOWN	OH		
WEYERHAEUSER PAPER CO.	VALLIANT	OK	kraft	unbleached
NATIONAL GYPSUM CO.	PRYOR	OK		
PORT HOWARD CORP.	MUSKOGEE	OK		
ROBEL TISSUE MILLS INC.	PRYOR	OK		
GEORGIA-PACIFIC CORP.	PRYOR	OK		
GEORGIA-PACIFIC CORP.	ARDMORE	OK		
GEORGIA-PACIFIC CORP.	TOLEDO	OR	co-semi	unbleached
BOISE CASCADE CORP.	ST HELENS	OR	kraft	bleached
POPE & TALBOT INC.	HALSEY	OR	kraft	bleached
JAMES RIVER CORP.	CLATSKANIE	OR	kraft	bleached
INTERNATIONAL PAPER CO.	GARDINER	OR	kraft	unbleached
WEYERHAEUSER PAPER CO.	SPRINGFIELD	OR	kraft	unbleached

Name	City	State	Mill Type	Bleached?
WILLAMETTE INDUSTRIES INC.	ALBANY	OR	kraft	bleached
WEYERHAEUSER PAPER CO.	NORTH BEND	OR	semichem	unbleached
JAMES RIVER CORP.	HALSEY	OR		
JAMES RIVER CORP.	WEST LINN	OR		
SMURFIT NEWSPRINT CORP.	OREGON CITY	OR		
SMURFIT NEWSPRINT CORP.	NEWBURG	OR		
WILLAMETTER INDUSTRIES INC.	JOHNSONBURG	PA	kraft	bleached
P. H. GLATFELTER CO.	SPRING GROVE	PA	kraft	bleached
APPLETON PAPERS INC.	ROARING SPRING	PA	kraft	bleached
INTERNATIONAL PAPER CO.	ERIE	PA	soda	bleached
P & G PAPER PRODUCTS CO.	MEHOBANY	PA	sulfite	bleached
WESTVACO CORP.	TYRONE	PA		
AHLSTROM FILTRATION INC.	MT HOLLY SPRINGS	PA		
BRANDYWINE PAPER CORP.	DOWNINGTOWN	PA		
YORKTOWNE PAPER MILLS INC.	YORK	PA		
NEWMAN AND COMPANY INC.	PHILIDELPHIA	PA		
SHRYOCK BROTHERS	DOWNINGTOWN	PA		
INTERSTATE CONTAINER CORP.	READING	PA		
HAMMERMILL PAPERS BUSINESS	LOCK HAVEN	PA		
AMERICAN PAPER PRODUCTS CO.	EDEN	PA		
CONTAINER CORP. OF AMERICA	PHILADELPHIA	PA		
EXTON PAPER	MODENA	PA		
SCOTT PAPER CO	CHESTER	PA		
NATIONAL GYPSUM CO.	MILTON	PA		
WOODSTREAM CORP.	LITITZ	PA		
STONE CONTAINER CORP.	YORK	PA		
ROCK-TENN CO.	DELAWARE WATER GAP	PA		
READING PAPERBOARD CORP.	READING	PA		
SONOCO PRODUCTS CO.	DOWNINGTOWN	PA		
QUIN-T CORP. - PA	ERIE	PA		
HENRY MOLDED PRODUCTS INC.	LEBANON	PA		
SEALED AIR	MODENA	PA		
POPE & TALBOT INC.	RANSOM	PA		
CORNELLY CONTAINERS	PHILIDELPHIA	PA		
DAVEY CO.	DOWNINGTOWN	PA		

Name	City	State	Mill Type	Bleached?
SIMPSON PAPER CO.	MIQUON	PA		
M.H. DIELECTRICS INC.	MOUNT HOLLY SPRINGS	PA		
UNION CAMP CORP.	EASTOVER	SC	kraft	bleached
WILAMETTE IND.	BENNETTSVILLE	SC	kraft	bleached
BOWATER SOUTHERN PAPER CO.	CATAWBA	SC	kraft	bleached
INTERNATIONAL PAPER CO.	GEORGETOWN	SC	kraft	bleached
STONE CONTAINER CORP.	FLORENCE	SC	kraft	unbleached
WESTVACO CORP.	NORTH CHARLESTON	SC	kraft	unbleached
SONOCO PRODUCTS CO.	HARTSVILLE	SC	semichem	unbleached
KIMBERLY-CLARK CORP.	BEECH ISLAND	SC		
CAROTELL PAPER BOARD CORP.	TAYLORS	SC		
BOWATER SOUTHERN PAPER CO.	CALHOUN	TN	kraft	bleached
PACKAGING CORP. OF AMERICA	COUNCE	TN	kraft	unbleached
INLAND CONTAINER CORP.	NEW JOHNSONVILLE	TN	semichem	unbleached
MEAD CORP.	KINGSPORT	TN	soda	bleached
TAMKO ASPHAULT PRODUCTS INC.	KNOXVILLE	TN		
PONDEROSA OF TENNESSEE	MEMPHIS	TN		
ROCK-TENN CO.	CHATTANOOGA	TN		
LYDALL INC.	COVINGTON	TN		
P & G CELLULOSE	MEMPHIS	TN		
KIMBERLY-CLARK CORP	MEMPHIS	TN		
SONOCO PRODUCTS CO.	NEWPORT	TN		
AHLSTROM FILTRATION INC.	CHATTANOOGA	TN		
CHATTANOOGA PAPERBOARD CORP.	CHATTANOOGA	TN		
TEMPLE-INLAND FOREST PROD. INC	SILSBEE	TX	kraft	bleached
SIMPSON PAPER CO.	PASADENA	TX	kraft	bleached
CHAMPION INTERNATIONAL	LUFKIN	TX	kraft	bleached
CHAMPION INTERNATIONAL	HOUSTON	TX	kraft	bleached
INTERNATIONAL PAPER CO.	TEXARKANA	TX	kraft	bleached
INLAND-ORANGE INC.	ORANGE	TX	kraft	unbleached
CELOTEX CORP.	SAN ANTONIO	TX		
ROCK-TENN CO.	DALLAS	TX		
CORRUGATED SERVICES	FORNEY	TX		
U.S. GYPSUM CORP.	GALENA PARK	TX		
EQUITABLE BAG CO. INC.	ORANGE	TX		

Name	City	State	Mill Type	Bleached?
WESTVACO CORP.	COVINGTON	VA	kraft	bleached
CHESAPEAKE CORP.	WEST POINT	VA	kraft	bleached
UNION CAMP CORP.	FRANKLIN	VA	kraft	bleached
STONE CONTAINER CORP.	HOPEWELL	VA	kraft	unbleached
GEORGIA-PACIFIC CORP.	BIG ISLAND	VA	semichem	unbleached
VIRGINIA FIBRE CORP.	AMHERST	VA	semichem	unbleached
JAMES RIVER CORP.	RICHMOND	VA		
GEORGIA BONDED FIBERS	BUENA VISTA	VA		
BEAR ISLAND PAPER CO.	ASHLAND	VA		
SONOCO PRODUCTS CO.	RICHMOND	VA		
ROCK-TENN CO.	LYNCHBURG	VA		
MANCHESTER BOARD & PAPER CO.	RICHMOND	VA		
EHV-WEIDMANN INDUSTRIES INC.	ST. JOHNSBURY	VT		
SPECIALTY PAPERBOARD	SHELDON SPRINGS	VT		
SIMPSON PAPER CO.	GILMAN	VT		
CPM INC.	E. RYEGATE	VT		
PUTNEY PAPER CO. INC	PUTNEY	VT		
SPECIALTY PAPER BOARD	SHELDON SPRINGS	VT		
BOISE CASCADE CORP.	WALLULA	WA	co-semi	bleached
WEYERHAEUSER PAPER CO.	LONGVIEW	WA	co-semi	bleached
LONGVIEW FIBRE CO.	LONGVIEW	WA	co-semi	bleached
JAMES RIVER CORP.	CAMAS	WA	co-sulfite	bleached
SIMPSON TACOMA KRAFT CO.	TACOMA	WA	kraft	bleached
WEYERHAEUSER PULP MILL	EVERETT	WA	kraft	unbleached
PORT TOWNSEND PAPER CORP.	PORT TOWNSEND	WA	kraft	unbleached
ITT RAYONIER INC.	PORT ANGELES	WA	sulfite	bleached
GEORGIA-PACIFIC CORP.	BELLINGHAM	WA	sulfite	bleached
SCOTT PAPER CO.	EVERETT	WA	sulfite	bleached
WEYERHAEUSER PAPER CO.	COSMOPOLIS	WA	sulfite	bleached
SONOCO PRODUCTS CO.	SUMNER	WA		
PONDERAY NEWSPRINT CO.	USK	WA		
CONTAINER CORP. OF AMERICA	TACOMA	WA		
BOISE CASCADE CORP.	VANCOUVER	WA		
KEYES FIBRE CO.	WENATCHEE	WA		
NORTH PACIFIC PAPER CO.	LONGVIEW	WA		

Name	City	State	Mill Type	Bleached?
BOISE CASCADE CORP.	STEILACOOM	WA		
DAISHOWA AMERICA CO. LTD.	PORT ANGELES	WA		
GRAYS HARBOR PAPER CO.	HOQUIAM	WA		
ITT-RAYONIER, INC.	HOQUIAM	WA		
INLAND EMPIRE PAPER CO.	MILLWOOD	WA		
GEORGIA-PACIFIC CORP.	NEKOOSA	WI	kraft	bleached
CONSOLIDATED PAPERS INC.	WISCONSIN RAPIDS	WI	kraft	bleached
MOSINEE PAPER CO.	MOSINEE	WI	kraft	unbleached
THILMANY PULP & PAPER CO.	KAUKAUNA	WI	kraft	unbleached
PACKAGING CORP. OF AMERICA	TOMAHAWK	WI	semichem	unbleached
CROSS POINTE PAPER CORP.	PARK FALLS	WI	sulfite	bleached
BADGER PAPER MILLS INC.	PESHITIGO	WI	sulfite	bleached
WEYERHAUSER	ROTHSCHILD	WI	sulfite	bleached
WAUSAU PAPER MILLS CO.	BROKAW	WI	sulfite	bleached
GEORGIA-PACIFIC CORP.	PORT EDWARDS	WI	sulfite	bleached
NICOLET PAPER CO.	DE PERE	WI		
GLOBE BUILDING MATERIALS INC.	CORNELL	WI		
BELOIT BOX BOARD CO.	BELOIT	WI		
SCOTT PAPER CO.	MARINETTE	WI		
POPE & TALBOT INC.	EAU CLAIRE	WI		
WARD PAPER CO INTN'L. PAPER	MERRILL	WI		
MEAD CORP.	MENASHA	WI		
U.S. PAPER MILLS INC.	DE PERE	WI		
CONSOLIDATED PAPERS INC.	WISCONSIN RAPIDS	WI		
JAMES RIVER CORP.	GREEN BAY	WI		
SHAWANO PAPER MILS	SHAWANO	WI		
STEVENS POINT DIV.	STEVENS POINT	WI		
FORT HOWARD CORP.	GREEN BAY	WI		
RHINELANDER PAPER CORP. INC.	RHINELANDER	WI		
SCOTT PAPER CO.	OCONTO FALLS	WI		
NIAGARA OF WISCONSIN PAPER CORP.	NIAGARA	WI		
FOX RIVER PAPER CO. INC.	APPLETON	WI		
POPE & TALBOT INC.	EAST LADYSMITH	WI		
NEENAH PAPER	STEVENS POINT	WI		
KERWIN PAPER CO.	APPLETON	WI		

Name	City	State	Mill Type	Bleached?
GEO A. WHITING PAPER CO.	MENASHA	WI		
WISCONSIN TISSUE MILLS INC.	MENASHA	WI		
P & G	GREEN BAY	WI		
WISCONSIN PAPERBOARD	MILWAUKEE	WI		
JAMES RIVER CORP.	ASHLAND	WI		
PONDEROSA PULP PRODUCTS	OSHKOSH	WI		
P. H. GLATFELTER CO.	NEEHAH	WI		
MIDTEC PAPER CORP.	KIMBERLY	WI		
APPLETON PAPERS INC.	COMBINED LOCKS	WI		
CONSOLIDATED PAPERS INC.	STEVENS POINT	WI		
U.S. PAPER MILLS CORP.	MENASHA	WI		
CONSOLIDATED PAPERS INC.	WISCONSIN RAPIDS	WI		
FILTER MATERIALS INC.	WAUPACA	WI		
KIMBERLY-CLARK	NEENAH	WI		
KIMBERLY-CLARK CORP.	NEENAH	WI		
BADGER PAPER MILLS INC	NEENAH	WI		
HALLTOWN PAPERBOARD CO.	HALLTOWN	WV		
BANNER FIBREBOARD CO.	WELLSBURG	WV		

Appendix B

NESHAP for Source Category: Pulp and Paper Production

(40 CFR 63 Subpart S)

PART 63--NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR SOURCE CATEGORIES

1. The authority citation for part 63 continues to read as follows:

Authority: 42 U.S.C. 7401, et seq.

2. Part 63 is amended by adding subpart S to read as follows:

Subpart S--National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry

Sec.

63.440 Applicability.
63.441 Definitions.
63.442 [Reserved]
63.443 Standards for the pulping system at kraft, soda, and semi-chemical processes.
63.444 Standards for the pulping system at sulfite processes.
63.445 Standards for the bleaching system.
63.446 Standards for kraft pulping process condensates.
63.447 Clean condensate alternative.
63.448-63.449 [Reserved]
63.450 Standards for enclosures and closed-vent systems.
63.451-63.452 [Reserved]
63.453 Monitoring requirements.
63.454 Recordkeeping requirements.
63.455 Reporting requirements.
63.456 [Reserved]
63.457 Test methods and procedures.
63.458 Delegation of authority.
63.459 [Reserved]

Table 1 to Subpart S.--General Provisions Applicability to Subpart S

Subpart S--National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry

Sec. 63.440 Applicability.

(a) The provisions of this subpart apply to the owner or operator of processes that produce pulp, paper, or paperboard; that are located at a plant site that is a major source as defined in Sec. 63.2 of subpart A of this part; and that use the following processes and materials:

(1) Kraft, soda, sulfite, or semi-chemical pulping processes using wood; or

(2) Mechanical pulping processes using wood; or

(3) Any process using secondary or non-wood fibers.

(b) The affected source to which the existing source provisions of this subpart apply is as follows:

(1) For the processes specified in paragraph (a)(1) of this section, the affected source is the total of all HAP emission points in the pulping and bleaching systems; or

(2) For the processes specified in paragraphs (a)(2) or (a)(3) of this section, the affected source is the total of all HAP emission points in the bleaching system.

(c) The new source provisions of this subpart apply to the total of all HAP emission points at new or existing sources as follows:

(1) Each affected source defined in paragraph (b)(1) of this section that commences construction or reconstruction after December 17, 1993;

(2) Each pulping system or bleaching system for the processes specified in paragraph (a)(1) of this section that commences construction or reconstruction after December 17, 1993;

(3) Each additional pulping or bleaching line at the processes specified in paragraph (a)(1) of this section, that commences construction after December 17, 1993;

(4) Each affected source defined in paragraph (b)(2) of this section that commences construction or reconstruction after March 8, 1996; or

(5) Each additional bleaching line at the processes specified in paragraphs (a)(2) or (a)(3) of this section, that commences construction after March 8, 1996.

(d) Each existing source shall achieve compliance no later than April 16, 2001, except as provided in paragraphs (d)(1) through (d)(3) of this section.

(1) Each kraft pulping system shall achieve compliance with the pulping system provisions of Sec. 63.443 for the equipment listed in Sec. 63.443(a)(1)(ii) through (a)(1)(v) as expeditiously as practicable, but in no event later than April 17, 2006 and the owners and operators shall establish dates, update dates, and report the dates for the milestones specified in Sec. 63.455(b).

(2) Each dissolving-grade bleaching system at either kraft or sulfite pulping mills shall achieve compliance with the bleach plant provisions of Sec. 63.445 of this subpart as expeditiously as practicable, but in no event later than 3 years after the promulgation of the revised effluent limitation guidelines and standards under 40 CFR 430.14 through 430.17 and 40 CFR 430.44 through 430.47.

(3) Each bleaching system complying with the Voluntary Advanced Technology Incentives Program for Effluent Limitation Guidelines in 40 CFR 430.24, shall comply with the requirements specified in either paragraph (d)(3)(i) or (d)(3)(ii) of this section for the effluent limitation guidelines and standards in 40 CFR 430.24.

(i) Comply with the bleach plant provisions of Sec. 63.445 of this subpart as expeditiously as practicable, but in no event later than April 16, 2001.

(ii) Comply with all of the following:

(A) The owner or operator of a bleaching system shall comply with the bleach plant provisions of Sec. 63.445 of this subpart as expeditiously as practicable, but in no event later than April 15, 2004.

(B) The owner or operator of a bleaching system shall not increase the application rate of chlorine or hypochlorite in kg of bleaching agent per megagram of ODP, in the bleaching system above the average daily rates used over the three months prior to June 15, 1998 until the requirements of paragraph (d)(3)(ii)(A) of this section are met and record application rates as specified in Sec. 63.454(c).

(C) Owners and operators shall establish dates, update dates, and report the dates for the milestones specified in Sec. 63.455(b).

(e) Each new source, specified as the total of all HAP emission points for the sources specified in paragraph (c) of this section, shall achieve compliance upon start-up or June 15, 1998, whichever is later, as provided in Sec. 63.6(b) of subpart A of this part.

(f) Each owner or operator of an affected source with affected process equipment shared by more than one type of pulping process, shall comply with the applicable requirement in this subpart that achieves the maximum degree of reduction in HAP emissions.

(g) Each owner or operator of an affected source specified in paragraphs (a) through (c) of this section must comply with the requirements of subpart A--General Provisions of this part, as indicated in table 1 to this subpart.

Sec. 63.441 Definitions.

All terms used in this subpart shall have the meaning given them in the CAA, in subpart A of this part, and in this section as follows:

Acid condensate storage tank means any storage tank containing cooking acid following the sulfur dioxide gas fortification process.

Black liquor means spent cooking liquor that has been separated from the pulp produced by the kraft, soda, or semi-chemical pulping process.

Bleaching means brightening of pulp by the addition of oxidizing chemicals or reducing chemicals.

Bleaching line means a group of bleaching stages arranged in series such that bleaching of the pulp progresses as the pulp moves from one stage to the next.

Bleaching stage means all process equipment associated with a discrete step of chemical application and removal in the bleaching process including chemical and steam mixers, bleaching towers, washers, seal (filtrate) tanks, vacuum pumps, and any other equipment serving the same function as those previously listed.

Bleaching system means all process equipment after high-density pulp storage prior to the first application of oxidizing chemicals or reducing chemicals following the pulping system, up to and including the final bleaching stage.

Boiler means any enclosed combustion device that extracts useful energy in the form of steam. A boiler is not considered a thermal oxidizer.

Chip steamer means a vessel used for the purpose of preheating or pretreating wood chips prior to the digester, using flash steam from the digester or live steam.

Closed-vent system means a system that is not open to the atmosphere and is composed of piping, ductwork, connections, and, if necessary, flow-inducing devices that transport gas or vapor from an emission point to a control device.

Combustion device means an individual unit of equipment, including but not limited to, a thermal oxidizer, lime kiln, recovery furnace, process heater, or boiler, used for the thermal oxidation of organic hazardous air pollutant vapors.

Decker system means all equipment used to thicken the pulp slurry or reduce its liquid content after the pulp washing system and prior to high-density pulp storage. The decker system includes decker vents, filtrate tanks, associated vacuum pumps, and any other equipment serving the same function as those previously listed.

Digester system means each continuous digester or each batch digester used for the chemical treatment of wood or non-wood fibers. The digester system equipment includes associated flash tank(s), blow tank(s), chip steamer(s) not using fresh steam, blow heat recovery accumulator(s), relief gas condenser(s), prehydrolysis unit(s) preceding the pulp washing system, and any other equipment serving the same function as those previously listed. The digester system includes any of the liquid streams or condensates associated with batch or continuous digester relief, blow, or flash steam processes.

Emission point means any part of a stationary source that emits hazardous air pollutants regulated under this subpart, including emissions from individual process vents, stacks, open pieces of process equipment, equipment leaks, wastewater and condensate collection and treatment system units, and those emissions that could reasonably be conveyed through a stack, chimney, or duct where such emissions first reach the environment.

Evaporator system means all equipment associated with increasing the solids content and/or concentrating spent cooking liquor from the pulp washing system including pre-evaporators, multi-effect evaporators, concentrators, and vacuum systems, as well as associated condensers, hotwells, and condensate streams, and any other equipment serving the same function as those previously listed.

Flow indicator means any device that indicates gas or liquid flow in an enclosed system.

HAP means a hazardous air pollutant as defined in Sec. 63.2 of subpart A of this part.

High volume, low concentration or HVLC collection system means the gas collection and transport system used to convey gases from the HVLC system to a control device.

High volume, low concentration or HVLC system means the collection of equipment including the pulp washing, knotter, screen, decker, and oxygen delignification systems, weak liquor storage tanks, and any other equipment serving the same function as those previously listed.

Knotter system means equipment where knots, oversized material, or pieces of uncooked wood are removed from the pulp slurry after the digester system and prior to the pulp washing system. The knotter system equipment includes the knotter, knot drainer tanks, ancillary tanks, and any other equipment serving the same function as those previously listed.

Kraft pulping means a chemical pulping process that uses a mixture of sodium hydroxide and sodium sulfide as the cooking liquor.

Lime kiln means an enclosed combustion device used to calcine lime mud, which consists primarily of calcium carbonate, into calcium oxide.

Low volume, high concentration or LVHC collection system means the gas collection and transport system used to convey gases from the LVHC system to a control device.

Low volume, high concentration or LVHC system means the collection of equipment including the digester, turpentine recovery, evaporator, steam stripper systems, and any other equipment serving the same function as those previously listed.

Mechanical pulping means a pulping process that only uses mechanical and thermo-mechanical processes to reduce wood to a fibrous mass. The mechanical pulping processes include, but are not limited to, stone groundwood, pressurized groundwood, refiner mechanical, thermal refiner mechanical, thermo-mechanical, and tandem thermo-mechanical.

Non-wood pulping means the production of pulp from fiber sources other than trees. The non-wood fiber sources include, but are not limited to, bagasse, cereal straw, cotton, flax straw, hemp, jute, kenaf, and leaf fibers.

Oven-dried pulp or ODP means a pulp sample at zero percent moisture content by weight. Pulp samples for applicability or compliance determinations for both the pulping and bleaching systems shall be unbleached pulp. For purposes of complying with mass emission limits in this subpart, megagram of ODP shall be measured to represent the amount of pulp entering and processed by the equipment system under the specified mass limit. For equipment that does not process pulp, megagram of ODP shall be measured to represent the amount of pulp that was processed to produce the gas and liquid streams.

Oxygen delignification system means the equipment that uses oxygen to remove lignin from pulp after high-density stock storage and prior to the bleaching system. The oxygen delignification system equipment includes the blow tank, washers, filtrate tanks, any interstage pulp storage tanks, and any other equipment serving the same function as those previously listed.

Primary fuel means the fuel that provides the principal heat input to the combustion device. To be considered primary, the fuel must be able to sustain operation of the combustion device without the addition of other fuels.

Process wastewater treatment system means a collection of equipment, a process, or specific technique that removes or destroys the HAP's in a process wastewater stream. Examples include, but are not limited to, a steam stripping unit, wastewater thermal oxidizer, or biological treatment unit.

Pulp washing system means all equipment used to wash pulp and separate spent cooking chemicals following the digester system and prior to the bleaching system, oxygen delignification

system, or paper machine system (at unbleached mills). The pulp washing system equipment includes vacuum drum washers, diffusion washers, rotary pressure washers, horizontal belt filters, intermediate stock chests, and their associated vacuum pumps, filtrate tanks, foam breakers or tanks, and any other equipment serving the same function as those previously listed. The pulp washing system does not include deckers, screens, knotters, stock chests, or pulp storage tanks following the last stage of pulp washing.

Pulping line means a group of equipment arranged in series such that the wood chips are digested and the resulting pulp progresses through a sequence of steps that may include knotting, refining, washing, thickening, blending, storing, oxygen delignification, and any other equipment serving the same function as those previously listed.

Pulping process condensates means any HAP-containing liquid that results from contact of water with organic compounds in the pulping process. Examples of process condensates include digester system condensates, turpentine recovery system condensates, evaporator system condensates, LVHC system condensates, HVLC system condensates, and any other condensates from equipment serving the same function as those previously listed. Liquid streams that are intended for byproduct recovery are not considered process condensate streams.

Pulping system means all process equipment, beginning with the digester system, and up to and including the last piece of pulp conditioning equipment prior to the bleaching system, including treatment with ozone, oxygen, or peroxide before the first application of a chemical bleaching agent intended to brighten pulp. The pulping system includes pulping process condensates and can include multiple pulping lines.

Recovery furnace means an enclosed combustion device where concentrated spent liquor is burned to recover sodium and sulfur, produce steam, and dispose of unwanted dissolved wood components in the liquor.

Screen system means equipment in which oversized particles are removed from the pulp slurry prior to the bleaching or papermaking system washed stock storage.

Secondary fiber pulping means a pulping process that converts a fibrous material, that has previously undergone a manufacturing process, into pulp stock through the addition of water and mechanical energy. The mill then uses that pulp as the raw material in another manufactured product. These mills may also utilize chemical, heat, and mechanical processes to remove ink particles from the fiber stock.

Semi-chemical pulping means a pulping process that combines both chemical and mechanical pulping processes. The semi-chemical pulping process produces intermediate yields ranging from 55 to 90 percent.

Soda pulping means a chemical pulping process that uses sodium hydroxide as the active chemical in the cooking liquor.

Spent liquor means process liquid generated from the separation of cooking liquor from pulp by the pulp washing system containing dissolved organic wood materials and residual cooking compounds.

Steam stripper system means a column (including associated stripper feed tanks, condensers, or heat exchangers) used to remove compounds from wastewater or condensates using steam. The steam stripper system also contains all equipment associated with a methanol rectification process including rectifiers, condensers, decanters, storage tanks, and any other equipment serving the same function as those previously listed.

Strong liquor storage tanks means all storage tanks containing liquor that has been concentrated in preparation for combustion or oxidation in the recovery process.

Sulfite pulping means a chemical pulping process that uses a mixture of sulfurous acid and bisulfite ion as the cooking liquor.

Temperature monitoring device means a piece of equipment used to monitor temperature and having an accuracy of 1.0 percent of the temperature being monitored expressed in degrees Celsius or 0.5 degrees Celsius (deg.C), whichever is greater.

Thermal oxidizer means an enclosed device that destroys organic compounds by thermal oxidation.

Turpentine recovery system means all equipment associated with recovering turpentine from digester system gases including condensers, decanters, storage tanks, and any other equipment serving the same function as those previously listed. The turpentine recovery system includes any liquid streams associated with the turpentine recovery process such as turpentine decanter underflow. Liquid streams that are intended for byproduct recovery are not considered turpentine recovery system condensate streams.

Weak liquor storage tank means any storage tank except washer filtrate tanks containing spent liquor recovered from the pulping process and prior to the evaporator system.

Sec. 63.442 [Reserved]

Sec. 63.443 Standards for the pulping system at kraft, soda, and semi-chemical processes.

(a) The owner or operator of each pulping system using the kraft process subject to the requirements of this subpart shall control the total HAP emissions from the following equipment systems, as specified in paragraphs (c) and (d) of this section.

(1) At existing affected sources, the total HAP emissions from the following equipment systems shall be controlled:

(i) Each LVHC system;

(ii) Each knotter or screen system with total HAP mass emission rates greater than or equal to the rates specified in paragraphs (a)(1)(ii)(A) or (a)(1)(ii)(B) of this section or the combined rate specified in paragraph (a)(1)(ii)(C) of this section.

(A) Each knotter system with emissions of 0.05 kilograms or more of total HAP per megagram of ODP (0.1 pounds per ton).

(B) Each screen system with emissions of 0.10 kilograms or more of total HAP per megagram of ODP (0.2 pounds per ton).

(C) Each knotter and screen system with emissions of 0.15 kilograms or more of total HAP per megagram of ODP (0.3 pounds per ton).

(iii) Each pulp washing system;

(iv) Each decker system that:

(A) Uses any process water other than fresh water or paper machine white water; or

(B) Uses any process water with a total HAP concentration greater than 400 parts per million by weight; and

(v) Each oxygen delignification system.

(2) At new affected sources, the total HAP emissions from the equipment systems listed in paragraphs (a)(1)(i), (a)(1)(iii), and
(a)(1)(v) of this section and the following equipment systems shall be controlled:

(i) Each knotter system;

(ii) Each screen system;

(iii) Each decker system; and

(iv) Each weak liquor storage tank.

(b) The owner or operator of each pulping system using a semi-chemical or soda process subject to the requirements of this subpart shall control the total HAP emissions from the following equipment systems as specified in paragraphs (c) and (d) of this section.

(1) At each existing affected sources, the total HAP emissions from each LVHC system shall be controlled.

(2) At each new affected source, the total HAP emissions from each LVHC system and each pulp washing system shall be controlled.

(c) Equipment systems listed in paragraphs (a) and (b) of this section shall be enclosed and vented into a closed-vent system and routed to a control device that meets the requirements specified in paragraph (d) of this section. The enclosures and closed-vent system shall meet the requirements specified in Sec. 63.450.

(d) The control device used to reduce total HAP emissions from each equipment system listed in paragraphs (a) and (b) of this section shall:

(1) Reduce total HAP emissions by 98 percent or more by weight; or

(2) Reduce the total HAP concentration at the outlet of the thermal oxidizer to 20 parts per million or less by volume, corrected to 10 percent oxygen on a dry basis; or

(3) Reduce total HAP emissions using a thermal oxidizer designed and operated at a minimum temperature of 871 deg.C (1600 deg.F) and a minimum residence time of 0.75 seconds; or

(4) Reduce total HAP emissions using a boiler, lime kiln, or recovery furnace by introducing the HAP emission stream with the primary fuel or into the flame zone.

(e) Periods of excess emissions reported under Sec. 63.455 shall not be a violation of Sec. 63.443 (c) and (d) provided that the time of excess emissions (excluding periods of startup, shutdown, or malfunction) divided by the total process operating time in a semi-annual reporting period does not exceed the following levels:

(1) One percent for control devices used to reduce the total HAP emissions from the LVHC system; and

(2) Four percent for control devices used to reduce the total HAP emissions from the HVLC system; and

(3) Four percent for control devices used to reduce the total HAP emissions from both the LVHC and HVLC systems.

Sec. 63.444 Standards for the pulping system at sulfite processes.

(a) The owner or operator of each sulfite process subject to the requirements of this subpart shall control the total HAP emissions from the following equipment systems as specified in paragraphs (b) and (c) of this section.

(1) At existing sulfite affected sources, the total HAP emissions from the following equipment systems shall be controlled:

(i) Each digester system vent;

(ii) Each evaporator system vent; and

(iii) Each pulp washing system.

(2) At new affected sources, the total HAP emissions from the equipment systems listed in paragraph (a)(1) of this section and the following equipment shall be controlled:

(i) Each weak liquor storage tank;

(ii) Each strong liquor storage tank; and

(iii) Each acid condensate storage tank.

(b) Equipment listed in paragraph (a) of this section shall be enclosed and vented into a closed-vent system and routed to a control device that meets the requirements specified in paragraph (c) of this section. The enclosures and closed-vent system shall meet the requirements specified in Sec. 63.450. Emissions from equipment listed in paragraph (a) of this section that is not necessary to be reduced to meet paragraph (c) of this section is not required to be routed to a control device.

(c) The total HAP emissions from both the equipment systems listed in paragraph (a) of this section and the vents, wastewater, and condensate streams from the control device used to reduce HAP emissions, shall be controlled as follows.

(1) Each calcium-based or sodium-based sulfite pulping process shall:

(i) Emit no more than 0.44 kilograms of total HAP or methanol per megagram (0.89 pounds per ton) of ODP; or

(ii) Remove 92 percent or more by weight of the total HAP or methanol.

(2) Each magnesium-based or ammonium-based sulfite pulping process shall:

(i) Emit no more than 1.1 kilograms of total HAP or methanol per megagram (2.2 pounds per ton) of ODP; or

(ii) Remove 87 percent or more by weight of the total HAP or methanol.

Sec. 63.445 Standards for the bleaching system.

(a) Each bleaching system that does not use any chlorine or chlorinated compounds for bleaching is exempt from the requirements of this section. Owners or operators of the following bleaching systems shall meet all the provisions of this section:

(1) Bleaching systems that use chlorine;

(2) Bleaching systems bleaching pulp from kraft, sulfite, or soda pulping processes that uses any chlorinated compounds; or

(3) Bleaching systems bleaching pulp from mechanical pulping processes using wood or from any process using secondary or non-wood fibers, that use chlorine dioxide.

(b) The equipment at each bleaching stage, of the bleaching systems listed in paragraph (a) of this section, where chlorinated compounds are introduced shall be enclosed and vented into a closed-vent system and routed to a control device that meets the requirements specified in paragraph (c) of this section. The enclosures and closed-vent system shall meet the requirements specified in Sec. 63.450.

(c) The control device used to reduce chlorinated HAP emissions (not including chloroform) from the equipment specified in paragraph (b) of this section shall:

(1) Reduce the total chlorinated HAP mass in the vent stream entering the control device by 99 percent or more by weight;

(2) Achieve a treatment device outlet concentration of 10 parts per million or less by volume of total chlorinated HAP; or

(3) Achieve a treatment device outlet mass emission rate of 0.001 kg of total chlorinated HAP mass per megagram (0.002 pounds per ton) of ODP.

(d) The owner or operator of each bleaching system subject to paragraph (a)(2) of this section shall comply with paragraph (d)(1) or (d)(2) of this section to reduce chloroform air emissions to the atmosphere, except the owner or operator of each bleaching system complying with extended compliance under Sec. 63.440(d)(3)(ii) shall comply with paragraph (d)(1) of this section.

(1) Comply with the following applicable effluent limitation guidelines and standards specified in 40 CFR part 430:

(i) Dissolving-grade kraft bleaching systems and lines, 40 CFR 430.14 through 430.17;

(ii) Paper-grade kraft and soda bleaching systems and lines, 40 CFR 430.24(a)(1) and (e), and 40 CFR 430.26 (a) and (c);

(iii) Dissolving-grade sulfite bleaching systems and lines, 40 CFR 430.44 through 430.47; or

(iv) Paper-grade sulfite bleaching systems and lines, 40 CFR 430.54(a) and (c), and 430.56(a) and (c).

(2) Use no hypochlorite or chlorine for bleaching in the bleaching system or line.

Sec. 63.446 Standards for kraft pulping process condensates.

(a) The requirements of this section apply to owners or operators of kraft processes subject to the requirements of this subpart.

(b) The pulping process condensates from the following equipment systems shall be treated to meet the requirements specified in paragraphs (c), (d), and (e) of this section:

(1) Each digester system;

(2) Each turpentine recovery system;

(3) Each evaporator stage where weak liquor is introduced (feed stages) in the evaporator system;

(4) Each HVLC collection system; and

(5) Each LVHC collection system.

(c) One of the following combinations of HAP-containing pulping process condensates generated, produced, or associated with the equipment systems listed in paragraph (b) of this section shall be subject to the requirements of paragraphs (d) and (e) of this section:

(1) All pulping process condensates from the equipment systems specified in paragraphs (b)(1) through (b)(5) of this section.

(2) The combined pulping process condensates from the equipment systems specified in paragraphs (b)(4) and (b)(5) of this section, plus pulping process condensate stream(s) that in total contain at least 65 percent of the total HAP mass from the pulping process condensates from equipment systems listed in paragraphs (b)(1) through (b)(3) of this section.

(3) The pulping process condensates from equipment systems listed in paragraphs (b)(1) through (b)(5) of this section that in total contain a total HAP mass of 3.6 kilograms or more of total HAP per megagram (7.2 pounds per ton) of ODP for mills that do not perform bleaching or 5.5 kilograms or more of total HAP per megagram (11.1 pounds per ton) of ODP for mills that perform bleaching.

(d) The pulping process condensates from the equipment systems listed in paragraph (b) of this section shall be conveyed in a closed collection system that is designed and operated to meet the requirements specified in paragraphs (d)(1) and (d)(2) of this section.

(1) Each closed collection system shall meet the individual drain system requirements specified in Sec. 63.960, 63.961, and 63.962 of subpart RR of this part, except for closed vent systems and control devices shall be designed and operated in accordance with Secs. 63.443(d) and 63.450, instead of in accordance with Sec. 63.693 as specified in Sec. 63.962 (a)(3)(ii), (b)(3)(ii)(A), and (b)(3)(ii)(B)(5)(iii); and

(2) If a condensate tank is used in the closed collection system, the tank shall meet the following requirements:

(i) The fixed roof and all openings (e.g., access hatches, sampling ports, gauge wells) shall be designed and operated with no detectable leaks as indicated by an instrument reading of less than 500 parts per million above background, and vented into a closed-vent system that meets the requirements in Sec. 63.450 and routed to a control device that meets the requirements in Sec. 63.443(d); and

(ii) Each opening shall be maintained in a closed, sealed position (e.g., covered by a lid that is gasketed and latched) at all times that the tank contains pulping process condensates or any HAP removed from a pulping process condensate stream except when it is necessary to use the opening for sampling, removal, or for equipment inspection, maintenance, or repair.

(e) Each pulping process condensate from the equipment systems listed in paragraph (b) of this section shall be treated according to one of the following options:

(1) Recycle the pulping process condensate to an equipment system specified in Sec. 63.443(a) meeting the requirements specified in Sec. 63.443(c) and (d); or

(2) Discharge the pulping process condensate below the liquid surface of a biological treatment system meeting the requirement specified in paragraph (e)(3) of this section; or

(3) Treat the pulping process condensates to reduce or destroy the total HAP's by at least 92 percent or more by weight; or

(4) At mills that do not perform bleaching, treat the pulping process condensates to remove 3.3 kilograms or more of total HAP per megagram (6.6 pounds per ton) of ODP, or achieve a total HAP concentration of 210 parts per million or less by weight at the outlet of the control device; or

(5) At mills that perform bleaching, treat the pulping process condensates to remove 5.1 kilograms or more of total HAP per megagram (10.2 pounds per ton) of ODP, or achieve a total HAP concentration of 330 parts per million or less by weight at the outlet of the control device.

(f) Each HAP removed from a pulping process condensate stream during treatment and handling under paragraphs (d) or (e) of this section, except for those treated according to paragraph (e)(2) of this section, shall be controlled as specified in Sec. 63.443(c) and (d).

(g) For each steam stripper system used to comply with the requirements specified in paragraph (e)(3) of this section, periods of excess emissions reported under Sec. 63.455 shall not be a violation of paragraphs (d), (e), and (f) of this section provided that the time of excess emissions (including periods of startup, shutdown, or malfunction) divided by the total process operating time in a semi-annual reporting period does not exceed 10 percent.

(h) Each owner or operator of a new or existing affected source subject to the requirements of this section shall evaluate all new or modified pulping process condensates or changes in the annual bleached or non-bleached ODP used to comply with paragraph (i) of this section, to determine if they meet the applicable requirements of this section.

(i) For the purposes of meeting the requirements in paragraphs (c)(2), (e)(4), or (e)(5) of this section at mills producing both bleached and unbleached pulp products, owners and operators may meet a prorated mass standard that is calculated by prorating the applicable mass standards (kilograms of total HAP per megagram of ODP) for bleached and unbleached specified in paragraphs (c)(2), (e)(4), or (e)(5) of this section by the ratio of annual megagrams of bleached and unbleached ODP.

Sec. 63.447 Clean condensate alternative.

As an alternative to the requirements specified in Sec. 63.443(a)(1)(ii) through (a)(1)(v) for the control of HAP emissions from pulping systems using the kraft process, an owner or operator must demonstrate to the satisfaction of the Administrator, by meeting all the requirements below, that the total HAP emissions reductions achieved by this clean condensate alternative technology are equal to or greater than the total HAP emission reductions that would have been achieved by compliance with Sec. 63.443(a)(1)(ii) through (a)(1)(v).

(a) For the purposes of this section only the following additional definitions apply.

(1) *Clean condensate alternative affected source* means the total of all HAP emission points in the pulping, bleaching, causticizing, and papermaking systems (exclusive of HAP emissions attributable to additives to paper machines and HAP emission points in the LVHC system).

(2) *Causticizing system* means all equipment associated with converting sodium carbonate into active sodium hydroxide. The equipment includes smelt dissolving tanks, lime mud washers and storage tanks, white and mud liquor clarifiers and storage tanks, slakers, slaker grit washers, lime kilns, green liquor clarifiers and storage tanks, and dreg washers ending with the white liquor storage tanks prior to the digester system, and any other equipment serving the same function as those previously listed.

(3) *Papermaking system* means all equipment used to convert pulp into paper, paperboard, or market pulp, including the stock storage and preparation systems, the paper or paperboard machines, and the paper machine white water system, broke recovery systems, and the systems involved in calendering, drying, on-machine coating, slitting, winding, and cutting.

(b) Each owner or operator shall install and operate a clean condensate alternative technology with a continuous monitoring system to reduce total HAP emissions by treating and reducing HAP concentrations in the pulping process water used within the clean condensate alternative affected source.

(c) Each owner or operator shall calculate HAP emissions on a kilogram per megagram of ODP basis and measure HAP emissions according to the appropriate procedures contained in Sec. 63.457.

(d) Each owner or operator shall determine the baseline HAP emissions for each equipment system and the total of all equipment systems in the clean condensate alternative affected source based on the following:

(1) Process and air pollution control equipment installed and operating on or after December 17, 1993, and

(2) Compliance with the following requirements that affect the level of HAP emissions from the clean condensate alternative affected source:

(i) The pulping process condensates requirements in Sec. 63.446;

(ii) The applicable effluent limitation guidelines and standards in 40 CFR part 430, subparts A, B, D, and E; and

(iii) All other applicable requirements of local, State, or Federal agencies or statutes.

(e) Each owner or operator shall determine the following HAP emission reductions from the baseline HAP emissions determined in paragraph (d) of this section for each equipment system and the total of all equipment systems in the clean condensate alternative affected source:

(1) The HAP emission reduction occurring by complying with the requirements of Sec. 63.443(a)(1)(ii) through (a)(1)(v); and

(2) The HAP emissions reduction that occurring by complying with the clean condensate alternative technology.

(f) For the purposes of all requirements in this section, each owner or operator may use as an alternative, individual equipment systems (instead of total of all equipment systems) within the clean condensate alternative affected source to determine emissions and reductions to demonstrate equal or greater than the reductions that would have been achieved by compliance with Sec. 63.443(a)(1)(ii) through (a)(1)(v).

(g) The initial and updates to the control strategy report specified in Sec. 63.455(b) shall include to the extent possible the following information:

(1) A detailed description of:

(i) The equipment systems and emission points that comprise the clean condensate alternative affected source;

(ii) The air pollution control technologies that would be used to meet the requirements of Sec. 63.443(a)(1)(ii) through (a)(1)(v);

(iii) The clean condensate alternative technology to be used.

(2) Estimates and basis for the estimates of total HAP emissions and emissions reductions to fulfill the requirements paragraphs (d), (e), and (f) of this section.

(h) Each owner or operator shall report to the Administrator by the applicable compliance date specified in Sec. 63.440(d) or (e) the rationale, calculations, test procedures, and data documentation used to demonstrate compliance with all the requirements of this section.

Secs. 63.448-63.449 [Reserved]

Sec. 63.450 Standards for enclosures and closed-vent systems.

(a) Each enclosure and closed-vent system specified in Secs. 63.443(c), 63.444(b), and 63.445(b) for capturing and transporting vent streams that contain HAP shall meet the requirements specified in paragraphs (b) through (d) of this section.

(b) Each enclosure shall maintain negative pressure at each enclosure or hood opening as demonstrated by the procedures specified Sec. 63.457(e). Each enclosure or hood opening closed

during the initial performance test specified in Sec. 63.457(a) shall be maintained in the same closed and sealed position as during the performance test at all times except when necessary to use the opening for sampling, inspection, maintenance, or repairs.

(c) Each component of the closed-vent system used to comply with Secs. 63.443(c), 63.444(b), and 63.445(b) that is operated at positive pressure and located prior to a control device shall be designed for and operated with no detectable leaks as indicated by an instrument reading of less than 500 parts per million by volume above background, as measured by the procedures specified in Sec. 63.457(d).

(d) Each bypass line in the closed-vent system that could divert vent streams containing HAP to the atmosphere without meeting the emission limitations in Secs. 63.443, 63.444, or 63.445 shall comply with either of the following requirements:

(1) On each bypass line, the owner or operator shall install, calibrate, maintain, and operate according to manufacturer's specifications a flow indicator that provides a record of the presence of gas stream flow in the bypass line at least once every 15 minutes. The flow indicator shall be installed in the bypass line in such a way as to indicate flow in the bypass line; or

(2) For bypass line valves that are not computer controlled, the owner or operator shall maintain the bypass line valve in the closed position with a car seal or a seal placed on the valve or closure mechanism in such a way that valve or closure mechanism cannot be opened without breaking the seal.

Secs. 63.451-63.452 **[Reserved]**

Sec. 63.453 Monitoring requirements.

(a) Each owner or operator subject to the standards specified in Secs. 63.443(c) and (d), 63.444(b) and (c), 63.445(b) and (c), 63.446(c), (d), and (e), 63.447(b) or Sec. 63.450(d), shall install, calibrate, certify, operate, and maintain according to the manufacturer's specifications, a continuous monitoring system (CMS, as defined in Sec. 63.2 of this part) as specified in paragraphs (b) through (m) of this section, except as allowed in paragraph (m) of this section. The CMS shall include a continuous recorder.

(b) A CMS shall be operated to measure the temperature in the firebox or in the ductwork immediately downstream of the firebox and before any substantial heat exchange occurs for each thermal oxidizer used to comply with the requirements of Sec. 63.443(d)(1) through (d)(3). Owners and operators complying with the requirements in Sec. 63.443(d)(2) or (d)(3) shall monitor the parameter specified and for the temperature and concentration limits specified.

(c) A CMS shall be operated to measure the following parameters for each gas scrubber used to comply with the bleaching system requirements of Sec. 63.445(c) or the sulfite pulping system requirements of Sec. 63.444(c).

(1) The pH or the oxidation/reduction potential of the gas scrubber effluent;

(2) The gas scrubber vent gas inlet flow rate; and

(3) The gas scrubber liquid influent flow rate.

(d) As an option to the requirements specified in paragraph (c) of this section, a CMS shall be operated to measure the chlorine outlet concentration of each gas scrubber used to comply with the bleaching system outlet concentration requirement specified in Sec. 63.445(c)(2).

(e) The owner or operator of a bleaching system complying with 40 CFR 430.24, shall monitor the chlorine and hypochlorite application rates, in kg of bleaching agent per megagram of ODP, of the bleaching system during the extended compliance period specified in Sec. 63.440(d)(3).

(f) A CMS shall be operated to measure the gas scrubber parameters specified in paragraphs (c)(1) through (c)(3) of this section or those site specific parameters determined according to the procedures specified in paragraph (n) of this section to comply with the sulfite pulping system requirements specified in Sec. 63.444(c).

(g) A CMS shall be operated to measure the following parameters for each steam stripper used to comply with the treatment requirements in Sec. 63.446(e) (3), (4), or (5):

(1) The process wastewater feed rate;

(2) The steam feed rate; and

(3) The process wastewater column feed temperature.

(h) As an option to the requirements specified in paragraph (g) of this section, a CMS shall be operated to measure the methanol outlet concentration to comply with the steam stripper outlet concentration requirement specified in Sec. 63.446 (e)(4) or (e)(5).

(i) A CMS shall be operated to measure the appropriate parameters determined according to the procedures specified in paragraph (n) of this section to comply with the condensate applicability requirements specified in Sec. 63.446(c).

(j) Each owner or operator using a biological treatment system to comply with Sec. 63.446(e)(2) shall perform the following monitoring procedures.

(1) On a daily basis, monitor the following parameters for each biological treatment unit:

(i) Composite daily sample of outlet soluble BOD5 concentration to monitor for maximum daily and maximum monthly average;

(ii) Mixed liquor volatile suspended solids;

(iii) Horsepower of aerator unit(s);

(iv) Inlet liquid flow; and

(v) Liquid temperature.

(2) Obtain daily inlet and outlet liquid grab samples from each biological treatment unit to have HAP data available to perform quarterly percent reduction tests specified in paragraph (j)(2)(ii) of this section and the compliance percent reduction tests specified in paragraph (p)(1)(i) of this section. Perform the following procedures with the liquid samples:

(i) Store the samples for 5 days as specified in Sec. 63.457(n). The 5 day storage requirement is required since the soluble BOD5 test requires 5 days to obtain results. If the results of the soluble BOD5 test are outside of the range established during the initial performance test, then the archive sample shall be used to perform the percent reduction test specified in Sec. 63.457(l).

(ii) Perform the percent reduction test procedures specified in Sec. 63.457(l) within 45 days after the beginning of each quarter as follows.

(A) The percent reduction test performed in the first quarter (annually) shall be performed for total HAP and the percent reduction obtained from the test shall be at least as great as the total HAP reduction specified in Sec. 63.446(e)(2).

(B) The remaining quarterly percent reduction tests shall be performed for methanol and the percent reduction obtained from the test shall be at least as great as the methanol reduction determined in the previous first-quarter test specified in paragraph (j)(2)(ii)(A) of this section.

(C) The parameter values used to calculate the percent reductions required in paragraphs (j)(2)(ii)(A) and (j)(2)(ii)(B) of this section shall be parameter values measured and samples taken in paragraph (j)(1) of this section.

(k) Each enclosure and closed-vent system used to comply with Sec. 63.450(a) shall comply with the requirements specified in paragraphs (k)(1) through (k)(6) of this section.

(1) For each enclosure opening, a visual inspection of the closure mechanism specified in Sec. 63.450(b) shall be performed at least once every 30 days to ensure the opening is maintained in the closed position and sealed.

(2) Each closed-vent system required by Sec. 63.450(a) shall be visually inspected every 30 days and at other times as requested by the Administrator. The visual inspection shall include inspection of ductwork, piping, enclosures, and connections to covers for visible evidence of defects.

(3) For positive pressure closed-vent systems or portions of closed-vent systems, demonstrate no detectable leaks as specified in Sec. 63.450(c) measured initially and annually by the procedures in Sec. 63.457(d).

(4) Demonstrate initially and annually that each enclosure opening is maintained at negative pressure as specified in Sec. 63.457(e).

(5) The valve or closure mechanism specified in Sec. 63.450(d)(2) shall be inspected at least once every 30 days to ensure that the valve is maintained in the closed position and the emission point gas stream is not diverted through the bypass line.

(6) If an inspection required by paragraphs (k)(1) through (k)(5) of this section identifies visible defects in ductwork, piping, enclosures or connections to covers required by Sec. 63.450, or if an instrument reading of 500 parts per million by volume or greater above background is measured, or if enclosure openings are not maintained at negative pressure, then the following corrective actions shall be taken as soon as practicable.

(i) A first effort to repair or correct the closed-vent system shall be made as soon as practicable but no later than 5 calendar days after the problem is identified.

(ii) The repair or corrective action shall be completed no later than 15 calendar days after the problem is identified.

(l) Each pulping process condensate closed collection system used to comply with Sec. 63.446(d) shall be visually inspected every 30 days and shall comply with the inspection and monitoring requirements specified in Sec. 63.964 of subpart RR of this part, except for the closed-vent system and control device inspection and monitoring requirements specified in Sec. 63.964(a)(2) of subpart RR of this part, the closed-vent system and the control device shall meet the requirements specified in paragraphs (a) and (k) of this section.

(m) Each owner or operator using a control device, technique or an alternative parameter other than those specified in paragraphs (b) through (l) of this section shall install a CMS and establish appropriate operating parameters to be monitored that demonstrate, to the Administrator's satisfaction, continuous compliance with the applicable control requirements.

(n) To establish or reestablish, the value for each operating parameter required to be monitored under paragraphs (b) through (j), (l), and (m) of this section or to establish appropriate parameters for paragraphs (f), (i), and (m) of this section, each owner or operator shall use the following procedures:

(1) During the initial performance test required in Sec. 63.457(a) or any subsequent performance test, continuously record the operating parameter;

(2) Determinations shall be based on the control performance and parameter data monitored during the performance test, supplemented if necessary by engineering assessments and the manufacturer's recommendations;

(3) The owner or operator shall provide for the Administrator's approval the rationale for selecting the monitoring parameters necessary to comply with paragraphs (f), (i), and (m) of this section; and

(4) Provide for the Administrator's approval the rationale for the selected operating parameter value, and monitoring frequency, and averaging time. Include all data and calculations used to develop the value and a description of why the value, monitoring frequency, and averaging time demonstrate continuous compliance with the applicable emission standard.

(o) Each owner or operator of a control device subject to the monitoring provisions of this section shall operate the control device in a manner consistent with the minimum or maximum (as appropriate) operating parameter value or procedure required to be monitored under paragraphs (a) through (n) of this section and established under this subpart. Except as provided in paragraph (p) of this section, Sec. 63.443(e), or Sec. 63.446(g), operation of the control device below minimum operating parameter values or above maximum operating parameter values established under this subpart or failure to perform procedures required by this subpart shall constitute a violation of the applicable emission standard of this subpart and be reported as a period of excess emissions.

(p) Each owner or operator of a biological treatment system complying with paragraph (j) of this section shall perform all the following requirements when the monitoring parameters specified in paragraphs (j)(1)(i) through (j)(1)(iii) of this section are below minimum operating parameter values or above maximum operating parameter values established in paragraph (n) of this section.

(1) The following shall occur and be recorded as soon as practical:

(i) Determine compliance with Sec. 63.446(e)(2) using the percent reduction test procedures specified in Sec. 63.457(l) and the monitoring data specified in paragraph (j)(1) of this section that coincide with the time period of the parameter excursion;

(ii) Steps shall be taken to repair or adjust the operation of the process to end the parameter excursion period; and

(iii) Steps shall be taken to minimize total HAP emissions to the atmosphere during the parameter excursion period.

(2) A parameter excursion is not a violation of the applicable emission standard if the percent reduction test specified in paragraph (p)(1)(i) of this section demonstrates compliance with Sec. 63.446(e)(2), and no maintenance or changes have been made to the process or control device after the beginning of a parameter excursion that would influence the results of the determination.

Sec. 63.454 Recordkeeping requirements.

(a) The owner or operator of each affected source subject to the requirements of this subpart shall comply with the recordkeeping requirements of Sec. 63.10 of subpart A of this part, as shown in table 1, and the requirements specified in paragraphs (b) through (d) of this section for the monitoring parameters specified in Sec. 63.453.

(b) For each applicable enclosure opening, closed-vent system, and closed collection system, the owner or operator shall prepare and maintain a site-specific inspection plan including a drawing or schematic of the components of applicable affected equipment and shall record the following information for each inspection:

(1) Date of inspection;

(2) The equipment type and identification;

(3) Results of negative pressure tests for enclosures;

(4) Results of leak detection tests;

(5) The nature of the defect or leak and the method of detection (i.e., visual inspection or instrument detection);

(6) The date the defect or leak was detected and the date of each attempt to repair the defect or leak;

(7) Repair methods applied in each attempt to repair the defect or leak;

(8) The reason for the delay if the defect or leak is not repaired within 15 days after discovery;

(9) The expected date of successful repair of the defect or leak if the repair is not completed within 15 days;

(10) The date of successful repair of the defect or leak;

(11) The position and duration of opening of bypass line valves and the condition of any valve seals; and

(12) The duration of the use of bypass valves on computer controlled valves.

(c) The owner or operator of a bleaching system complying with Sec. 63.440(d)(3)(ii)(B) shall record the daily average chlorine and hypochlorite application rates, in kg of bleaching agent per megagram of ODP, of the bleaching system until the requirements specified in Sec. 63.440(d)(3)(ii)(A) are met.

(d) The owner or operator shall record the CMS parameters specified in Sec. 63.453 and meet the requirements specified in paragraph (a) of this section for any new affected process equipment or pulping process condensate stream that becomes subject to the standards in this subpart due to a process change or modification.

Sec. 63.455 Reporting requirements.

(a) Each owner or operator of a source subject to this subpart shall comply with the reporting requirements of subpart A of this part as specified in table 1 and all the following requirements in this section. The initial notification report specified under Sec. 63.9(b)(2) of subpart A of this part shall be submitted by April 15, 1999.

(b) Each owner or operator of a kraft pulping system specified in Sec. 63.440(d)(1) or a bleaching system specified in Sec. 63.440(d)(3)(ii) shall submit, with the initial notification report specified under Sec. 63.9(b)(2) of subpart A of this part and paragraph (a) of this section and update every two years thereafter, a non-binding control strategy report containing, at a minimum, the information specified in paragraphs (b)(1) through (b)(3) of this section in addition to the information required in Sec. 63.9(b)(2) of subpart A of this part.

(1) A description of the emission controls or process modifications selected for compliance with the control requirements in this standard.

(2) A compliance schedule, including the dates by which each step toward compliance will be reached for each emission point or sets of emission points. At a minimum, the list of dates shall include:

(i) The date by which the major study(s) for determining the compliance strategy will be completed;

(ii) The date by which contracts for emission controls or process modifications will be awarded, or the date by which orders will be issued for the purchase of major components to accomplish emission controls or process changes;

(iii) The date by which on-site construction, installation of emission control equipment, or a process change is to be initiated;

(iv) The date by which on-site construction, installation of emissions control equipment, or a process change is to be completed;

(v) The date by which final compliance is to be achieved;

(vi) For compliance with paragraph Sec. 63.440(d)(3)(ii), the tentative dates by which compliance with effluent limitation guidelines and standards intermediate pollutant load effluent reductions and as available, all the dates for the best available technology's milestones reported in the National Pollutant Discharge Elimination System authorized under section 402 of the Clean Water Act and for the best professional milestones in the Voluntary Advanced Technology Incentives Program under 40 CFR 430.24 (b)(2); and

(vii) The date by which the final compliance tests will be performed.

(3) Until compliance is achieved, revisions or updates shall be made to the control strategy report required by paragraph (b) of this section indicating the progress made towards completing the installation of the emission controls or process modifications during the 2-year period.

(c) The owner or operator of each bleaching system complying with Sec. 63.440(d)(3)(ii)(B) shall certify in the report specified under Sec. 63.10(e)(3) of subpart A of this part that the daily application rates of chlorine and hypochlorite for that bleaching system have not increased as specified in Sec. 63.440(d)(3)(ii)(B) until the requirements of Sec. 63.440(d)(3)(ii)(A) are met.

(d) The owner or operator shall meet the requirements specified in paragraph (a) of this section upon startup of any new affected process equipment or pulping process condensate stream that becomes subject to the standards of this subpart due to a process change or modification.

Sec. 63.456 [Reserved]

Sec. 63.457 Test methods and procedures.

(a) *Initial performance test.* An initial performance test is required for all emission sources subject to the limitations in Secs. 63.443, 63.444, 63.445, 63.446, and 63.447, except those controlled by a combustion device that is designed and operated as specified in Sec. 63.443(d)(3) or (d)(4).

(b) *Vent sampling port locations and gas stream properties.* For purposes of selecting vent sampling port locations and determining vent gas stream properties, required in Secs. 63.443, 63.444, 63.445, and 63.447, each owner or operator shall comply with the applicable procedures in paragraphs (b)(1) through (b)(6) of this section.

(1) Method 1 or 1A of part 60, appendix A, as appropriate, shall be used for selection of the sampling site as follows:

(i) To sample for vent gas concentrations and volumetric flow rates, the sampling site shall be located prior to dilution of the vent gas stream and prior to release to the atmosphere;

(ii) For determining compliance with percent reduction requirements, sampling sites shall be located prior to the inlet of the control device and at the outlet of the control device; measurements shall be performed simultaneously at the two sampling sites; and

(iii) For determining compliance with concentration limits or mass emission rate limits, the sampling site shall be located at the outlet of the control device.

(2) No traverse site selection method is needed for vents smaller than 0.10 meter (4.0 inches) in diameter.

(3) The vent gas volumetric flow rate shall be determined using Method 2, 2A, 2C, or 2D of part 60, appendix A, as appropriate.

(4) The moisture content of the vent gas shall be measured using Method 4 of part 60, appendix A.

(5) To determine vent gas concentrations, the owner or operator shall collect a minimum of three samples that are representative of normal conditions and average the resulting pollutant concentrations using the following procedures.

(i) Method 308 in Appendix A of this part shall be used to determine the methanol concentration.

(ii) Except for the modifications specified in paragraphs (b)(5)(ii)(A) through (b)(5)(ii)(K) of this section, Method 26A of part 60, appendix A shall be used to determine chlorine concentration in the vent stream.

(A) *Probe/Sampling Line*. A separate probe is not required. The sampling line shall be an appropriate length of 0.64 cm (0 25 in) OD Teflon® tubing. The sample inlet end of the sampling line shall be inserted into the stack in such a way as to not entrain liquid condensation from the vent gases. The other end shall be connected to the impingers. The length of the tubing may vary from one sampling site to another, but shall be as short as possible in each situation. If sampling is conducted in sunlight, opaque tubing shall be used. Alternatively, if transparent tubing is used, it shall be covered with opaque tape.

(B) *Impinger Train*. Three 30 milliliter (ml) capacity midget impingers shall be connected in series to the sampling line. The impingers shall have regular tapered stems. Silica gel shall be placed in the third impinger as a desiccant. All impinger train connectors shall be glass and/or Teflon®.

(C) *Critical Orifice*. The critical orifice shall have a flow rate of 200 to 250 ml/min and shall be followed by a vacuum pump capable of providing a vacuum of 640 millimeters of mercury (mm Hg). A 45 millimeter diameter in-line Teflon® 0.8 micrometer filter shall follow the impingers to project the critical orifice and vacuum pump.

(D) The following are necessary for the analysis apparatus:

(1) Wash bottle filled with deionized water;

(2) 25 or 50 ml graduated burette and stand;

(3) Magnetic stirring apparatus and stir bar;

(4) Calibrated pH Meter;

(5) 150-250 ml beaker or flask; and

(6) A 5 ml pipette.

(E) The procedures listed in paragraphs (b)(5)(ii)(E)(1) through (b)(5)(ii)(E)(7) of this section shall be used to prepare the reagents.

(1) To prepare the 1 molarity (M) potassium dihydrogen phosphate solution, dissolve 13.61 grams (g) of potassium dihydrogen phosphate in water and dilute to 100 ml.

(2) To prepare the 1 M sodium hydroxide solution (NaOH), dissolve 4.0 g of sodium hydroxide in water and dilute to 100 ml.

(3) To prepare the buffered 2 percent potassium iodide solution, dissolve 20 g of potassium iodide in 900 ml water. Add 50 ml of the 1 M potassium dihydrogen phosphate solution and 30 ml of the 1 M sodium hydroxide solution. While stirring solution, measure the pH of solution electrometrically and add the 1 M sodium hydroxide solution to bring pH to between 6.95 and 7.05.

(4) To prepare the 0.1 normality (N) sodium thiosulfate solution, dissolve 25 g of sodium thiosulfate, pentahydrate, in 800 ml of freshly boiled and cooled distilled water in a 1-liter volumetric flask. Dilute to volume. To prepare the 0.01 N sodium thiosulfate solution, add 10.0 ml standardized 0.1 N sodium thiosulfate solution to a 100 ml volumetric flask, and dilute to volume with water.

(5) To standardize the 0.1 N sodium thiosulfate solution, dissolve 3.249 g of anhydrous potassium bi-iodate, primary standard quality, or 3.567 g potassium iodate dried at 103 +/-2 degrees Centigrade for 1 hour. in distilled water and dilute to 1000 ml to yield a 0.1000 N solution. Store in a glass-stoppered bottle. To 80 ml distilled water, add, with constant stirring, 1 ml concentrated sulfuric acid, 10.00 ml 0.1000 N anhydrous potassium bi-iodate, and 1 g potassium iodide. Titrate immediately with 0.1 n sodium thiosulfate titrant until the yellow color of the liberated iodine is almost discharged. Add 1 ml starch indicator solution and continue titrating until the blue color disappears. The normality of the sodium thiosulfate solution is inversely proportional to the ml of sodium thiosulfate solution consumed:

$$\text{Normality of Sodium Thiosulfate} = \frac{1}{\text{ml Sodium Thiosulfate Consumed}}$$

(6) To prepare the starch indicator solution, add a small amount of cold water to 5 g starch and grind in a mortar to obtain a thin paste. Pour paste into 1 L of boiling distilled water, stir, and let settle overnight. Use clear supernate for starch indicator solution.

(7) To prepare the 10 percent sulfuric acid solution, add 10 ml of concentrated sulfuric acid to 80 ml water in an 100 ml volumetric flask. Dilute to volume.

(F) The procedures specified in paragraphs (b)(5)(ii)(F)(1) through (b)(5)(ii)(F)(5) of this section shall be used to perform the sampling.

(1) *Preparation of Collection Train.* Measure 20 ml buffered potassium iodide solution into each of the first two impingers and connect probe, impingers, filter, critical orifice, and pump. The sampling line and the impingers shall be shielded from sunlight.

(2) *Leak and Flow Check Procedure.* Plug sampling line inlet tip and turn on pump. If a flow of bubbles is visible in either of the liquid impingers, tighten fittings and adjust connections and impingers. A leakage rate not in excess of 2 percent of the sampling rate is acceptable. Carefully remove the plug from the end of the probe. Check the flow rate at the probe inlet with a bubble tube flow meter. The flow should be comparable or slightly less than the flow rate of the critical orifice with the impingers off-line. Record the flow and turn off the pump.

(3) *Sample Collection.* Insert the sampling line into the stack and secure it with the tip slightly lower than the port height. Start the pump, recording the time. End the sampling after 60 minutes, or after yellow color is observed in the second in-line impinger. Record time and remove the tubing from the vent. Recheck flow rate at sampling line inlet and turn off pump. If the flow rate has changed significantly, redo sampling with fresh capture solution. A slight variation (less than 5 percent) in flow may be averaged. With the inlet end of the line elevated above the impingers, add about 5 ml water into the inlet tip to rinse the line into the first impinger.

(4) *Sample Analysis.* Fill the burette with 0.01 N sodium thiosulfate solution to the zero mark. Combine the contents of the impingers in the beaker or flask. Stir the solution and titrate with thiosulfate until the solution is colorless. Record the volume of the first endpoint (TN, ml). Add

5 ml of the 10 percent sulfuric acid solution, and continue the titration until the contents of the flask are again colorless. Record the total volume of titrant required to go through the first and to the second endpoint (TA, ml). If the volume of neutral titer is less than 0.5 ml, repeat the testing for a longer period of time. It is important that sufficient lighting be present to clearly see the endpoints, which are determined when the solution turns from pale yellow to colorless. A lighted stirring plate and a white background are useful for this purpose.

(5) *Interferences*. Known interfering agents of this method are sulfur dioxide and hydrogen peroxide. Sulfur dioxide, which is used to reduce oxidant residuals in some bleaching systems, reduces formed iodine to iodide in the capture solution. It is therefore a negative interference for chlorine, and in some cases could result in erroneous negative chlorine concentrations. Any agent capable of reducing iodine to iodide could interfere in this manner. A chromium trioxide impregnated filter will capture sulfur dioxide and pass chlorine and chlorine dioxide. Hydrogen peroxide, which is commonly used as a bleaching agent in modern bleaching systems, reacts with iodide to form iodine and thus can cause a positive interference in the chlorine measurement. Due to the chemistry involved, the precision of the chlorine analysis will decrease as the ratio of chlorine dioxide to chlorine increases. Slightly negative calculated concentrations of chlorine may occur when sampling a vent gas with high concentrations of chlorine dioxide and very low concentrations of chlorine.

(G) The following calculation shall be performed to determine the corrected sampling flow rate:

$$S_C = S_U\left(\frac{BP - PW}{760}\right)\left(\frac{293}{273+t}\right)$$

Where:
S_C=Corrected (dry standard) sampling flow rate, liters per minute;
S_U=Uncorrected sampling flow rate, L/min;
BP=Barometric pressure at time of sampling;
PW=Saturated partial pressure of water vapor, mm Hg at temperature; and
t=Ambient temperature, deg.C.

(H) The following calculation shall be performed to determine the moles of chlorine in the sample:

$$Cl_2\text{Moles} = 1/8000\ (5\ T_N - T_A)\times N_{Thio}$$

Where:
T_N=Volume neutral titer, ml;
T_A=Volume acid titer (total), ml; and
N_{Thio}=Normality of sodium thiosulfate titrant.

(i) The following calculation shall be performed to determine the concentration of chlorine in the sample:

$$Cl_2 ppmv = \frac{3005(5\ T_N - T_A)\times N_{Thio}}{S_C \times t_S}$$

Where:
S_C=Corrected (dry standard) sampling flow rate, liters per minute;
t_S=Time sampled, minutes;
T_N=Volume neutral titer, ml;
T_A=Volume acid titer (total), ml; and
N_{Thio}=Normality of sodium thiosulfate titrant.

(J) The following calculation shall be performed to determine the moles of chlorine dioxide in the sample:

$$ClO_2 Moles = 1/4000\ (T_A - T_N)\times N_{Thio}$$

Where:
T_A=Volume acid titer (total), ml;
T_N=Volume neutral titer, ml; and
N_{Thio}=Normality of sodium thiosulfate titrant.

(K) The following calculation shall be performed to determine the concentration of chlorine dioxide in the sample:

$$ClO_2 ppmv = \frac{6010(T_A - T_N)\times N_{Thio}}{S_C \times t_S}$$

Where:
S_C=Corrected (dry standard) sampling flow rate, liters per minute;
t_S=Time sampled, minutes;
T_A=Volume acid titer (total), ml;
T_N=Volume neutral titer, ml; and
N_{Thio}=Normality of sodium thiosulfate titrant.

(iii) Any other method that measures the total HAP or methanol concentration that has been demonstrated to the Administrator's satisfaction.

(6) The minimum sampling time for each of the three runs per method shall be 1 hour in which either an integrated sample or four grab samples shall be taken. If grab sampling is used, then the samples shall be taken at approximately equal intervals in time, such as 15 minute intervals during the run.

(c) *Liquid sampling locations and properties*. For purposes of selecting liquid sampling locations and for determining properties of liquid streams such as wastewaters, process waters, and condensates required in Secs. 63.444, 63.446, and 63.447, the owner or operator shall comply with the following procedures:

(1) Samples shall be collected using the sampling procedures specified in Method 305 of part 60, appendix A;

(i) Where feasible, samples shall be taken from an enclosed pipe prior to the liquid stream being exposed to the atmosphere; and

(ii) When sampling from an enclosed pipe is not feasible, samples shall be collected in a manner to minimize exposure of the sample to the atmosphere and loss of HAP compounds prior to sampling.

(2) The volumetric flow rate of the entering and exiting liquid streams shall be determined using the inlet and outlet flow meters or other methods demonstrated to the Administrator's satisfaction. The volumetric flow rate measurements to determine actual mass removal shall be taken at the same time as the concentration measurements;

(3) To determine liquid stream total HAP or methanol concentrations, the owner or operator shall collect a minimum of three samples that are representative of normal conditions and average the resulting pollutant concentrations using one of the following:

(i) Method 305 in Appendix A of this part, adjusted using the following equation:

$$\bar{C} = \sum_{i=1}^{n} C_i/fm_i$$

Where:

$\bar{C}$=Pollutant concentration for the liquid stream, parts per million by weight.

C_i=Measured concentration of pollutant I in the liquid stream sample determined using Method 305, parts per million by weight.

fm_i=Pollutant-specific constant that adjusts concentration measured by Method 305 to actual liquid concentration; the fm for methanol is 0.85. Additional pollutant fm values can be found in table 34, subpart G of this part.

n=Number of individual pollutants, I, summed to calculate total HAP.

(ii) Any other method that measures total HAP concentration that has been demonstrated to the Administrator's satisfaction.

(4) To determine soluble BOD5 in the effluent stream from a biological treatment unit used to comply with Secs. 63.446(e)(2) and 63.453(j), the owner or operator shall use Method 405.1, of part 136, with the following modifications:

(i) Filter the sample through the filter paper, into Erlenmeyer flask by applying a vacuum to the flask sidearm. Minimize the time for which vacuum is applied to prevent stripping of volatile organics from the sample. Replace filter paper as often as needed in order to maintain filter times of less than approximately 30 seconds per filter paper. No rinsing of sample container or filter bowl into the Erlenmeyer flask is allowed.

(ii) Perform Method 405.1 on the filtrate obtained in paragraph (c)(4) of this section. Dilution water shall be seeded with 1 milliliter of final effluent per liter of dilution water. Dilution ratios may require adjustment to reflect the lower oxygen demand of the filtered sample in comparison to the total BOD5. Three BOD bottles and different dilutions shall be used for each sample.

(d) *Detectable leak procedures*. To measure detectable leaks for closed-vent systems as specified in Sec. 63.450 or for pulping process wastewater collection systems as specified in Sec. 63.446(d)(2)(i), the owner or operator shall comply with the following:

(1) Method 21, of part 60, appendix A; and

(2) The instrument specified in Method 21 shall be calibrated before use according to the procedures specified in Method 21 on each day that leak checks are performed. The following calibration gases shall be used:

(i) Zero air (less than 10 parts per million by volume of hydrocarbon in air); and

(ii) A mixture of methane or n-hexane and air at a concentration of approximately, but less than, 10,000 parts per million by volume methane or n-hexane.

(e) *Negative pressure procedures*. To demonstrate negative pressure at process equipment enclosure openings as specified in Sec. 63.450(b), the owner or operator shall use one of the following procedures:

(1) An anemometer to demonstrate flow into the enclosure opening;

(2) Measure the static pressure across the opening;

(3) Smoke tubes to demonstrate flow into the enclosure opening; or

(4) Any other industrial ventilation test method demonstrated to the Administrator's satisfaction.

(f) *HAP concentration measurements*. For purposes of complying with the requirements in Secs. 63.443, 63.444, and 63.447, the owner or operator shall measure the total HAP concentration as one of the following:

(1) As the sum of all individual HAP's; or

(2) As methanol.

(g) *Condensate HAP concentration measurement*. For purposes of complying with the kraft pulping condensate requirements in Sec. 63.446, the owner or operator shall measure the total HAP concentration as methanol except for the purposes of complying with the initial performance test specified in Sec. 63.457(a) for Sec. 63.446(e)(2) and as specified in Sec. 63.453(j)(2)(ii).

(h) *Bleaching HAP concentration measurement*. For purposes of complying with the bleaching system requirements in Sec. 63.445, the owner or operator shall measure the total HAP concentration as the sum of all individual chlorinated HAP's or as chlorine.

(i) *Vent gas stream calculations*. To demonstrate compliance with the mass emission rate, mass emission rate per megagram of ODP, and percent reduction requirements for vent gas streams specified in Secs. 63.443, 63.444, 63.445, and 63.447, the owner or operator shall use the following:

(1) The total HAP mass emission rate shall be calculated using the following equation:

$$E = K_2\left(\sum_{j=1}^{n} C_j M_j\right) Q_s$$

Where:

E=Mass emission rate of total HAP from the sampled vent, kilograms per hour.

K_2=Constant, 2.494 x 10-6 (parts per million by volume)-1 (gram-mole per standard cubic meter) (kilogram/gram) (minutes/hour), where standard temperature for (gram-mole per standard cubic meter) is 20 deg.C.

C_j=Concentration on a dry basis of pollutant j in parts per million by volume as measured by the test methods specified in paragraph (b) of this section.
M_j=Molecular weight of pollutant j, gram/gram-mole.
Q_s=Vent gas stream flow rate (dry standard cubic meter per minute) at a temperature of 20 deg.C as indicated in paragraph (b) of this section.
n=Number of individual pollutants, I, summed to calculate total HAP.

(2) The total HAP mass emission rate per megagram of ODP shall be calculated using the following equation:

$$F = \frac{E}{P}$$

Where:
F=Mass emission rate of total HAP from the sampled vent, in kilograms per megagram of ODP.
E=Mass emission rate of total HAP from the sampled vent, in kilograms per hour determined as specified in paragraph (i)(1) of this section.
P=The production rate of pulp during the sampling period, in megagrams of ODP per hour.

(3) The total HAP percent reduction shall be calculated using the following equation:

$$R = \frac{E_i - E_O}{E_i}(100)$$

Where:
R=Efficiency of control device, percent.
E_i=Inlet mass emission rate of total HAP from the sampled vent, in kilograms of pollutant per hour, determined as specified in paragraph (i)(1) of this section.
E_o=Outlet mass emission rate of total HAP from the sampled vent, in kilograms of pollutant per hour, determined as specified in paragraph (i)(1) of this section.

(j) *Liquid stream calculations*. To demonstrate compliance with the mass flow rate, mass per megagram of ODP, and percent reduction requirements for liquid streams specified in Sec. 63.446, the owner or operator shall use the following:

(1) The mass flow rates of total HAP or methanol entering and exiting the treatment process shall be calculated using the following equations:

$$E_b = \frac{K}{n \times 10^6}\left(\sum_{i=1}^{n} V_{bi} C_{bi}\right)$$

$$E_a = \frac{K}{n \times 10^6}\left(\sum_{i=1}^{n} V_{ai} C_{ai}\right)$$

Where:

E_b=Mass flow rate of total HAP or methanol in the liquid stream entering the treatment process, kilograms per hour.

E_a=Mass flow rate of total HAP or methanol in the liquid exiting the treatment process, kilograms per hour.

K=Density of the liquid stream, kilograms per cubic meter.

V_{bi}=Volumetric flow rate of liquid stream entering the treatment process during each run I, cubic meters per hour, determined as specified in paragraph (c) of this section.

V_{ai}=Volumetric flow rate of liquid stream exiting the treatment process during each run I, cubic meters per hour, determined as specified in paragraph (c) of this section.

C_{bi}=Concentration of total HAP or methanol in the stream entering the treatment process during each run I, parts per million by weight, determined as specified in paragraph (c) of this section.

C_{ai}=Concentration of total HAP or methanol in the stream exiting the treatment process during each run I, parts per million by weight, determined as specified in paragraph (c) of this section.

n=Number of runs.

(2) The mass of total HAP or methanol per megagram ODP shall be calculated using the following equation:

$$F = \frac{E_a}{P}$$

Where:

F=Mass loading of total HAP or methanol in the sample, in kilograms per megagram of ODP.

E_a=Mass flow rate of total HAP or methanol in the wastewater stream in kilograms per hour as determined using the procedures in paragraph (j)(1) of this section.

P=The production rate of pulp during the sampling period in megagrams of ODP per hour.

(3) The percent reduction of total HAP across the applicable treatment process shall be calculated using the following equation:

$$R = \frac{E_b - E_a}{E_b} \times 100$$

Where:

R=Control efficiency of the treatment process, percent.

E_b=Mass flow rate of total HAP in the stream entering the treatment process, kilograms per hour, as determined in paragraph (j)(1) of this section.

E_a=Mass flow rate of total HAP in the stream exiting the treatment process, kilograms per hour, as determined in paragraph (j)(1) of this section.

(4) Compounds that meet the requirements specified in paragraphs (j)(4)(i) or (4)(ii) of this section are not required to be included in the mass flow rate, mass per megagram of ODP, or the mass percent reduction determinations.

(i) Compounds with concentrations at the point of determination that are below 1 part per million by weight; or

(ii) Compounds with concentrations at the point of determination that are below the lower detection limit where the lower detection limit is greater than 1 part per million by weight.

(k) *Oxygen concentration correction procedures.* To demonstrate compliance with the total HAP concentration limit of 20 ppmv in Sec. 63.443(d)(2), the concentration measured using the methods specified in paragraph (b)(5) of this section shall be corrected to 10 percent oxygen using the following procedures:

(1) The emission rate correction factor and excess air integrated sampling and analysis procedures of Methods 3A or 3B of part 60, appendix A shall be used to determine the oxygen concentration. The samples shall be taken at the same time that the HAP samples are taken.

(2) The concentration corrected to 10 percent oxygen shall be computed using the following equation:

$$C_c = C_m\left(\frac{10.9}{20.9-\%O_{2d}}\right)$$

Where:

C_c=Concentration of total HAP corrected to 10 percent oxygen, dry basis, parts per million by volume.

C_m=Concentration of total HAP dry basis, parts per million by volume, as specified in paragraph (b) of this section.

$\%0_{2d}$=Concentration of oxygen, dry basis, percent by volume.

(l) *Biological treatment system percent reduction calculation.* To determine compliance with an open biological treatment system option specified in Sec. 63.446(e)(2) and the monitoring requirements specified in Sec. 63.453(j)(2), the percent reduction due to destruction in the biological treatment system shall be calculated using the following equation:

$$R=f_{bio} \times 100$$

Where:

R=Destruction of total HAP or methanol in the biological treatment process, percent.

f_{bio}=The fraction of total HAP or methanol removed in the biological treatment system. The site-specific biorate constants shall be determined using the procedures specified and as limited in appendix C of part 63.

(m) *Condensate segregation procedures.* The following procedures shall be used to demonstrate compliance with the condensate segregation requirements specified in Sec. 63.446(c).

(1) To demonstrate compliance with the percent mass requirements specified in Sec. 63.446(c)(1), the procedures specified in paragraphs (m)(1)(i) through (m)(1)(iii) of this section shall be performed.

(i) Determine the total HAP mass of all condensates from each equipment system listed in Sec. 63.446 (b)(1) through (b)(3) using the procedures specified in paragraphs (c) and (j) of this section.

(ii) Multiply the total HAP mass determine in paragraph (m)(1)(i) of this section by 0.65 to determine the target HAP mass for the high-HAP fraction condensate stream or streams.

(iii) Compliance with the segregation requirements specified in Sec. 63.446(c)(1) is demonstrated if the condensate stream or streams from each equipment system listed in Sec. 63.446 (b)(1) through (b)(3) being treated as specified in Sec. 63.446(e) contain at least as much total HAP mass as the target total HAP mass determined in paragraph (m)(1)(ii) of this section.

(2) To demonstrate compliance with the percent mass requirements specified in Sec. 63.446(c)(2), the procedures specified in paragraphs (m)(2)(i) through (m)(2)(ii) of this section shall be performed.

(i) Determine the total HAP mass contained in the high-HAP fraction condensates from each equipment system listed in Sec. 63.446(b)(1) through (b)(3) and the total condensates streams from the equipment systems listed in Sec. 63.446(b)(4) and (b)(5), using the procedures specified in paragraphs (c) and (j) of this section.

(ii) Compliance with the segregation requirements specified in Sec. 63.446(c)(2) is demonstrated if the total HAP mass determined in paragraph (m)(2)(i) of this section is equal to or greater than the appropriate mass requirements specified in Sec. 63.446(c)(2).

(n) *Biological treatment system monitoring sampling storage*. The inlet and outlet grab samples required to be collected in Sec. 63.453(j)(2) shall be stored at 4 deg. C (40 deg. F) to minimize the biodegradation of the organic compounds in the samples.

Sec. 63.458 Delegation of authority.

(a) In delegating implementation and enforcement authority to a State under section 112(d) of the CAA, the authorities contained in paragraph (b) of this section shall be retained by the Administrator and not transferred to a State.

(b) Authorities which will not be delegated to States:

(1) Section 63.6(g)--Use of an alternative nonopacity emission standard;

(2) Section 63.453(m)--Use of an alternative monitoring parameter;

(3) Section 63.457(b)(5)(iii)--Use of an alternative test method for total HAP or methanol in vents; and

(4) Section 63.457(c)(3)(ii)--Use of an alternative test method for total HAP or methanol in wastewater.

Sec. 63.459 [Reserved]

TABLE 1 TO SUBPART S—GENERAL PROVISIONS APPLICABILITY TO SUBPART S[a]

Reference	Applies to Subpart S	Comment
63.1(a)(1)-(3) ..	Yes.	
63.1(a)(4)	Yes	Subpart S (this table) specifies applicability of each paragraph in subpart A to subpart S.
63.1(a)(5)	No	Section reserved.
63.1(a)(6)-(8) ..	Yes.	
63.1(a)(9)	No	Section reserved.
63.1(a)(10)	No	Subpart S and other cross-referenced subparts specify calendar or operating day.

TABLE 1 TO SUBPART S—GENERAL PROVISIONS APPLICABILITY TO SUBPART S*—Continued

Reference	Applies to Subpart S	Comment
63.1(a)(11)-(14)	Yes.	
63.1(b)(1)	No	Subpart S specifies its own applicability.
63.1(b)(2)-(3) ..	Yes.	
63.1(c)(1)-(2) ..	Yes.	
63.1(c)(3)	No	Section reserved.
63.1(c)(4)-(5) ..	Yes.	
63.1(d)	No	Section reserved.
63.1(e)	Yes.	
63.2	Yes.	
63.3	Yes.	
63.4(a)(1)	Yes.	
63.4(a)(3).		
63.4(a)(4)	No	Section reserved.
63.4(a)(5)	Yes.	
63.4(b)	Yes.	
63.4(c)	Yes.	
63.5(a)	Yes.	
63.5(b)(1)	Yes.	
63.5(b)(2)	No	Section reserved.
63.5(b)(3)	Yes.	
63.5(b)(4)-(6) ..	Yes.	
63.5(c)	No	Section reserved.
63.5(d)	Yes.	
63.5(e)	Yes.	
63.5(f)	Yes.	
63.6(a)	Yes.	
63.6(b)	No	Subpart S specifies compliance dates for sources subject to subpart S.
63.6(c)	No	Subpart S specifies compliance dates for sources subject to subpart S.
63.6(d)	No	Section reserved.
63.6(e)	Yes.	
63.6(f)	Yes.	
63.6(g)	Yes.	
63.6(h)	No	Pertains to continuous opacity monitors that are not part of this standard.
63.6(i)	Yes.	
63.6(j)	Yes.	
63.7	Yes.	
63.8(a)(1)	Yes.	
63.8(a)(2)	Yes.	
63.8(a)(3)	No	Section reserved.

TABLE 1 TO SUBPART S—GENERAL PROVISIONS APPLICABILITY TO SUBPART S—Continued

Reference	Applies to Subpart S	Comment
63.8(a)(4)	Yes.	
63.8(b)(1)	Yes.	
63.8(b)(2)	No.	Subpart S specifies locations to conduct monitoring.
63.8(b)(3)	Yes.	
63.8(c)(1)	Yes.	
63.8(c)(2)	Yes.	
63.8(c)(3)	Yes.	
63.8(c)(4)	No	Subpart S allows site specific determination of monitoring frequency in §63.453(n)(4).
63.8(c)(5)	No	Pertains to continuous opacity monitors that are not part of this standard.
63.8(c)(6)	Yes.	
63.8(c)(7)	Yes.	
63.8(c)(8)	Yes.	
63.8(d)	Yes.	
63.8(e)	Yes.	
63.8(f)(1)-(5) ..	Yes.	
63.8(f)(6)	No	Subpart S does not specify relative accuracy test for CEM's.
63.8(g)	Yes.	
63.9(a)	Yes.	
63.9(b)	Yes	Initial notifications must be submitted within one year after the source becomes subject to the relevant standard.
63.9(c)	Yes.	
63.9(d)	No	Special compliance requirements are only applicable to kraft mills.
63.9(e)	Yes.	
63.9(f)	No	Pertains to continuous opacity monitors that are not part of this standard.
63.9(g)(1)	Yes.	
63.9(g)(2)	No	Pertains to continuous opacity monitors that are not part of this standard.
63.9(g)(3)	No	Subpart S does not specify relative accuracy tests, therefore no notification is required for an alternative.
63.9(h)	Yes.	
63.9(i)	Yes.	
63.9(j)	Yes.	
63.10(a)	Yes.	
63.10(b)	Yes.	
63.10(c)	Yes.	
63.10(d)(1)	Yes.	
63.10(d)(2)	Yes.	
63.10(d)(3)	No	Pertains to continuous opacity monitors that are not part of this standard.
63.10(d)(4)	Yes.	
63.10(d)(5)	Yes.	

TABLE 1 TO SUBPART S—GENERAL PROVISIONS APPLICABILITY TO SUBPART S[a]—Continued

Reference	Applies to Subpart S	Comment
63.10(e)(1)	Yes.	
63.10(e)(2)(i) ..	Yes.	
63.10(e)(2)(ii)	No	Pertains to continuous opacity monitors that are not part of this standard.
63.10(e)(3)	Yes.	
63.10(e)(4)	No	Pertains to continuous opacity monitors that are not part of this standard.
63.10(f)	Yes.	
63.11-63.15 ...	Yes.	

a Wherever subpart A specifies "postmark" dates, submittals may be sent by methods other than the U.S. Mail (e.g., by fax or courier). Submittals shall be sent by the specified dates, but a postmark is not required.

3. Appendix A of part 63 is amended by adding Method 308 in numerical order to read as follows:

Appendix A to Part 63--Test Methods

* * * * *

Method 308--Procedure for Determination of Methanol Emission From Stationary Sources

1.0 Scope and Application

1.1 Analyte. Methanol. Chemical Abstract Service (CAS) No. 67-56-1.

1.2 Applicability. This method applies to the measurement of methanol emissions from specified stationary sources.

2.0 Summary of Method

A gas sample is extracted from the sampling point in the stack. The methanol is collected in deionized distilled water and adsorbed on silica gel. The sample is returned to the laboratory where the methanol in the water fraction is separated from other organic compounds with a gas chromatograph (GC) and is then measured by a flame ionization detector (FID). The fraction adsorbed on silica gel is extracted with an aqueous solution of n-propanol and is then separated and measured by GC/FID.

3.0 Definitions [Reserved]

4.0 Interferences [Reserved]

5.0 Safety

5.1 Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and to determine the applicability of regulatory limitations before performing this test method.

5.2 Methanol Characteristics. Methanol is flammable and a dangerous fire and explosion risk. It is moderately toxic by ingestion and inhalation.

6.0 Equipment and Supplies

6.1 Sample Collection. The following items are required for sample collection:

6.1.1 Sampling Train. The sampling train is shown in Figure 308-1 and component parts are discussed below.

6.1.1.1 Probe. Teflon®, approximately 6-millimeter (mm) (0.24 inch) outside diameter.

6.1.1.2 Impinger. A 30-milliliter (ml) midget impinger. The impinger must be connected with leak-free glass connectors. Silicone grease may not be used to lubricate the connectors.

6.1.1.3 Adsorbent Tube. Glass tubes packed with the required amount of the specified adsorbent.

6.1.1.4 Valve. Needle valve, to regulate sample gas flow rate.

6.1.1.5 Pump. Leak-free diaphragm pump, or equivalent, to pull gas through the sampling train. Install a small surge tank between the pump and rate meter to eliminate the pulsation effect of the diaphragm pump
on the rotameter.

6.1.1.6 Rate Meter. Rotameter, or equivalent, capable of measuring flow rate to within 2 percent of the selected flow rate of up to 1000 milliliter per minute (ml/min). Alternatively, the tester may use a critical orifice to set the flow rate.

6.1.1.7 Volume Meter. Dry gas meter (DGM), sufficiently accurate to measure the sample volume to within 2 percent, calibrated at the selected flow rate and conditions actually encountered during sampling, and equipped with a temperature sensor (dial thermometer, or equivalent) capable of measuring temperature accurately to within 3 deg.C (5.4 deg.F).

6.1.1.8 Barometer. Mercury (Hg), aneroid, or other barometer capable of measuring atmospheric pressure to within 2.5 mm (0.1 inch) Hg. See the NOTE in Method 5 (40 CFR part 60, appendix A), section 6.1.2.

6.1.1.9 Vacuum Gauge and Rotameter. At least 760-mm (30-inch) Hg gauge and 0- to 40-ml/min rotameter, to be used for leak-check of the sampling train.

6.2 Sample Recovery. The following items are required for sample recovery:

6.2.1 Wash Bottles. Polyethylene or glass, 500-ml, two.

6.2.2 Sample Vials. Glass, 40-ml, with Teflon®-lined septa, to store impinger samples (one per sample).

6.2.3 Graduated Cylinder. 100-ml size.

6.3 Analysis. The following are required for analysis:

6.3.1 Gas Chromatograph. GC with an FID, programmable temperature control, and heated liquid injection port.

6.3.2 Pump. Capable of pumping 100 ml/min. For flushing sample loop.

6.3.3 Flow Meter. To monitor accurately sample loop flow rate of 100 ml/min.

6.3.4 Regulators. Two-stage regulators used on gas cylinders for GC and for cylinder standards.

6.3.5 Recorder. To record, integrate, and store chromatograms.

6.3.6 Syringes. 1.0- and 10-microliter (l) size, calibrated, for injecting samples.

6.3.7 Tubing Fittings. Stainless steel, to plumb GC and gas cylinders.

6.3.8 Vials. Two 5.0-ml glass vials with screw caps fitted with Teflon®-lined septa for each sample.

6.3.9 Pipettes. Volumetric type, assorted sizes for preparing calibration standards.

6.3.10 Volumetric Flasks. Assorted sizes for preparing calibration standards.

6.3.11 Vials. Glass 40-ml with Teflon®-lined septa, to store calibration standards (one per standard).

7.0 Reagents and Standards

Note: Unless otherwise indicated, all reagents must conform to the specifications established by the Committee on Analytical Reagents of the American Chemical Society. Where such specifications are not available, use the best available grade.

7.1 Sampling. The following are required for sampling:

7.1.1 Water. Deionized distilled to conform to the American Society for Testing and Materials (ASTM) Specification D 1193-77, Type 3. At the option of the analyst, the potassium permanganate ($KMnO_4$) test for oxidizable organic matter may be omitted when high concentrations of organic matter are not expected to be present.

7.1.2 Silica Gel. Deactivated chromatographic grade 20/40 mesh silica gel packed in glass adsorbent tubes. The silica gel is packed in two sections. The front section contains 520 milligrams (mg) of silica gel, and the back section contains 260 mg.

7.2 Analysis. The following are required for analysis:

7.2.1 Water. Same as specified in section 7.1.1.

7.2.2 n-Propanol, 3 Percent. Mix 3 ml of n-propanol with 97 ml of water.

7.2.3 Methanol Stock Standard. Prepare a methanol stock standard by weighing 1 gram of methanol into a 100-ml volumetric flask. Dilute to 100 ml with water.

7.2.3.1 Methanol Working Standard. Prepare a methanol working standard by pipetting 1 ml of the methanol stock standard into a 100-ml volumetric flask. Dilute the solution to 100 ml with water.

7.2.3.2 Methanol Standards For Impinger Samples. Prepare a series of methanol standards by pipetting 1, 2, 5, 10, and 25 ml of methanol working standard solution respectively into five 50-ml volumetric flasks. Dilute the solutions to 50 ml with water. These standards will have 2, 4, 10, 20, and 50 µg/ml of methanol, respectively. After preparation, transfer the solutions to 40-ml glass vials capped with Teflon® septa and store the vials under refrigeration. Discard any excess solution.

7.2.3.3 Methanol Standards for Adsorbent Tube Samples. Prepare a series of methanol standards by first pipetting 10 ml of the methanol working standard into a 100-ml volumetric flask and diluting the contents to exactly 100 ml with 3 percent n-propanol solution. This standard will contain 10 µg/ml of methanol. Pipette 5, 15, and 25 ml of this standard, respectively, into four 50-ml volumetric flasks. Dilute each solution to 50 ml with 3 percent n-propanol solution. These standards will have 1, 3, and 5 µg/ml of methanol, respectively. Transfer all four standards into 40-ml glass vials capped with Teflon®-lined septa and store under refrigeration. Discard any excess solution.

7.2.4 GC Column. Capillary column, 30 meters (100 feet) long with an inside diameter (ID) of 0.53 mm (0.02 inch), coated with DB 624 to a film thickness of 3.0 micrometers, (µm) or an equivalent column. Alternatively, a 30-meter capillary column coated with polyethylene glycol to a film thickness of 1 m such as AT-WAX or its equivalent.

7.2.5 Helium. Ultra high purity.

7.2.6 Hydrogen. Zero grade.

7.2.7 Oxygen. Zero grade.

8.0 Procedure

8.1 Sampling. The following items are required for sampling:

8.1.1 Preparation of Collection Train. Measure 20 ml of water into the midget impinger. The adsorbent tube must contain 520 mg of silica gel in the front section and 260 mg of silica gel in the backup section. Assemble the train as shown in Figure 308-1. An optional, second impinger that is left empty may be placed in front of the water-containing impinger to act as a condensate trap. Place crushed ice and water around the impinger.

BILLING CODE 6560-50-P

[GRAPHIC] [TIFF OMITTED] TR15AP98.014 - Sampling train schematic

BILLING CODE 6560-50-C

8.1.2 Leak Check. A leak check prior to the sampling run is optional; however, a leak check after the sampling run is mandatory. The leak-check procedure is as follows: Temporarily attach a suitable (e.g., 0-to 40-ml/min) rotameter to the outlet of the DGM, and place a vacuum gauge at or near the probe inlet. Plug the probe inlet, pull a vacuum of at least 250 mm (10 inch) Hg, and note the flow rate as indicated by the rotameter. A leakage rate not in excess of 2 percent of the average sampling rate is acceptable.

Note: Carefully release the probe inlet plug before turning off the pump.

8.1.3 Sample Collection. Record the initial DGM reading and barometric pressure. To begin sampling, position the tip of the Teflon® tubing at the sampling point, connect the tubing to the impinger, and start the pump. Adjust the sample flow to a constant rate between 200 and 1000 ml/min as indicated by the rotameter. Maintain this constant rate (±10 percent) during the entire sampling run. Take readings (DGM, temperatures at DGM and at impinger outlet, and rate meter) at least every 5 minutes. Add more ice during the run to keep the temperature of the gases leaving the last impinger at 20 deg.C (68 deg.F) or less. At the conclusion of each run, turn off the pump, remove the Teflon® tubing from the stack, and record the final readings. Conduct a leak check as in section 8.1.2. (This leak check is mandatory.) If a leak is found, void the test run or use procedures acceptable to the Administrator to adjust the sample volume for the leakage.

8.2 Sample Recovery. The following items are required for sample recovery:

8.2.1 Impinger. Disconnect the impinger. Pour the contents of the midget impinger into a graduated cylinder. Rinse the midget impinger and the connecting tubes with water, and add the rinses to the graduated cylinder. Record the sample volume. Transfer the sample to a glass vial and cap with a Teflon® septum. Discard any excess sample. Place the samples in an ice chest for shipment to the laboratory.

8.2.2. Adsorbent Tubes. Seal the silica gel adsorbent tubes and place them in an ice chest for shipment to the laboratory.

9.0 Quality Control

9.1 Miscellaneous Quality Control Measures. The following quality control measures are required:

Section	Quality control measure	Effect
8.1.2, 8.1.3, 10.1.	Sampling equipment leak check and calibration.	Ensures accurate measurement of sample volume.
10.2	GC calibration.	Ensures precision of GC analysis.

9.2 Applicability. When the method is used to analyze samples to demonstrate compliance with a source emission regulation, an audit sample must be analyzed, subject to availability.

9.3 Audit Procedure. Analyze an audit sample with each set of compliance samples. Concurrently analyze the audit sample and a set of compliance samples in the same manner to evaluate the technique of the analyst and the standards preparation. The same analyst, analytical reagents, and analytical system shall be used both for the compliance samples and the EPA audit sample.

9.4 Audit Sample Availability. Audit samples will be supplied only to enforcement agencies for compliance tests. Audit samples may be obtained by writing: Source Test Audit Coordinator (MD-77B), Air Measurement Research Division, National Exposure Research Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, NC 27711; or by calling the Source Test Audit Coordinator (STAC) at (919) 541-7834. The audit sample request must be made at least 30 days prior to the scheduled compliance sample analysis.

9.5 Audit Results. Calculate the audit sample concentration according to the calculation procedure provided in the audit instructions included with the audit sample. Fill in the audit sample concentration and the analyst's name on the audit response form included with the audit instructions. Send one copy to the EPA Regional Office or the appropriate enforcement agency and a second copy to the STAC. The EPA Regional office or the appropriate enforcement agency will report the results of the audit to the laboratory being audited. Include this response with the results of the compliance samples in relevant reports to the EPA Regional Office or the appropriate enforcement agency.

10.0 Calibration and Standardization

10.1 Metering System. The following items are required for the metering system:

10.1.1 Initial Calibration.

10.1.1.1 Before its initial use in the field, first leak-check the metering system (drying tube, needle valve, pump, rotameter, and DGM) as follows: Place a vacuum gauge at the inlet to the drying tube, and pull a vacuum of 250 mm (10 inch) Hg; plug or pinch off the outlet of the flow meter, and then turn off the pump. The vacuum shall remain stable for at least 30 seconds. Carefully release the vacuum gauge before releasing the flow meter end.

10.1.1.2 Next, remove the drying tube, and calibrate the metering system (at the sampling flow rate specified by the method) as follows: Connect an appropriately sized wet test meter (e.g., 1 liter per revolution (0.035 cubic feet per revolution)) to the inlet of the drying tube. Make

three independent calibrations runs, using at least five revolutions of the DGM per run. Calculate the calibration factor, Y (wet test meter calibration volume divided by the DGM volume, both volumes adjusted to the same reference temperature and pressure), for each run, and average the results. If any Y-value deviates by more than 2 percent from the average, the metering system is unacceptable for use. Otherwise, use the average as the calibration factor for subsequent test runs.

10.1.2 Posttest Calibration Check. After each field test series, conduct a calibration check as in section 10.1.1 above, except for the following variations: (a) The leak check is not to be conducted, (b) three, or more revolutions of the DGM may be used, and (c) only two independent runs need be made. If the calibration factor does not deviate by more than 5 percent from the initial calibration factor (determined in section 10.1.1), then the DGM volumes obtained during the test series are acceptable. If the calibration factor deviates by more than 5 percent, recalibrate the metering system as in section 10.1.1, and for the calculations, use the calibration factor (initial or recalibration) that yields the lower gas volume for each test run.

10.1.3 Temperature Sensors. Calibrate against mercury-in-glass thermometers.

10.1.4 Rotameter. The rotameter need not be calibrated, but should be cleaned and maintained according to the manufacturer's instruction.

10.1.5 Barometer. Calibrate against a mercury barometer.

10.2 Gas Chromatograph. The following procedures are required for the gas chromatograph:

10.2.1 Initial Calibration. Inject 1 µl of each of the standards prepared in sections 7.2.3.3 and 7.2.3.4 into the GC and record the response. Repeat the injections for each standard until two successive injections agree within 5 percent. Using the mean response for each calibration standard, prepare a linear least squares equation relating the response to the mass of methanol in the sample. Perform the calibration before analyzing each set of samples.

10.2.2 Continuing Calibration. At the beginning of each day, analyze the mid level calibration standard as described in section 10.5.1. The response from the daily analysis must agree with the response from the initial calibration within 10 percent. If it does not, the initial calibration must be repeated.

11.0 Analytical Procedure

11.1 Gas Chromatograph Operating Conditions. The following operating conditions are required for the GC:

11.1.1 Injector. Configured for capillary column, splitless, 200 deg.C (392 deg.F).

11.1.2 Carrier. Helium at 10 ml/min.

11.1.3 Oven. Initially at 45 deg.C for 3 minutes; then raise by 10 deg.C to 70 deg.C; then raise by 70 deg.C/min to 200 deg.C.

11.2 Impinger Sample. Inject 1 µl of the stored sample into the GC. Repeat the injection and average the results. If the sample response is above that of the highest calibration standard, either dilute the sample until it is in the measurement range of the calibration line or prepare additional calibration standards. If the sample response is below that of the lowest calibration standard, prepare additional calibration standards. If additional calibration standards are prepared, there shall be at least two that bracket the response of the sample. These standards should produce approximately 50 percent and 150 percent of the response of the sample.

11.3 Silica Gel Adsorbent Sample. The following items are required for the silica gel adsorbent samples:

11.3.1 Preparation of Samples. Extract the front and backup sections of the adsorbent tube separately. With a file, score the glass adsorbent tube in front of the first section of silica gel. Break the tube open. Remove and discard the glass wool. Transfer the first section of the silica gel to a 5-ml glass vial and stopper the vial. Remove the spacer between the first and second section of the adsorbent tube and discard it. Transfer the second section of silica gel to a separate 5-ml glass vial and stopper the vial.

11.3.2 Desorption of Samples. Add 3 ml of the 10 percent n-propanol solution to each of the stoppered vials and shake or vibrate the vials for 30 minutes.

11.3.3 Inject a 1-µl aliquot of the diluted sample from each vial into the GC. Repeat the injection and average the results. If the sample response is above that of the highest calibration standard, either dilute the sample until it is in the measurement range of the calibration line or prepare additional calibration standards. If the sample response is below that of the lowest calibration standard, prepare additional calibration standards. If additional calibration standards are prepared, there shall be at least two that bracket the response of the sample. These standards should produce approximately 50 percent and 150 percent of the response of the sample.

12.0 Data Analysis and Calculations

12.1 Nomenclature.

C_{af}=Concentration of methanol in the front of the adsorbent tube, µg/ml.
C_{ab}=Concentration of methanol in the back of the adsorbent tube, µg/ml.
C_i=Concentration of methanol in the impinger portion of the sample train, µg/ml.
E=Mass emission rate of methanol, µg/hr (lb/hr).
M_{tot}=Total mass of methanol collected in the sample train, g.
P_{bar}=Barometric pressure at the exit orifice of the DGM, mmHg (in. Hg).
P_{std}=Standard absolute pressure, 760 mm Hg (29.92 in. Hg).
Q_{std}=Dry volumetric stack gas flow rate corrected to standard conditions, dscm/hr (dscf/hr).
T_m=Average DGM absolute temperature, degrees K (deg.R).
T_{std}=Standard absolute temperature, 293 degrees K (528 deg.R).
V_{af}=Volume of front half adsorbent sample, ml.
V_{ab}=Volume of back half adsorbent sample, ml.
V_i=Volume of impinger sample, ml.
V_m=Dry gas volume as measured by the DGM, dry cubic meters (dcm), dry cubic feet (dcf).
$V_{m(std)}$=Dry gas volume measured by the DGM, corrected to standard conditions, dry standard cubic meters (dscm), dry standard cubic feet (dscf).

12.2 Mass of Methanol. Calculate the total mass of methanol collected in the sampling train using Equation 308-1.

$$M_{tot} = V_i C_i + V_{af} C_{af} + V_{ab} C_{ab} \qquad \text{Equation 308-1}$$

12.3 Dry Sample Gas Volume, Corrected to Standard Conditions. Calculate the volume of gas sampled at standard conditions using Equation 308-2.

$$V_m(std) = \frac{V_m Y \; T_{std} P_{bar}}{T_m P_{std}}$$ Equation 308-2

12.4 **Mass Emission Rate of Methanol. Calculate the mass emission rate of methanol using Equation 308-3.**

$$E = \frac{M_{tot} Q_{std}}{V_{m(std)}}$$ Equation 308-3

13.0 Method Performance [Reserved]

14.0 Pollution Prevention [Reserved]

15.0 Waste Management [Reserved]

16.0 Bibliography

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17.0 Tables, Diagrams. Flowcharts. and Validation Data

[Reserved].

* * * * *

Appendix C

Flowchart Summary of the NESHAP

NOTE: The following eleven diagrams provide only a summary of the requirements of the standards and do not supersede the standards in any manner. Compliance determinations are based on the standards published in the Code of Federal Regulations.

FIGURE 1. MILL APPLICABILITY (§63.440)

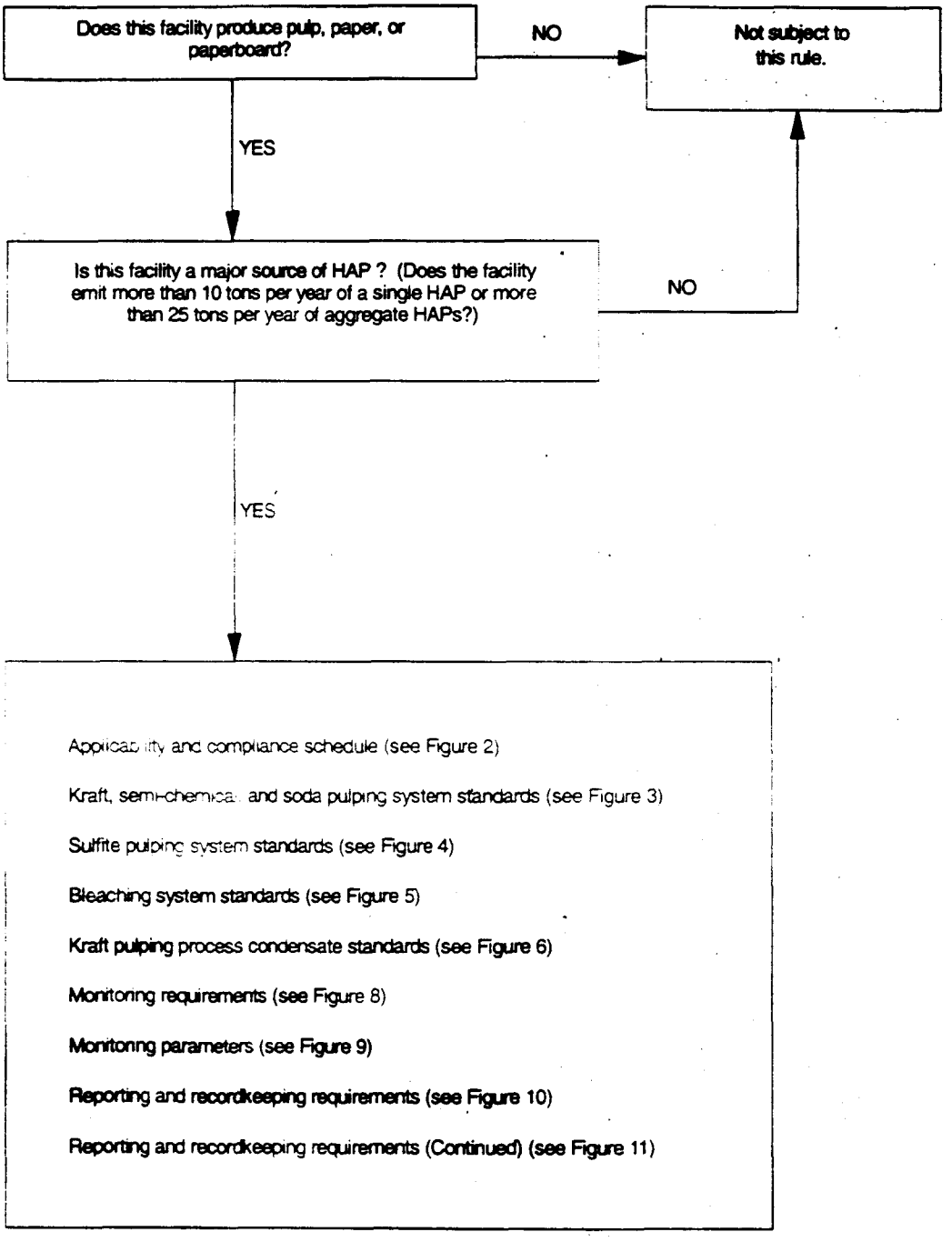


FIGURE 2. APPLICABILITY AND COMPLIANCE SCHEDULE (§63.440)

KRAFT, SEMI-CHEMICAL, SODA, AND SULFITE PULPING MILLS

Existing Source Applicability
- Pulping and bleaching systems

New Source Applicability
- Pulping and bleaching systems constructed or reconstructed after December 17, 1993
- Additional pulping or bleaching lines constructed after December 17, 1993

MECHANICAL, NON-WOOD FIBER, AND SECONDARY FIBER PULPING MILLS

Existing Source Applicability
- Bleaching systems

New Source Applicability
- Bleaching systems constructed or reconstructed after March 8, 1996
- Additional bleaching lines constructed after March 8, 1996

New Sources Must Achieve Compliance Upon Startup or June 15, 1998 Whichever is Later.

Existing Sources Must Achieve Compliance by April 16, 2001 With the Following Exceptions:

HVLC* Systems At Kraft Mills
- Compliance Within 8 Years After Promulgation of This Rule.
- Mill Must Provide and Update Compliance Milestones.

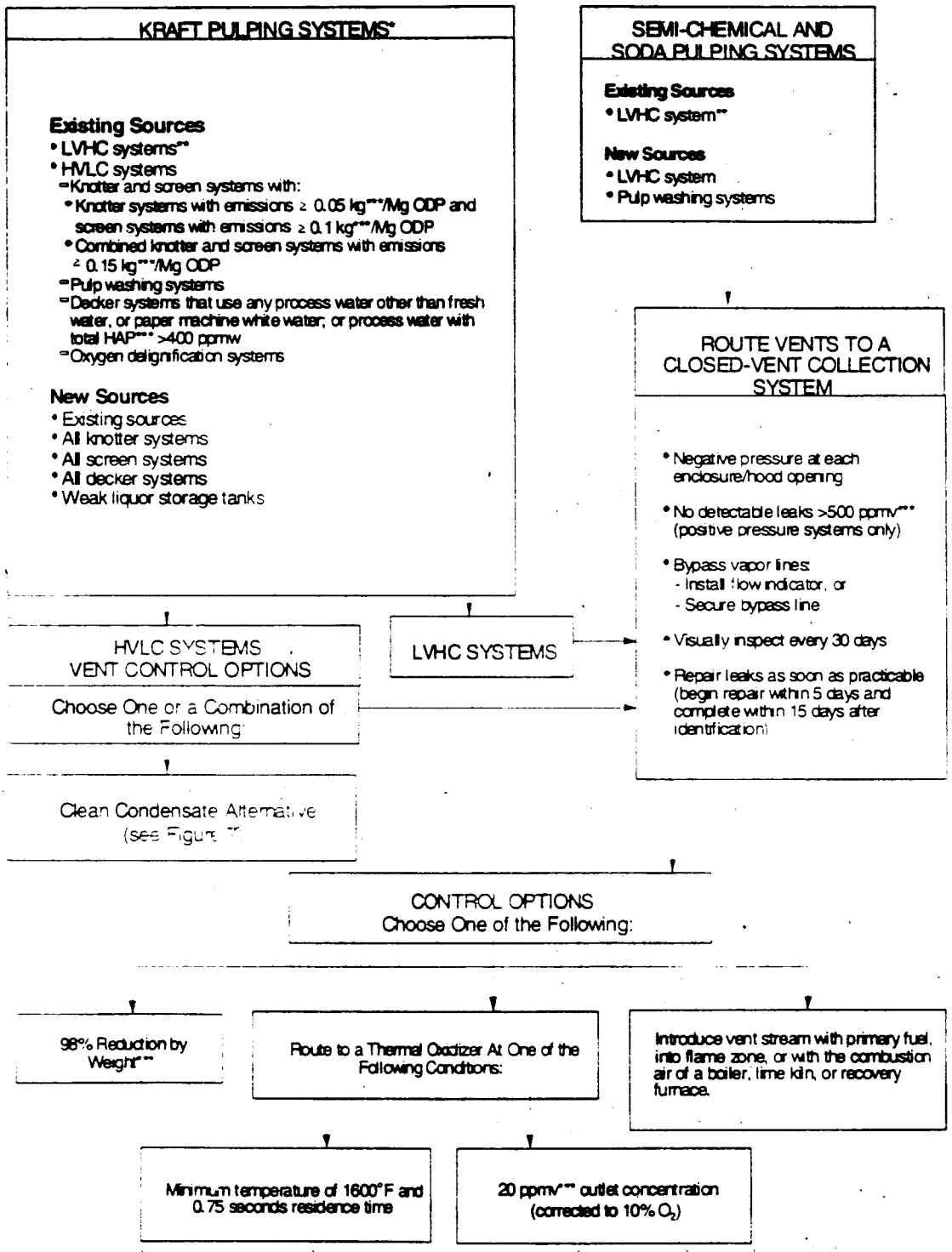
Bleaching Systems at Dissolving-Grade Kraft and Sulfite Mills

Compliance Within 3 Years After the Promulgation of the Effluent Limitations Guidelines (expected compliance date of 2003-2005).

Bleaching Systems in the Voluntary Advanced Technology Incentives Program
- Compliance Within 6 Years After Promulgation of The NESHAP
- "No backsliding" provision in effect 3 years after promulgation (e.g., mill must not increase the application rate of chlorine of hypochlorite)
- Mill Must Provide and Update Compliance Milestones.

* High volume, low-concentration systems include knotters, screens, deckers, pulp washers, oxygen delignification systems, and weak liquor storage tanks.

FIGURE 3. PULPING SYSTEM STANDARDS FOR KRAFT, SEMI-CHEMICAL, AND SODA PULPING MILLS (§63.443, §63.450)

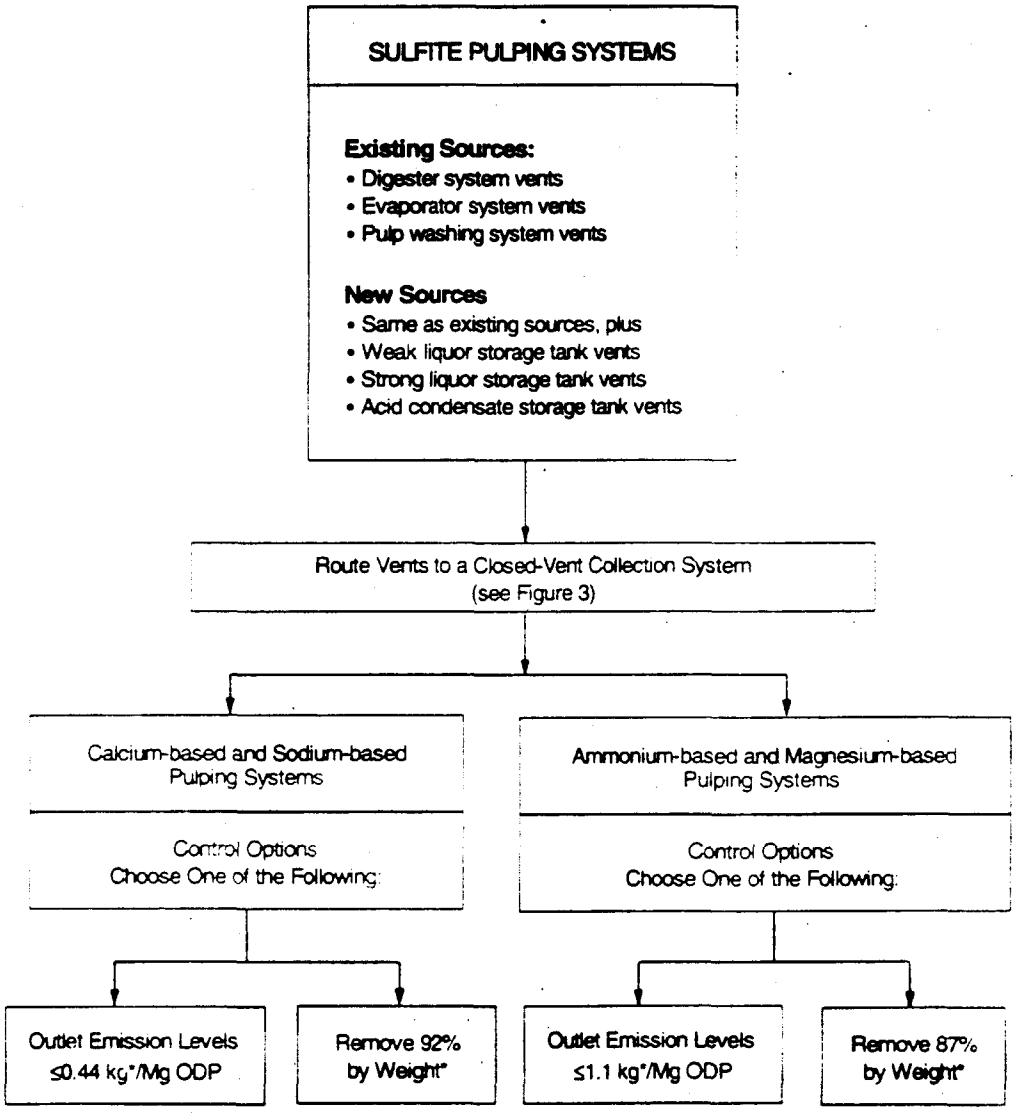


* Kraft pulping systems must also control pulping process condensates (see Figure 6).

** LVHC systems include digesters, turpentine recovery, evaporators, steam stripper systems, and any other equipment serving the same function as those previously mentioned.

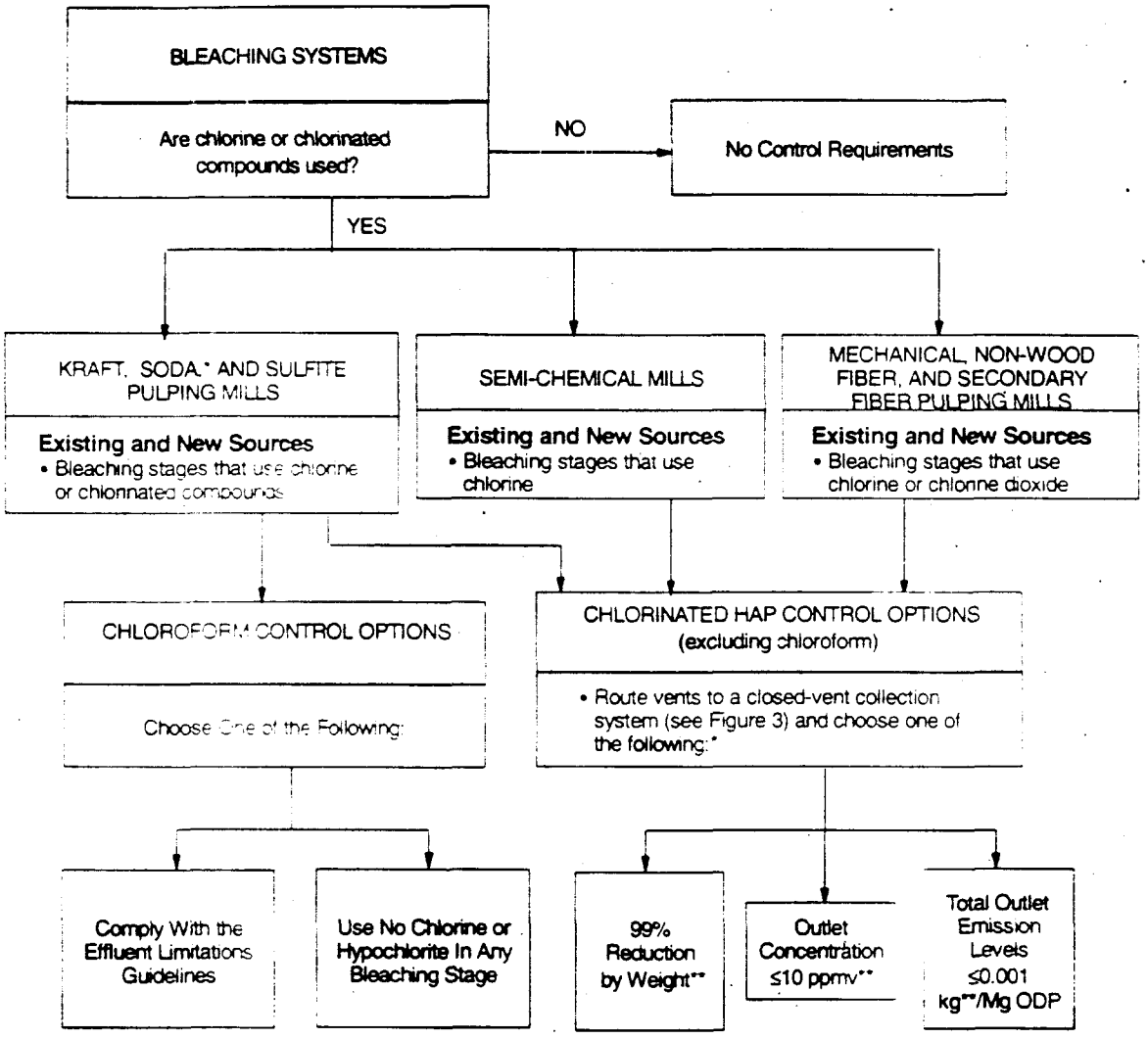
*** All measurements as total HAP or methanol.

FIGURE 4. PULPING SYSTEM STANDARDS FOR SULFITE PULPING MILLS (§63.443, §63.450)



* All values measured as total HAP or Methanol. Outlet emission level and percent reduction requirements include emissions from regulated equipment systems and HAP releases from vents, condensates, and wastewater streams from control devices used to reduce HAP emissions.

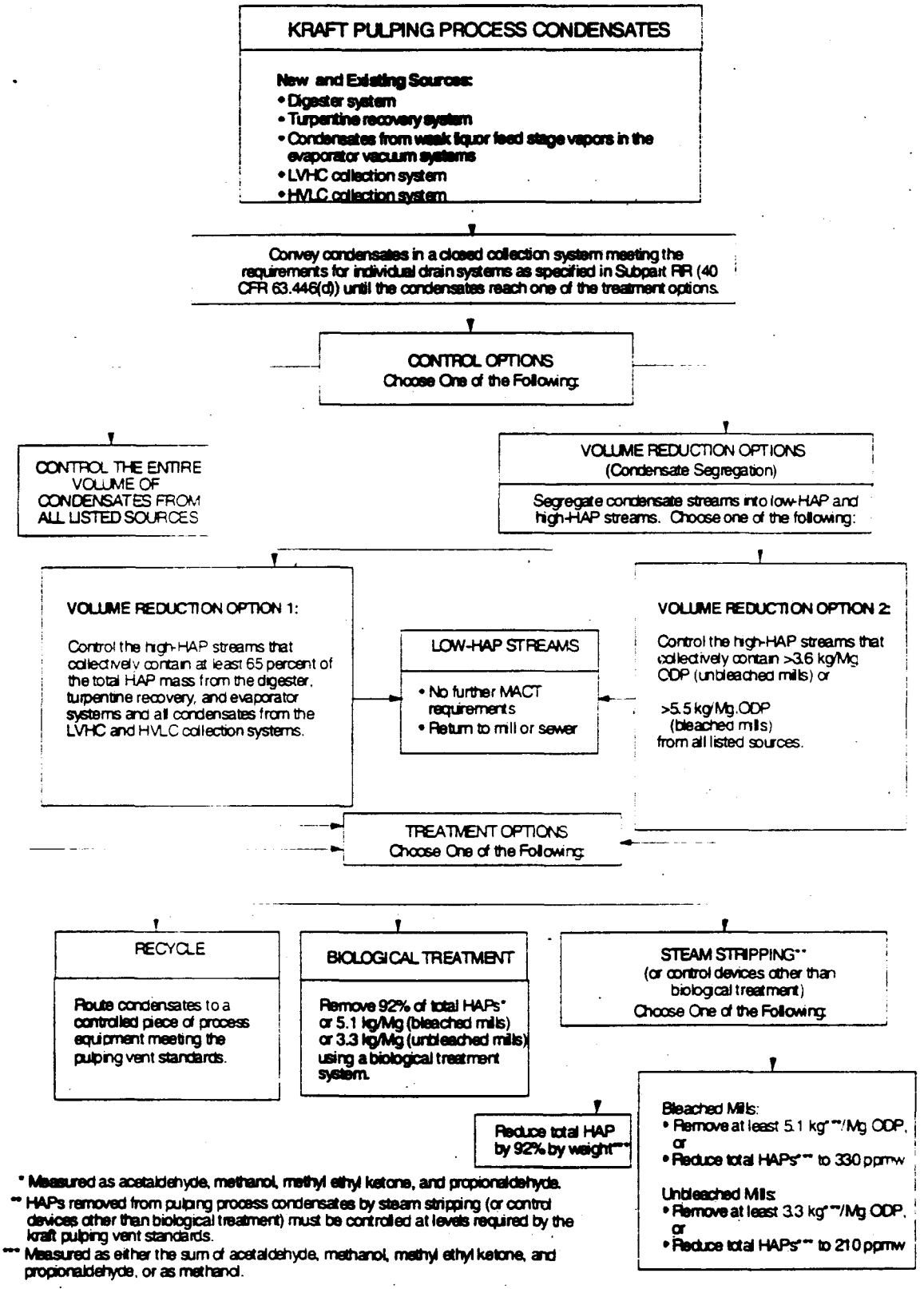
FIGURE 5. BLEACHING SYSTEM STANDARDS (§63.445)



* Enclosures and closed-vent systems are not required for facilities that use process modifications to comply with the concentration or total HAP mass emission limits.

**All values measured as total chlorinated HAP or chlorine.

FIGURE 6. KRAFT PULPING PROCESS CONDENSATE STANDARDS (§63.446)



* Measured as acetaldehyde, methanol, methyl ethyl ketone, and propionaldehyde.

** HAPs removed from pulping process condensates by steam stripping (or control devices other than biological treatment) must be controlled at levels required by the kraft pulping vent standards.

*** Measured as either the sum of acetaldehyde, methanol, methyl ethyl ketone, and propionaldehyde, or as methanol.

FIGURE 7. CLEAN CONDENSATE ALTERNATIVE FOR KRAFT MILLS (§63.447)

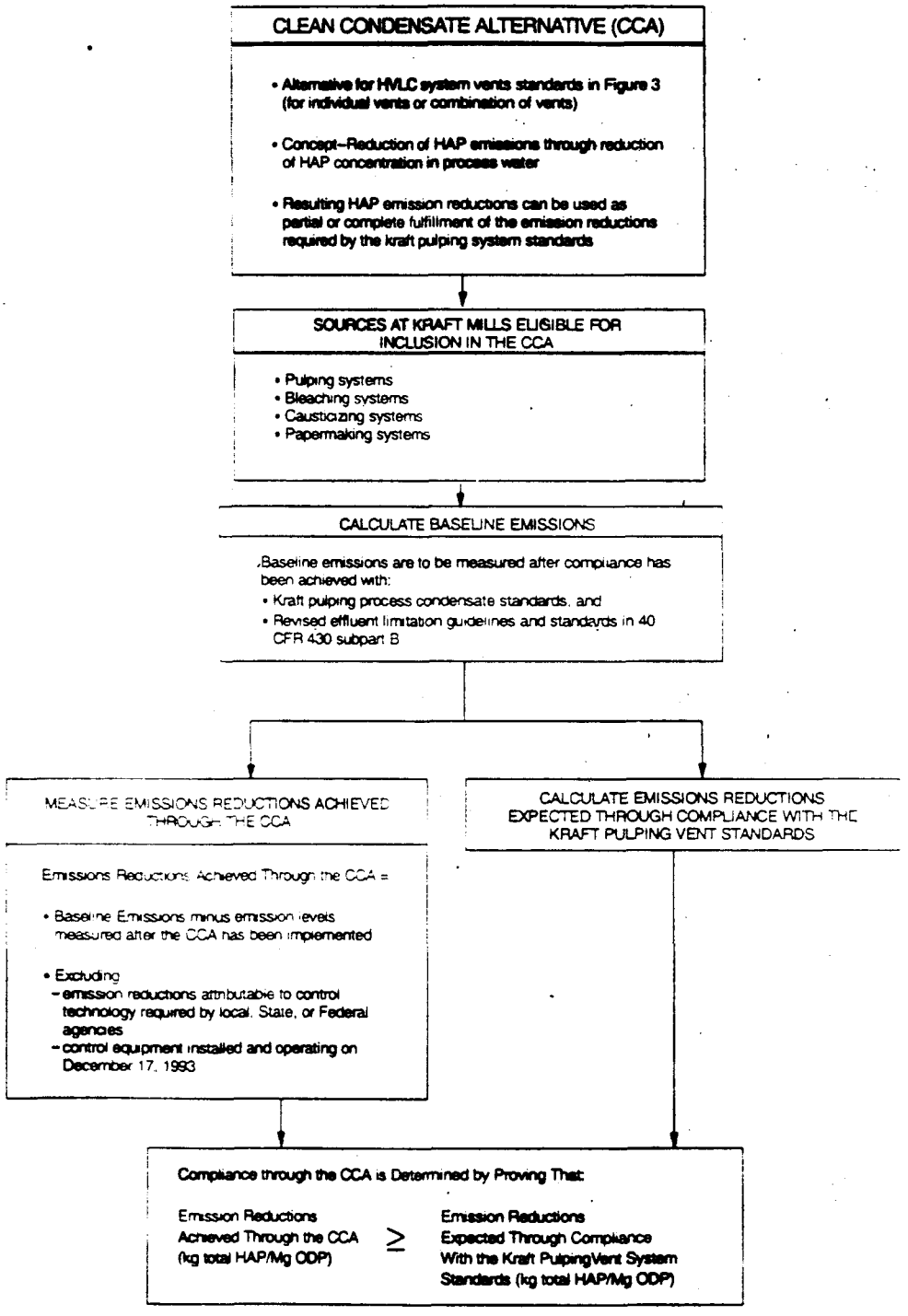


FIGURE 8. MONITORING REQUIREMENTS (§63.453)

INSTALL AND OPERATE:
Continuous Monitoring System (CMS)

ALLOWABLE OPERATING/EMISSION PARAMETERS FOR SPECIFIED SOURCES AND CONTROLS

- Use named parameters in Figure 9 for specified sources and controls.
- Alternative parameters to those specified are allowed only with EPA approval.

DETERMINING OPERATING/EMISSION PARAMETERS FOR OTHER SOURCES AND CONTROLS

- Only for the sources and controls listed below:
  - Sulfite pulping vent controls,
  - Kraft condensate segregation techniques; and
  - Kraft clean condensate alternative controls.
  - Bleaching systems using process mode features
- Establish parameters:
  - Monitor parameters during performance test; and
  - Supplement the performance test results with engineering assessment and manufacturer's recommendations.
  - Provide the rationale and data to Administrator indicating that the chosen parameter(s) demonstrate compliance with the emission standard.

SETTING PARAMETER:
VALUE, AVERAGING TIME, AND MONITORING FREQUENCY

- Establish parameter value:
  - Continuous monitoring data collected during performance test, and
  - Supplement the performance test results with engineering assessment and manufacturer's recommendations.
- Provide rationale and data to Administrator indicating that the chosen parameter value demonstrates compliance with emission standard.

EXCEEDING THE MONITORING PARAMETER VALUES OR PROCEDURES

- Shall constitute a violation of the applicable emission standard, and
- Must be reported as excess emissions
- Except:
  - Biological treatment systems that are tested and comply with percent reduction or mass removal standards
  - Control devices (except biological treatment) excess emissions must not exceed 10% of operating time including startup, shutdown, or malfunction, and
  - Kraft, soda, and semi-chemical vent controls must not exceed (excluding startup, shutdown, or malfunction):
    - 1% for LVHC systems controls
    - 4% for HVLC or combined LVHC and HVLC system controls

FIGURE 9. MONITORING PARAMETERS (§63.453)

PULPING SYSTEMS	Thermal Oxidizer • For compliance with the 98 percent reduction option; measure, maintain, and record fire box temperature with a CMS* • For compliance with the 20 ppmv outlet option; measure, maintain, and record fire box temperature or outlet HAP concentration with a CMS • For compliance with the 1600°F design temperature option; measure, maintain, and record fire box temperature with a CMS • No monitoring requirements for pulping vent system vents routed to a power boiler, lime kiln, or recovery furnace
BLEACHING SYSTEMS	Bleaching Vent Scrubbers • Measure and record the following parameters using a CMS: = pH or oxidation/reduction potential of scrubber effluent, = gas scrubber fan speed, and = gas scrubber liquid influent flowrate -or- = Chlorine outlet concentration Systems participating in the extended compliance time of the Voluntary Advanced Technology Incentives Program: • Monitor chlorine and hypochlorite application rates (kg/Mg ODP) during extended compliance period
PULPING PROCESS CONDENSATES	Steam Strippers • Measure and record the following parameters using a CMS: = Process water feed rate, = Steam feed rate, and = Column feed temperature -or- = Outlet methanol concentration Biological Treatment Systems • Daily monitoring = Outlet soluble BOD5 = Mixed liquor volatile suspended solids = Horsepower of aerator unit(s) = Inlet liquid flow = Liquid temperature = Collect and store inlet and outlet grab samples -or- = Monitor site-specific parameters • Quarterly monitoring = Every 1st quarter: demonstrate percent reduction or mass removal of acetaldehyde, methanol, methyl ethyl ketone, and propionaldehyde = Remaining quarters: percent reduction or mass removal of the four HAP (methanol can be measured if a relationship between the four HAP and methanol reduction is established during the 1st quarter).
CLOSED VENT SYSTEMS -and- CLOSED COLLECTION SYSTEMS (Condensates)	Every 30 days: • Visual inspection • Inspect bypass line valve or closure mechanism Initially and Annually • Demonstrate no detectable leaks in positive pressure portions • Demonstrate negative pressure at enclosure openings

* CMS = Continuous Monitoring System

FIGURE 10. RECORDKEEPING AND REPORTING REQUIREMENTS (§63.454, §63.455)

INITIAL NOTIFICATION REPORT

Existing Major Sources: *Within 1 year after becoming subject to rule*

New or Reconstructed Major Sources: *No later than 120 days after initial startup*

- Name & address of owner or operator.
- Address of the source.
- Identification of the rule and source's compliance date.
- Description of operations, design capacity, and HAP emission points.
- Statement of whether a major or area source.
- Notification of intent to construct or startup date for new or reconstructed sources.
- Control strategy report (HVLC systems at kraft mills).
- Control strategy report (bleaching systems participating in the Effluent Incentives Program)

NOTIFICATION OF COMPLIANCE STATUS REPORT

60 Days Following Compliance Demonstration

- Methods used to determine compliance.
- Results of performance tests and/or CMS performance evaluations.
- Methods to be used to determine continuous compliance.
- Type and quantity of HAP emitted.
- Analysis demonstrating whether a major or area source.
- Description of control equipment and efficiencies.
- Statement as to whether source has complied with standard.
- Data, calculations, engineering assessments, and manufacturer's recommendations used to determine operating parameter value.

FIGURE 11. RECORDKEEPING AND REPORTING REQUIREMENTS (§63.454, §63.455)

PERIODIC REPORTS	
QUARTERLY (Excess Emissions)	• Requirements specified in Subpart A • No additional requirements under Subpart S
SEMI-ANNUALLY (No Excess Emissions)	• Requirements specified in Subpart A • Mills participating in the Voluntary Advanced Technology Incentives Program must report daily application rates of chlorine and hypochlorite
BI-ANNUALLY	• Mills with extended compliance schedules (some kraft pulping systems and for mills participating in the Effluent Incentives Program) must update control strategy reports

RECORDKEEPING
• Comply with recordkeeping requirements specified in Subpart A • Mills with closed-vent systems and/or closed collection systems shall prepare and maintain a site-specific inspection plan • Mills participating with the Voluntary Advanced Technology Incentives Program shall record daily average chlorine and hypochlorite application rates (kg/Mg ODP) • Mills shall record all CMS parameters included in the monitoring requirements (see Figures 8 and 9)

Appendix D

List of EPA Region Office Contacts

REGIONAL AIR TOXICS CONTACTS

Susan Lancey
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J.F.K. Federal Building
Boston, MA 02203-2211
PH: (617) 565-3587
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EPA Region II
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FAX: (212) 637-3901

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FAX: (312) 353-8289

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1445 Ross Avenue, Suite 700
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FAX: (303) 312-6409

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San Francisco, CA 94105
PH: (415) 744-1200
FAX: (415) 744-1076

Andrea Wullenweber
EPA Region X (OAQ-107)
1200 Sixth Avenue
Seattle, WA 98101
PH: (206) 553-8760
FAX: (206) 553-0404

Appendix E

Equipment Diagrams For Pulp and Paper Mills

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Figure 3 Example Kraft Digester System (batch)
Figure 4 Example Kraft Digester System (continuous)
Figure 5 Example Kraft Turpentine Recovery System
Figure 6 Example Kraft Knotter System
Figure 7 Example Kraft Pulp Washing System
Figure 8 Example Kraft Screen System and Decker System
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Figure 25 Example Sulfite Weak Liquor Storage Tank
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Figure 27 Example Sulfite Strong Liquor Storage Tank
Figure 28 Example Sulfite Acid Condensate Storage Tank

Figure 29 Example Bleaching System

Figure 30 Example Steam Stripping System with Methanol Rectification

Figure 31 Example Biological Treatment System

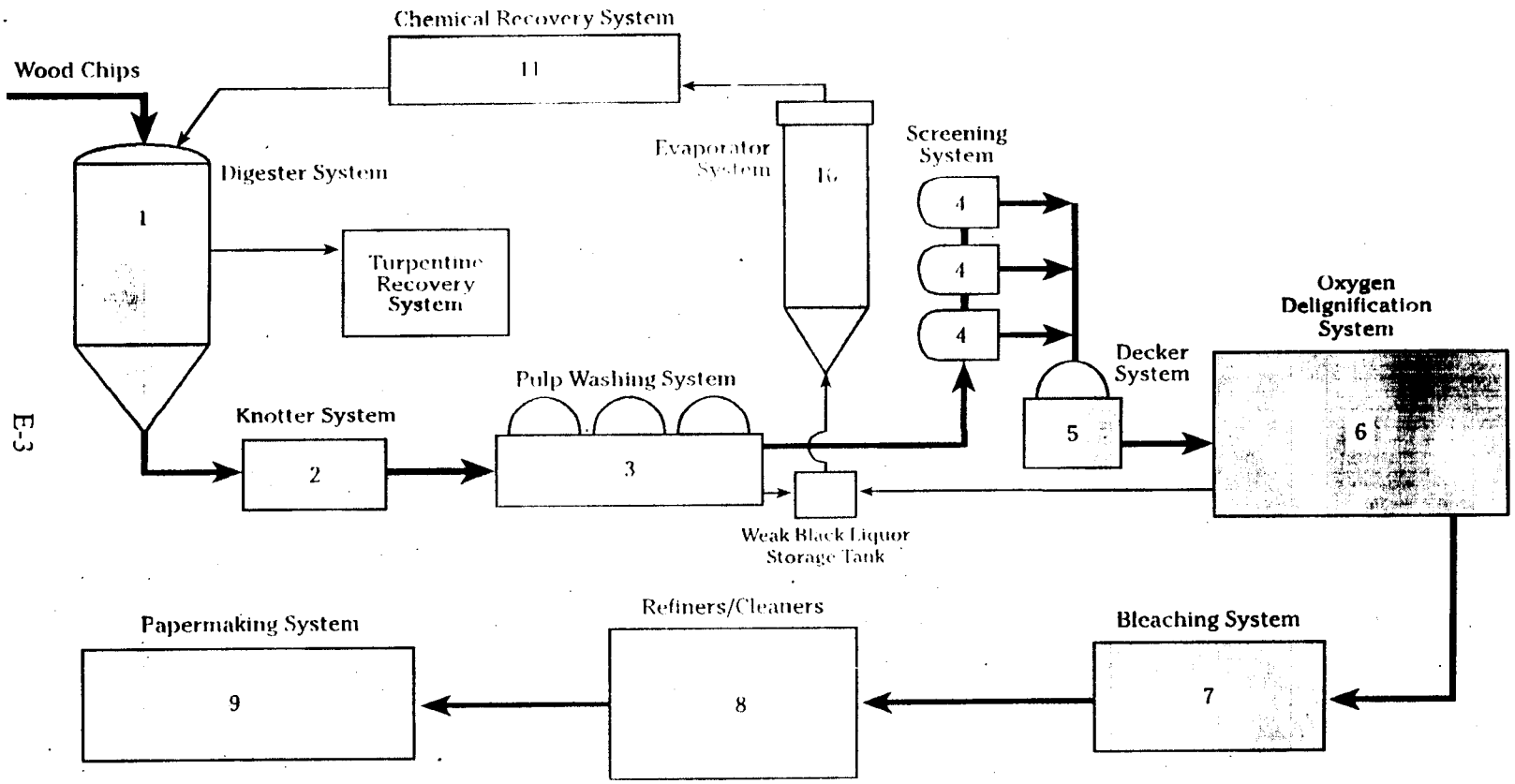
SUMMARY OF FIGURES

These figures are intended to serve as an overview of the various processes that exist at kraft, semi-chemical, soda, and sulfite pulp and paper mills. Figure 1 provides an overview of the entire pulp and papermaking process at a kraft mill. This general process is followed at semi-chemical, soda, and sulfite mills, therefore, process overviews are not repeated for those mills. Figures 2, 13, 18, and 22 illustrate the various processes within pulping systems at kraft, semi-chemical, soda, and sulfite mills, respectively. Process blocks in these figures that list collection systems indicate the processes that are subject to the Pulp and Paper NESHAP. Alternatively, process blocks that do not list collection systems are not subject to the Pulp and Paper NESHAP. The figures that follow Figures 2, 13, 18 and 22 provide greater detail about the specific processes and equipment in these pulping systems. Figures 29, 30, and 31 illustrate the processes and equipment used in bleaching systems, steam stripper systems, and biological treatment systems, respectively.

Disclaimer

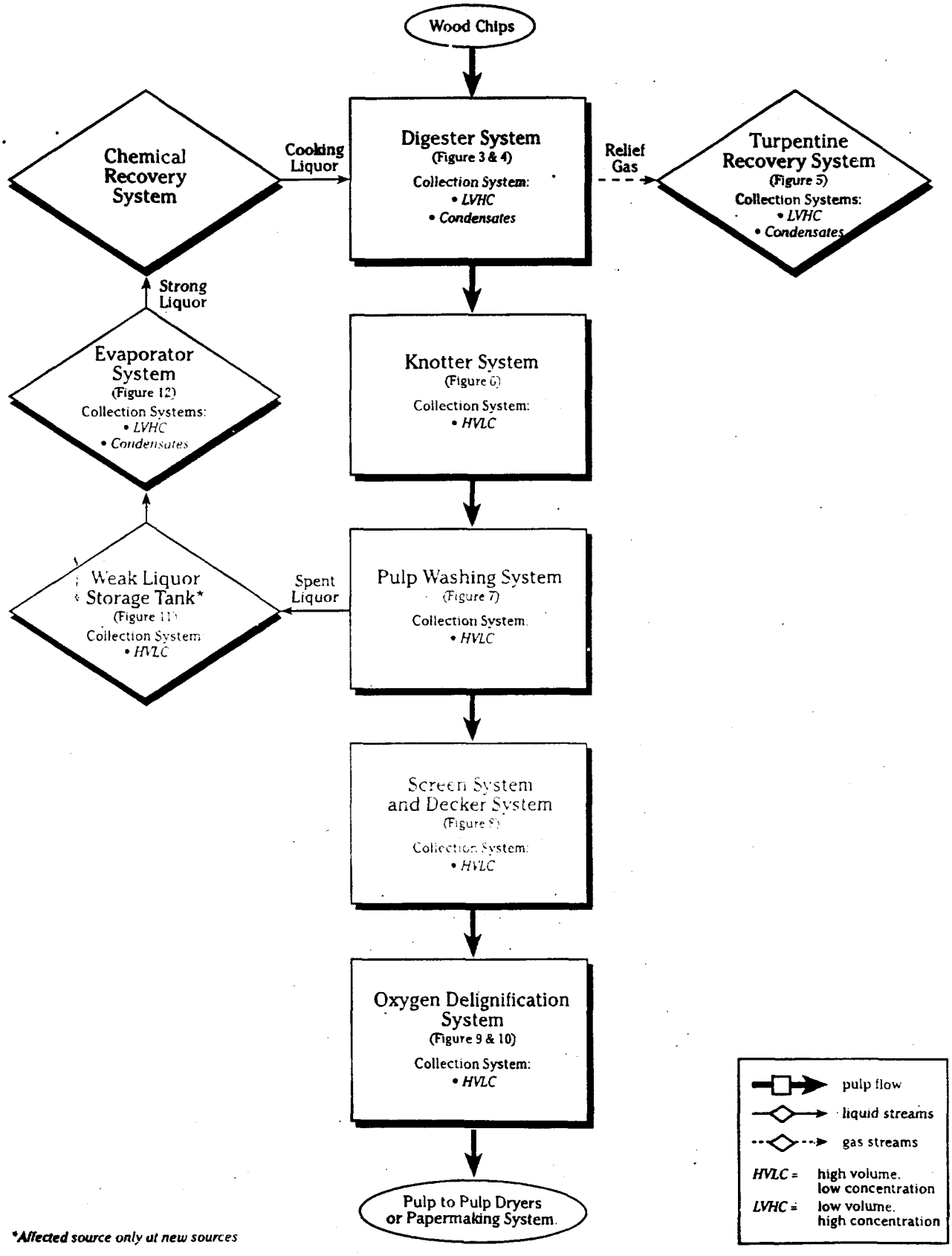
The following figures are representations of pulping and bleaching systems and processes for the purpose of clarifying the Pulp and Paper NESHAP. They are intended to provide the reader with a general understanding of processes at pulp and paper mills: not pulping and bleaching systems at specific mills.

Figure 1
Example Overview of a Kraft Pulping Mill with a Papermaking System



1–Cooking liquor added to wood chips to dissolve lignin.
2–Removal of uncooked chips and knots.
3–Weak black liquor washed from pulp.
4–Fiber bundles and contaminants screened from pulp.
5–Pulp thickened for oxygen delignification.
6–Oxygen Delignification System for further delignification.
7–Pulp bleached to increase whiteness.
8–Pulp is cleaned and prepared for papermaking.
9–Paper sheet formed through dewatering.
10–Evaporator System removes excess water from the weak black liquor.
11–Chemical recovery system converts the concentrated liquor into cooking liquor for use in the digester system.

Figure 2 – Example Kraft Pulping System



*Affected source only at new sources

Figure 3 – Example Kraft Digester System (batch)

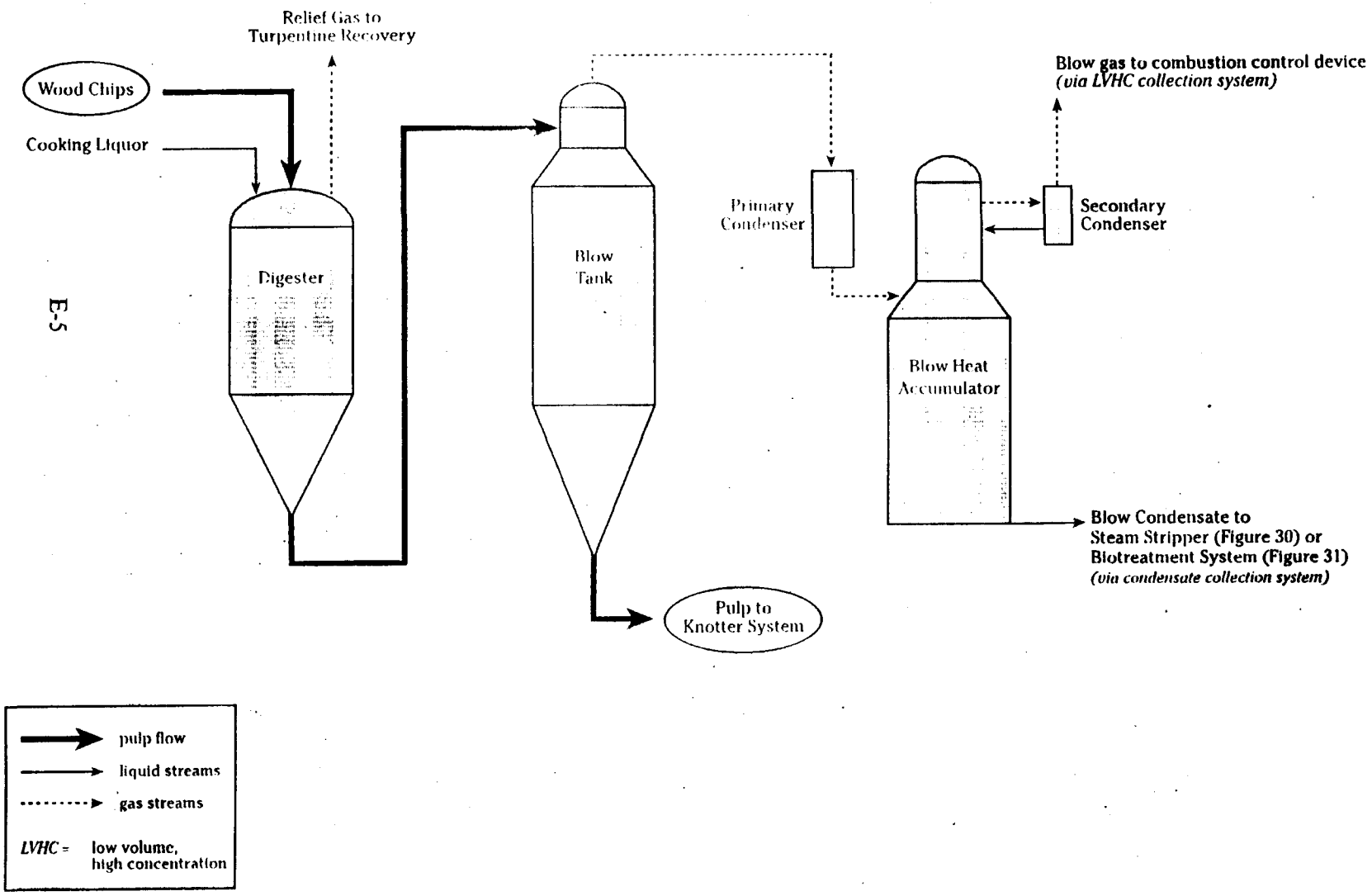
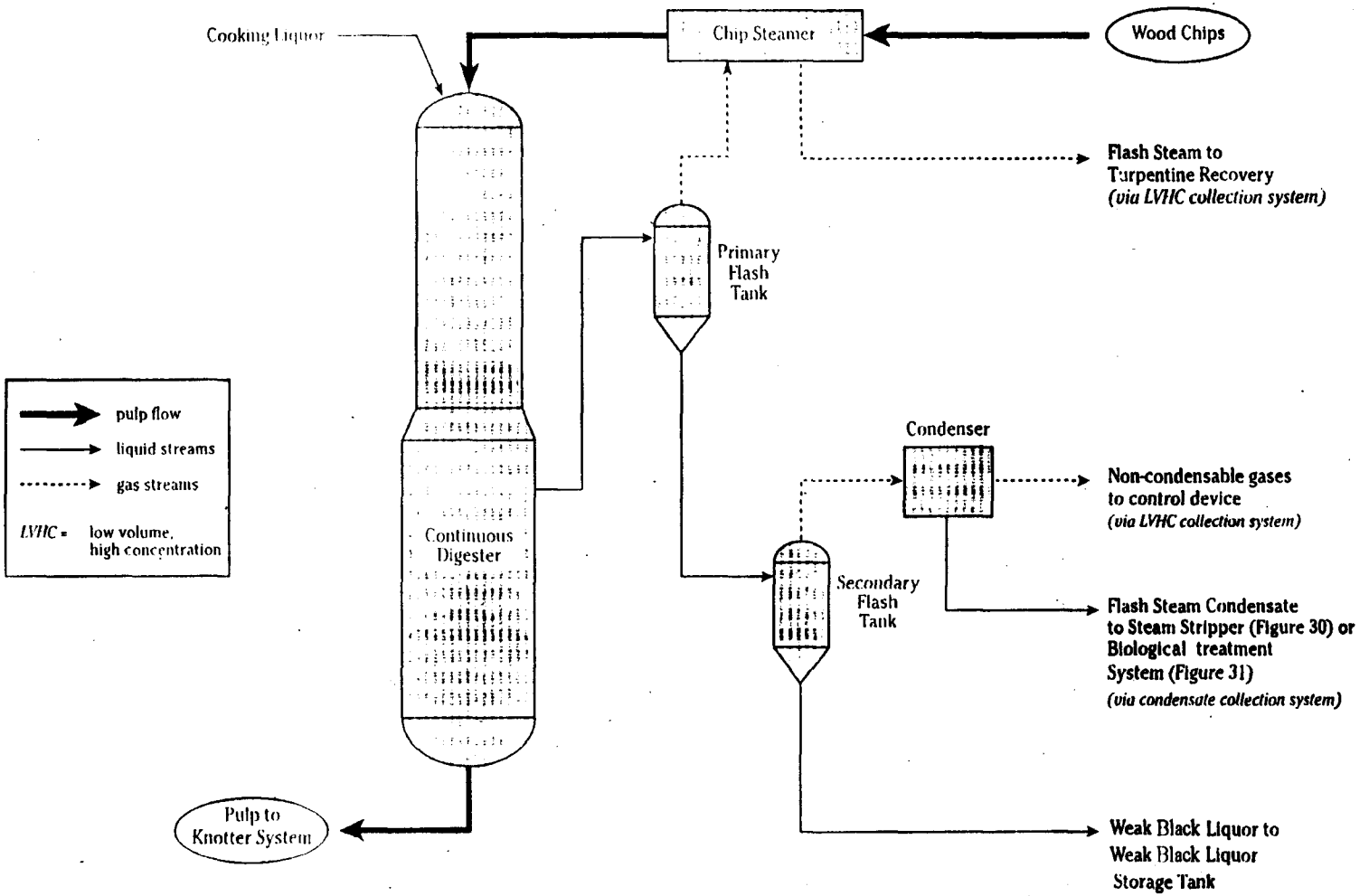


Figure 4 – Example Kraft Digester System (continuous)*



Blow tank for continuous digester is not pictured.

Figure 5 – Example Kraft Turpentine Recovery System

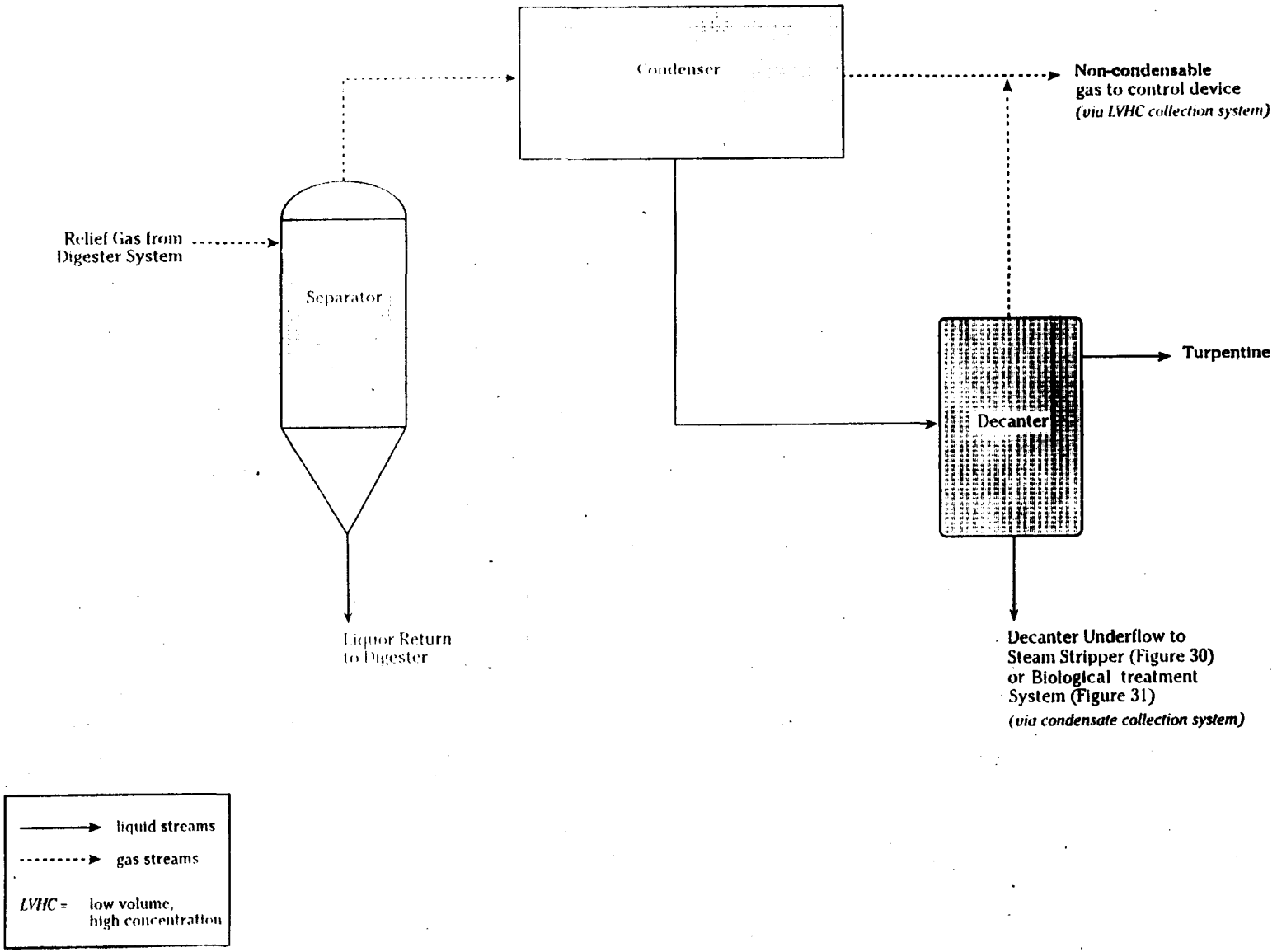


Figure 6 – Example Kraft Knotter System

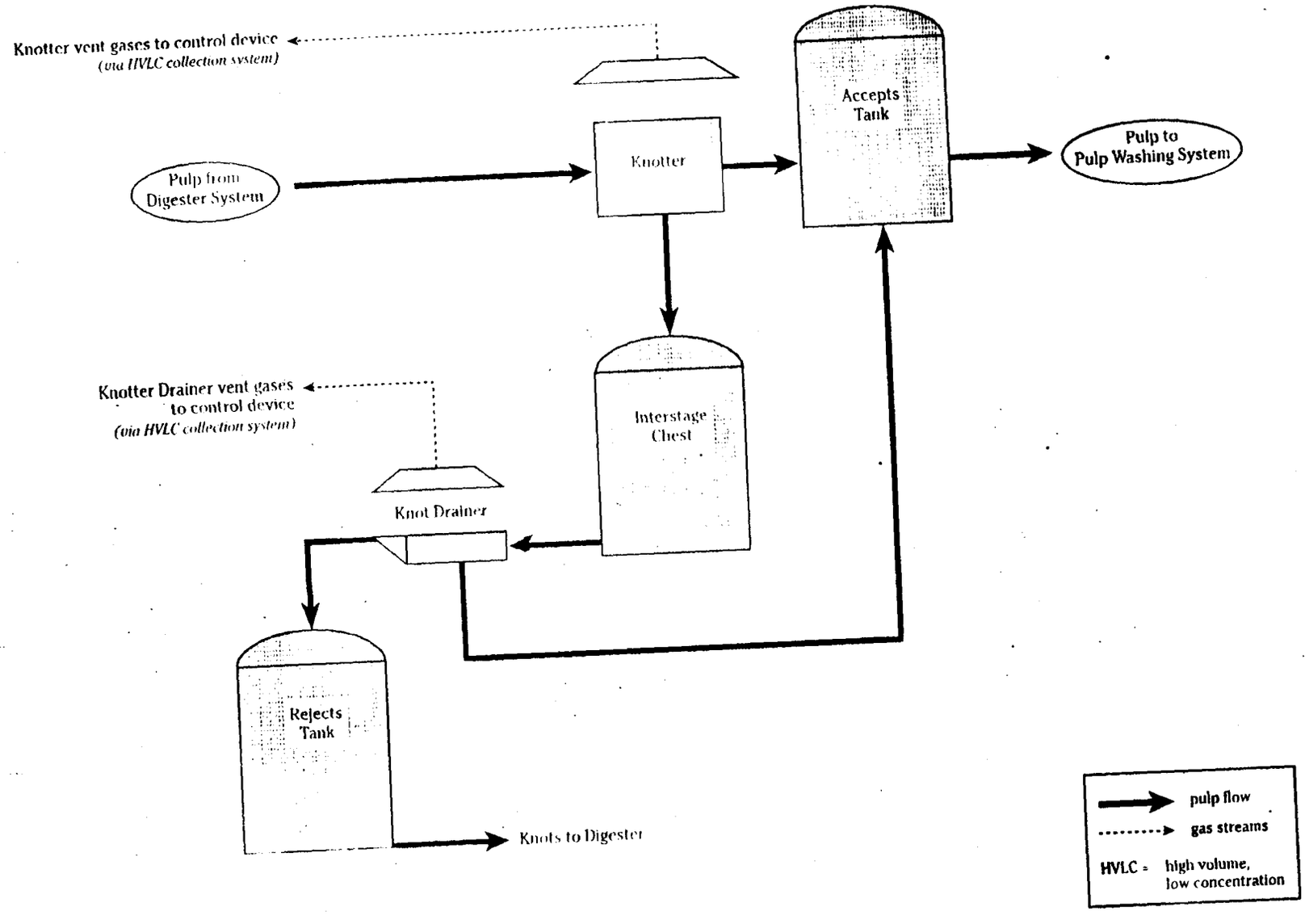


Figure 7 – Example Kraft Pulp Washing System

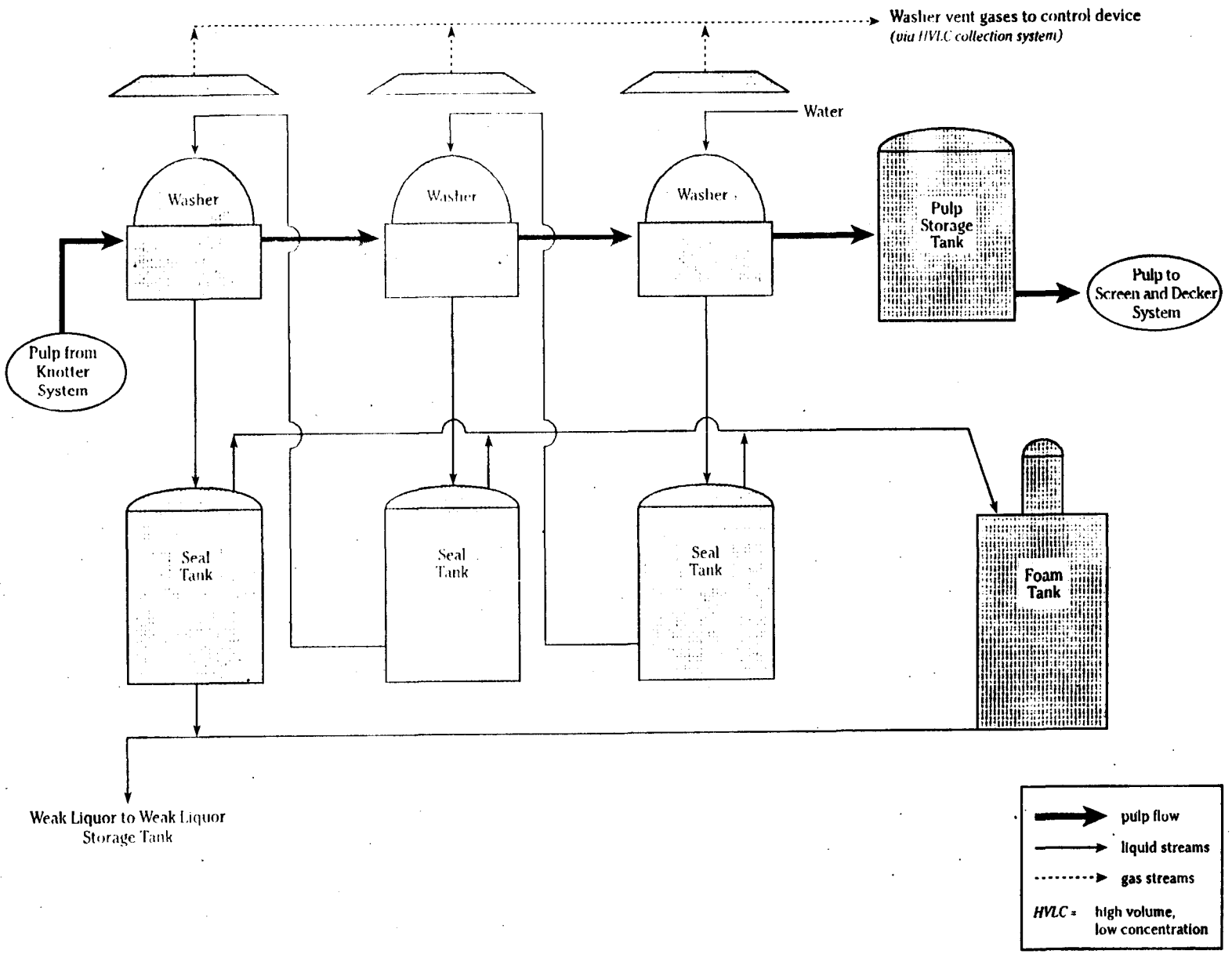


Figure 8 – Example Kraft Screen System and Decker System

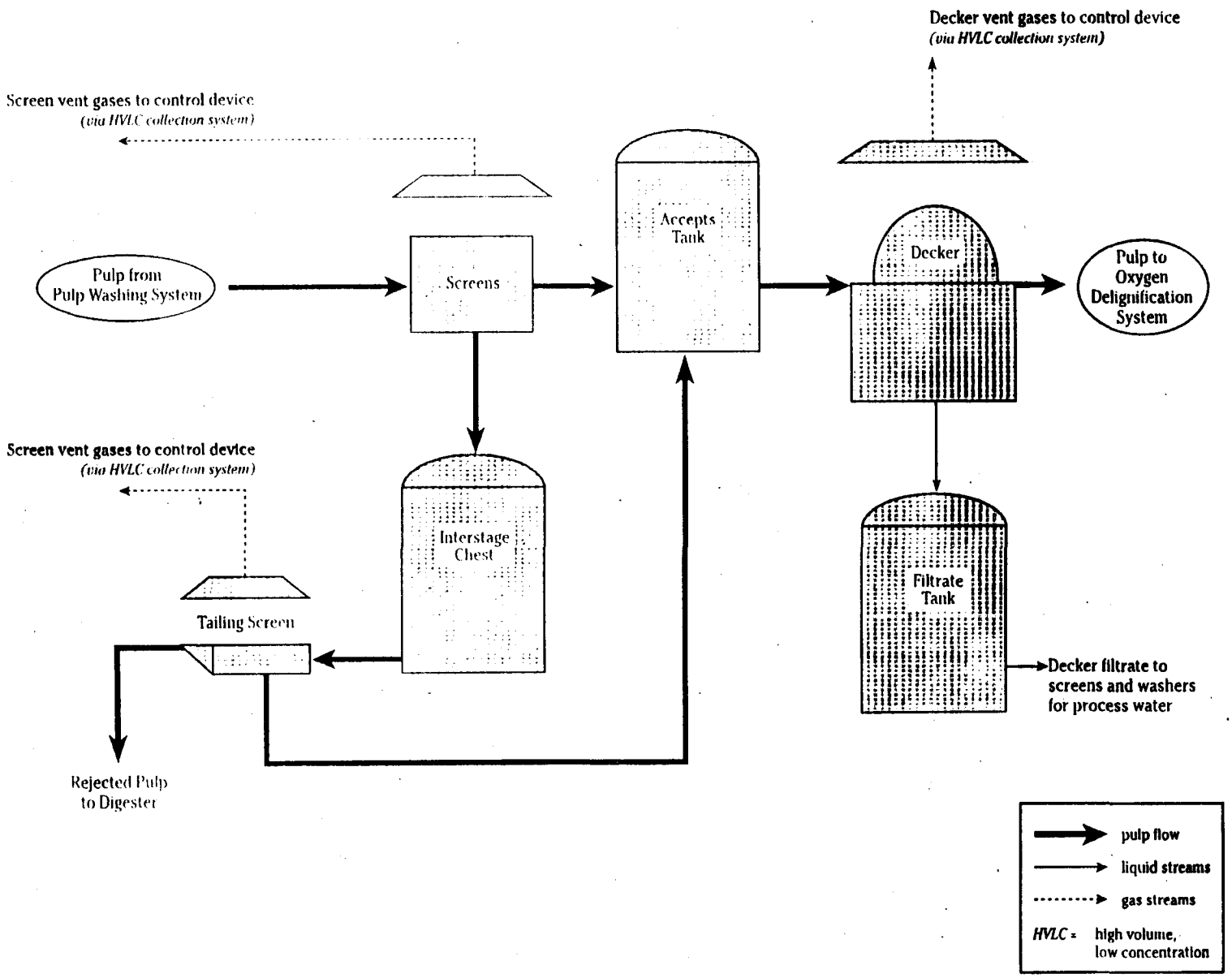


Figure 9 – Example Kraft Oxygen Delignification System (medium consistency)

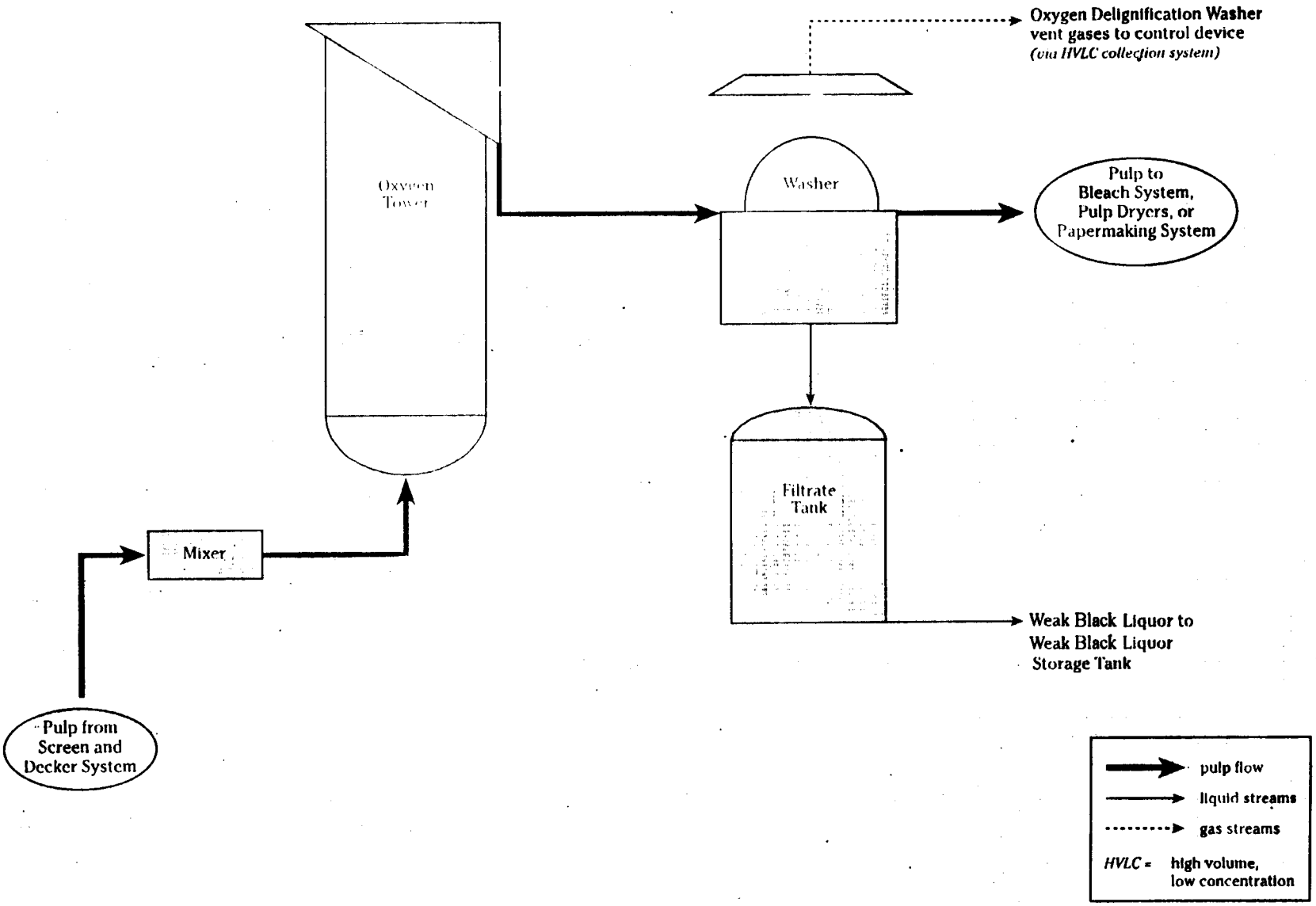


Figure 10 – Example Kraft Oxygen Delignification System (high consistency)

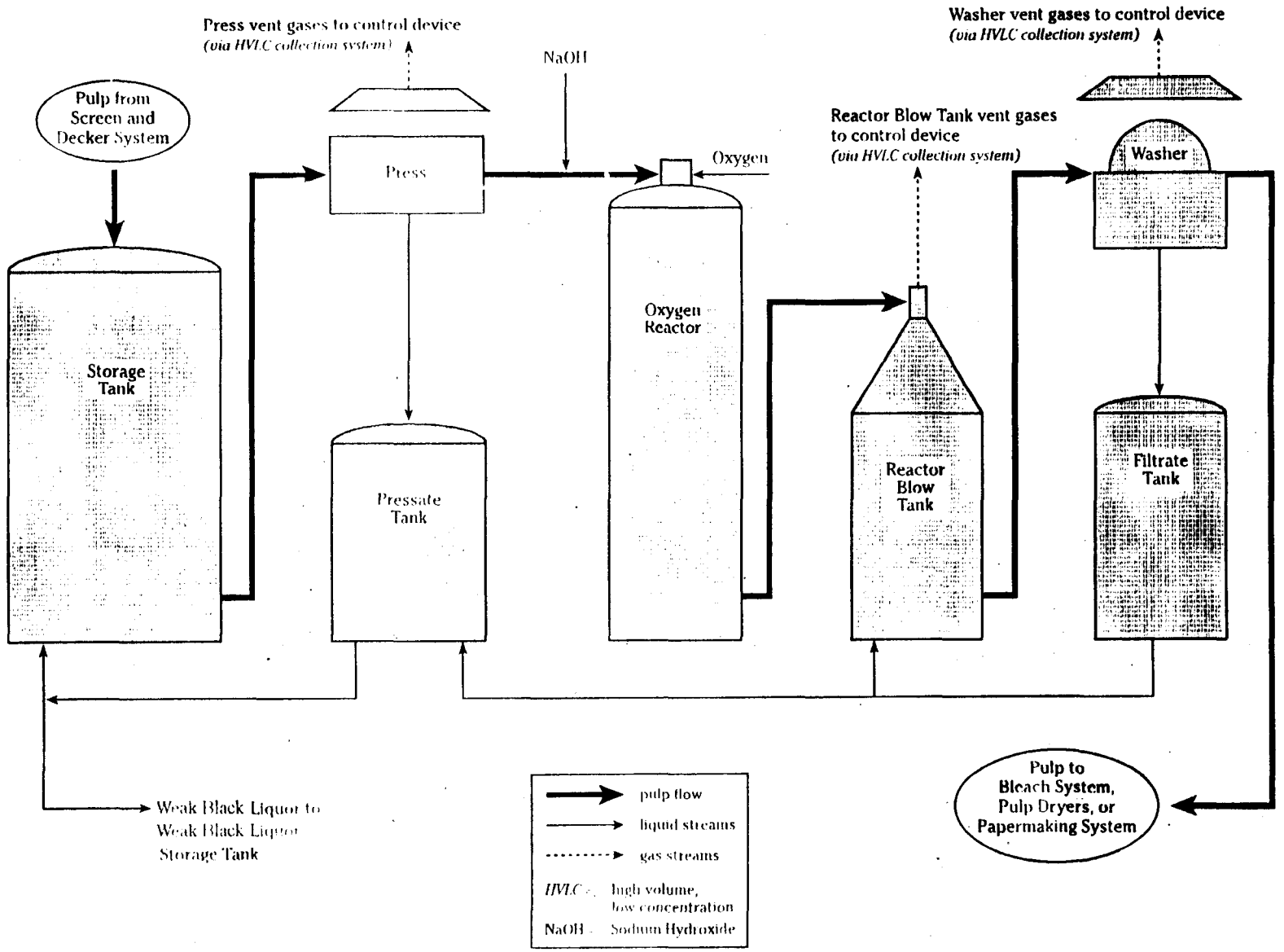
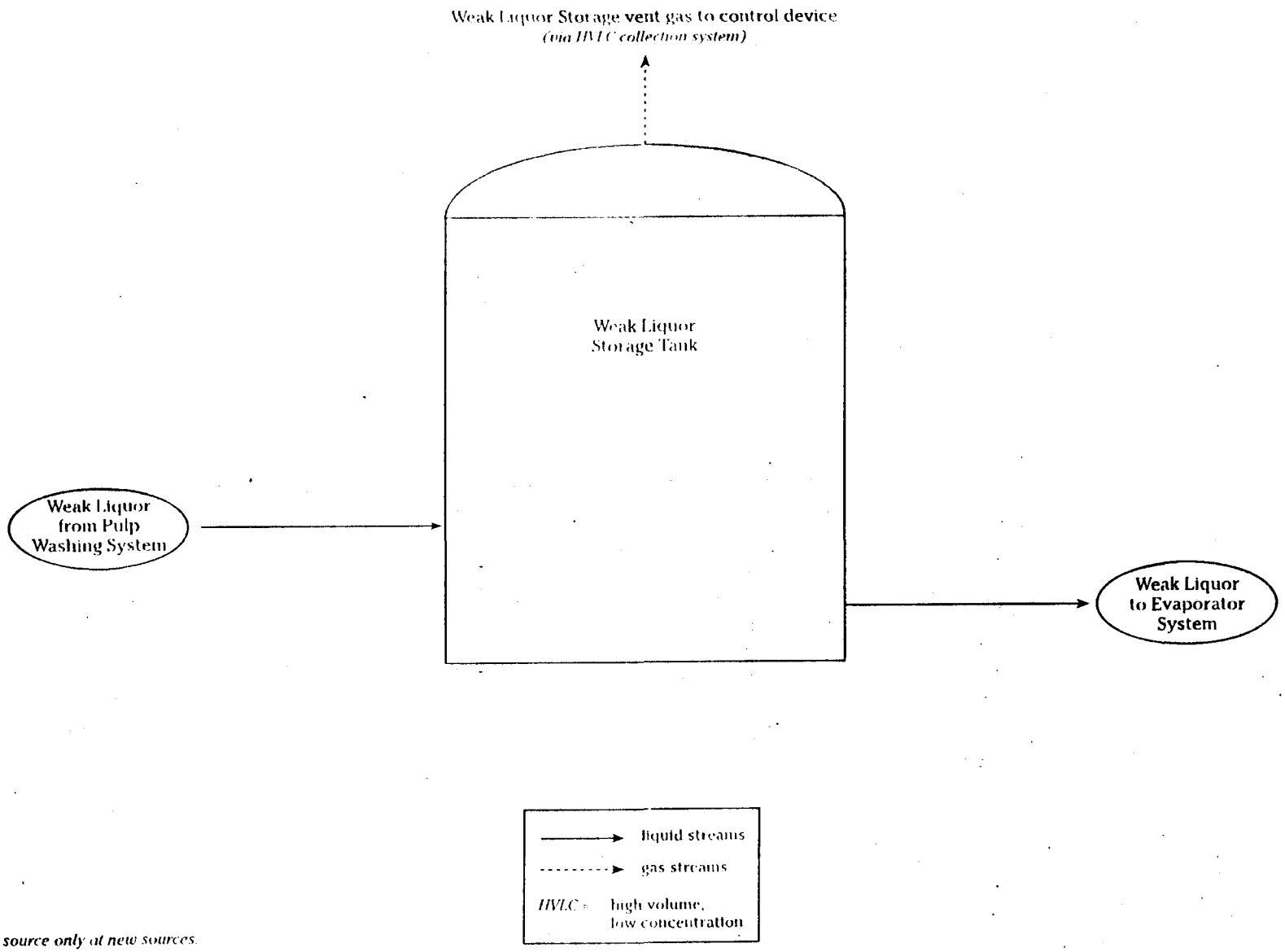


Figure 11 – Example Kraft Weak Liquor Storage Tank*



*Affected source only at new sources.

Figure 12 – Example Kraft Evaporator System

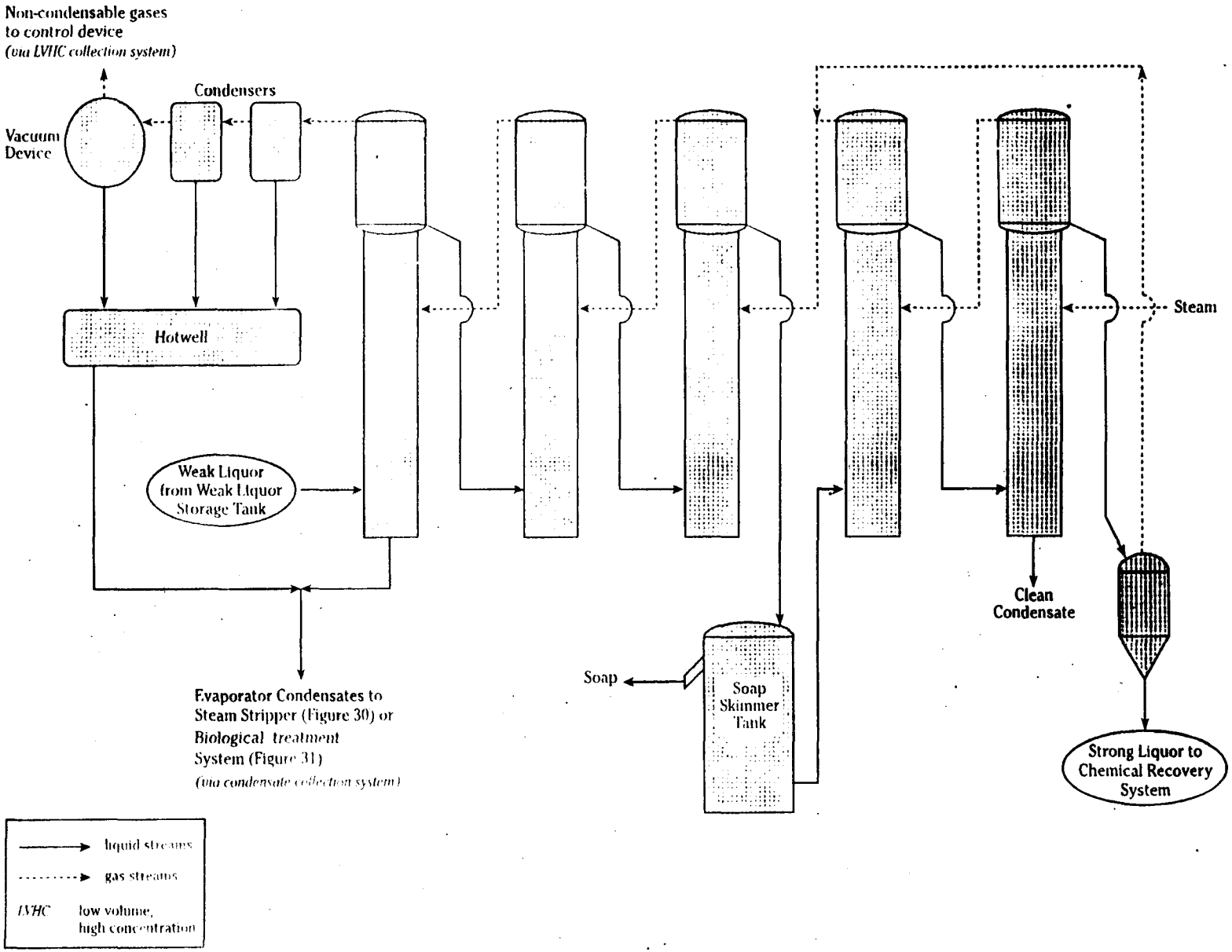
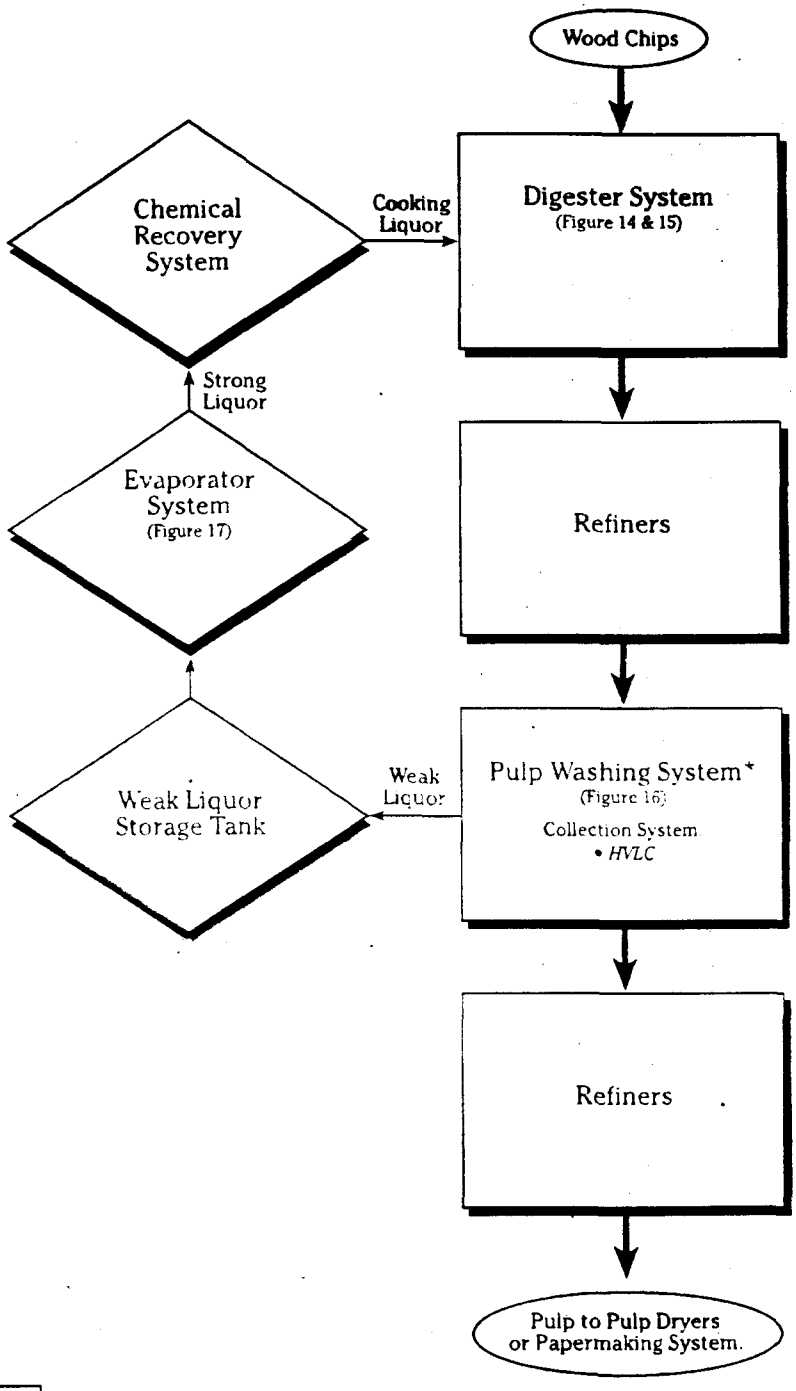
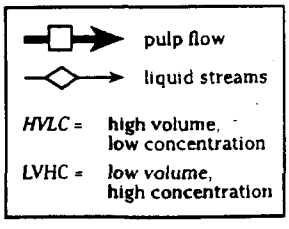


Figure 13 – Example Semi-chemical Pulping System





*Affected source only at new sources.

Figure 14 – Example Semi-Chemical Digester System (batch)

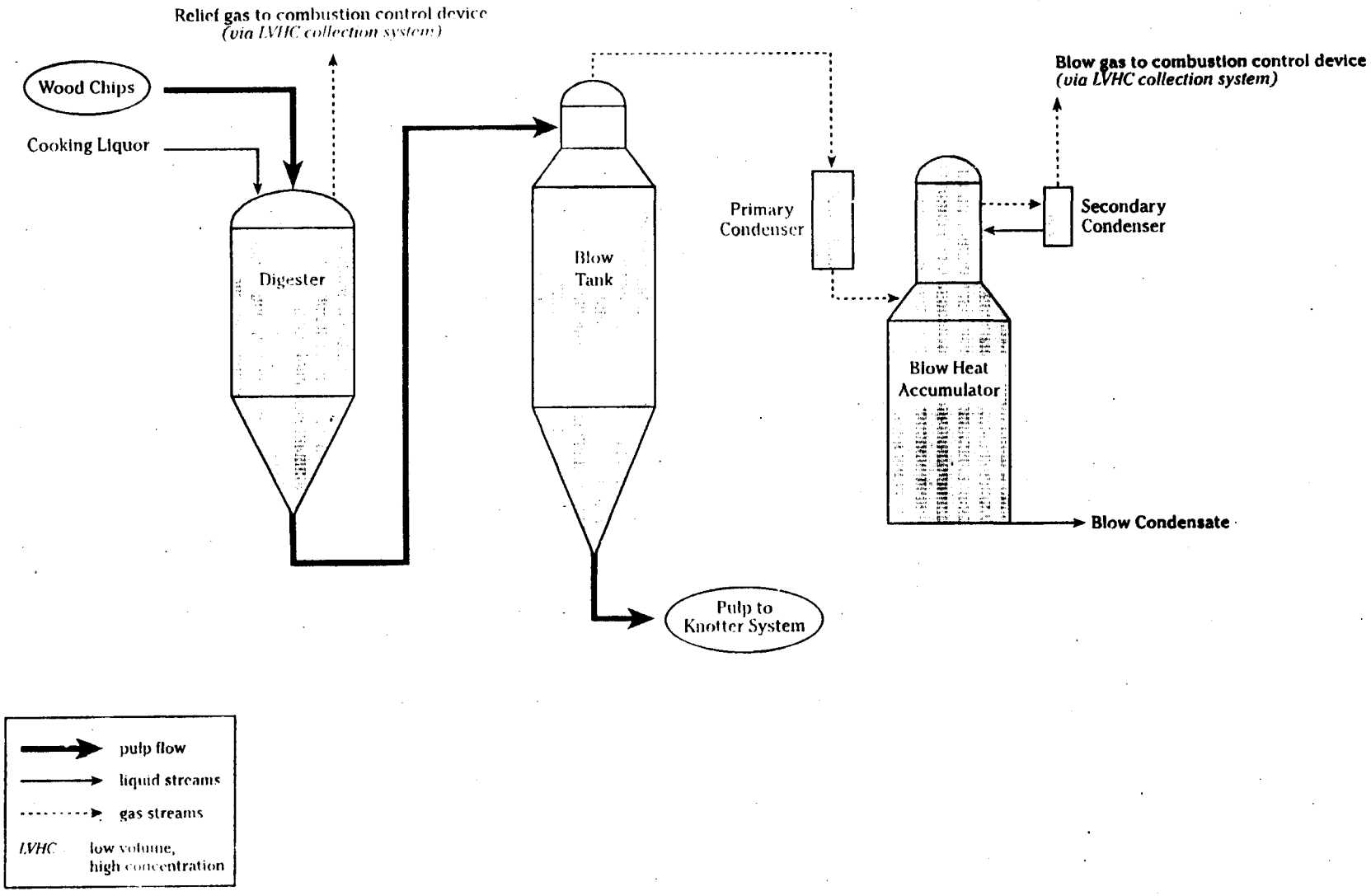
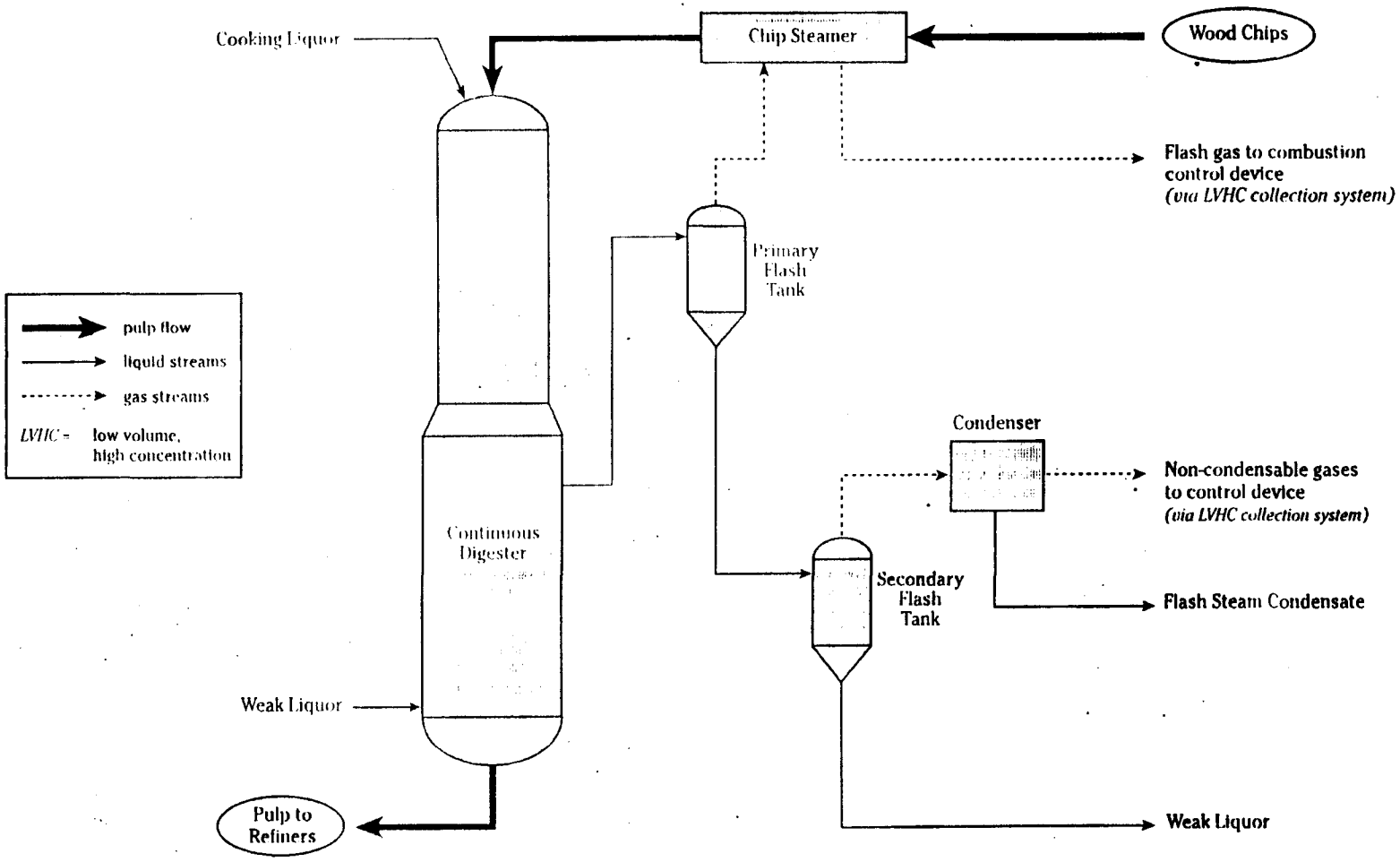
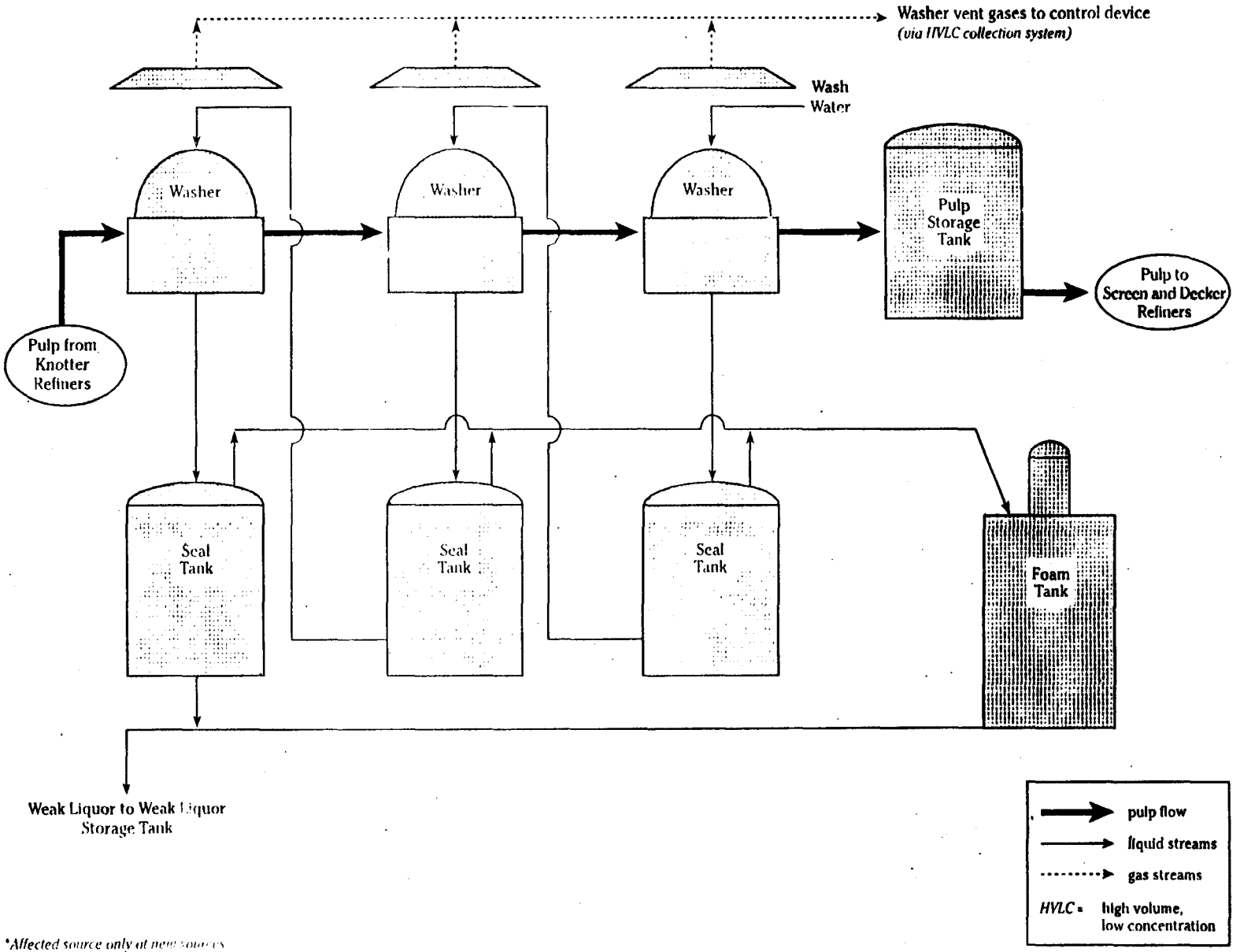


Figure 15 – Example Semi-Chemical Digester System (continuous)*



Blow tank for continuous digester is not pictured.

Figure 16 – Example Semi-Chemical Pulp Washing System*



*Affected source only at new sources

Figure 17 – Semi-Chemical Evaporator System

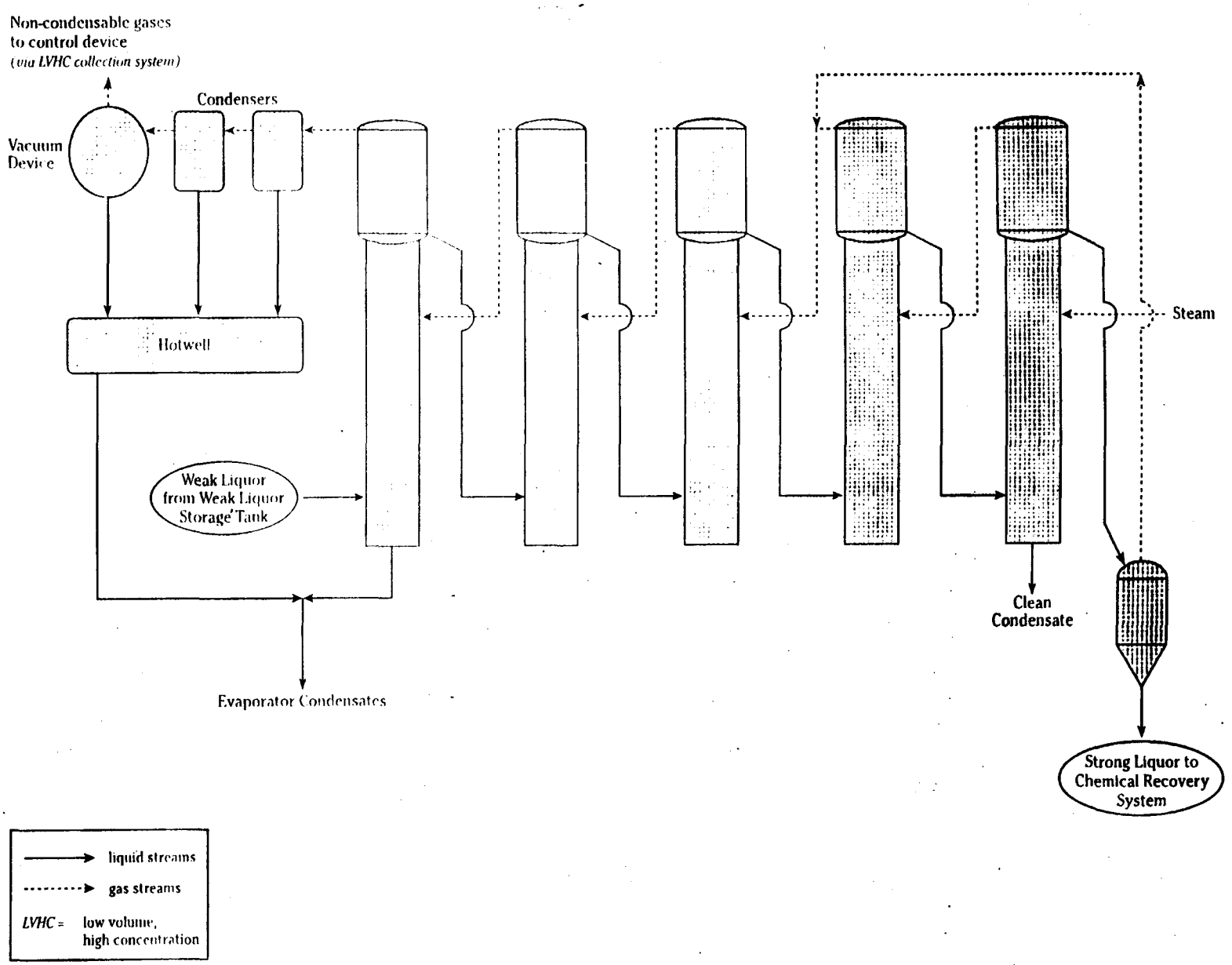
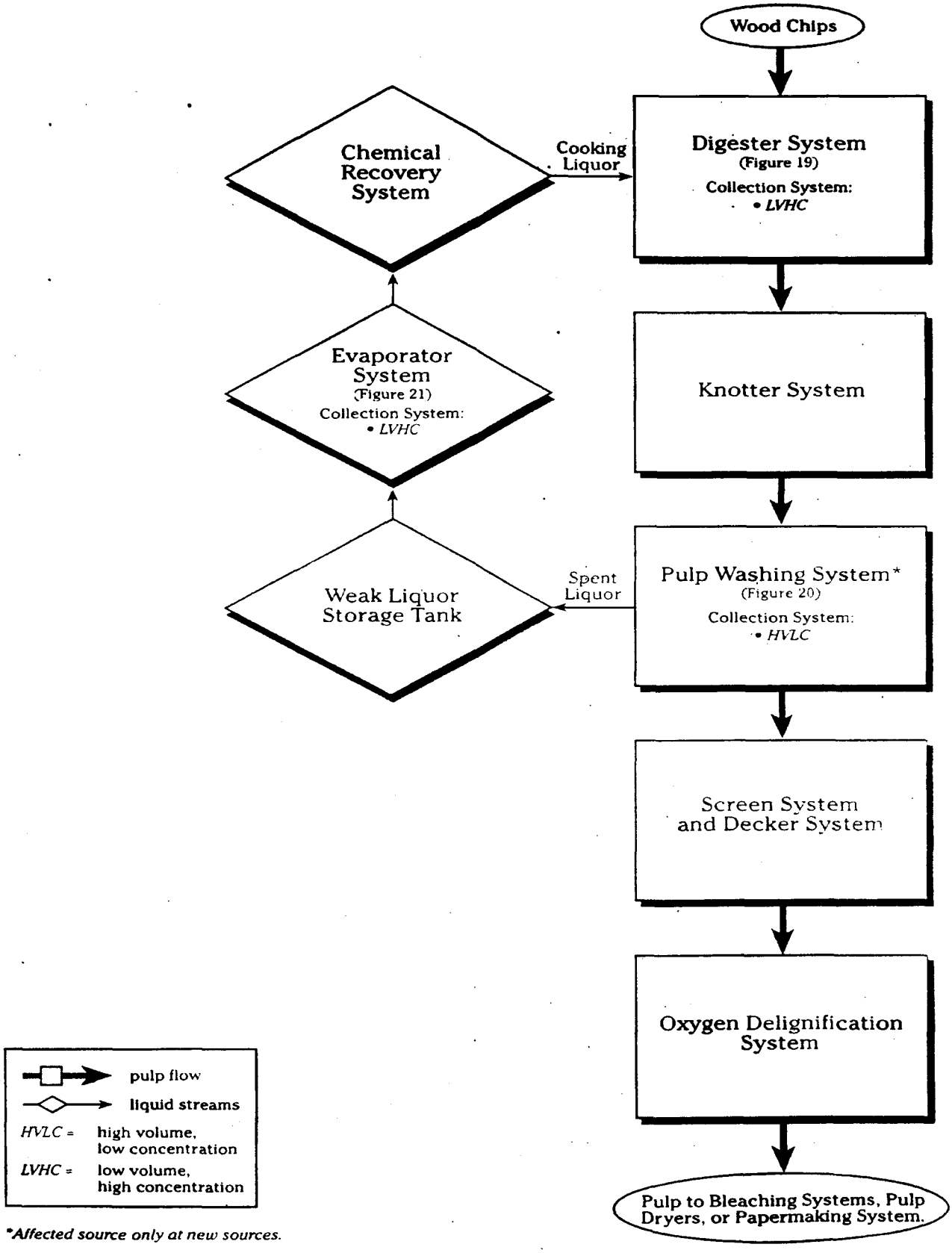


Figure 18 – Example Soda Pulping System



*Affected source only at new sources.

Figure 19 – Example Soda Digester System (batch)

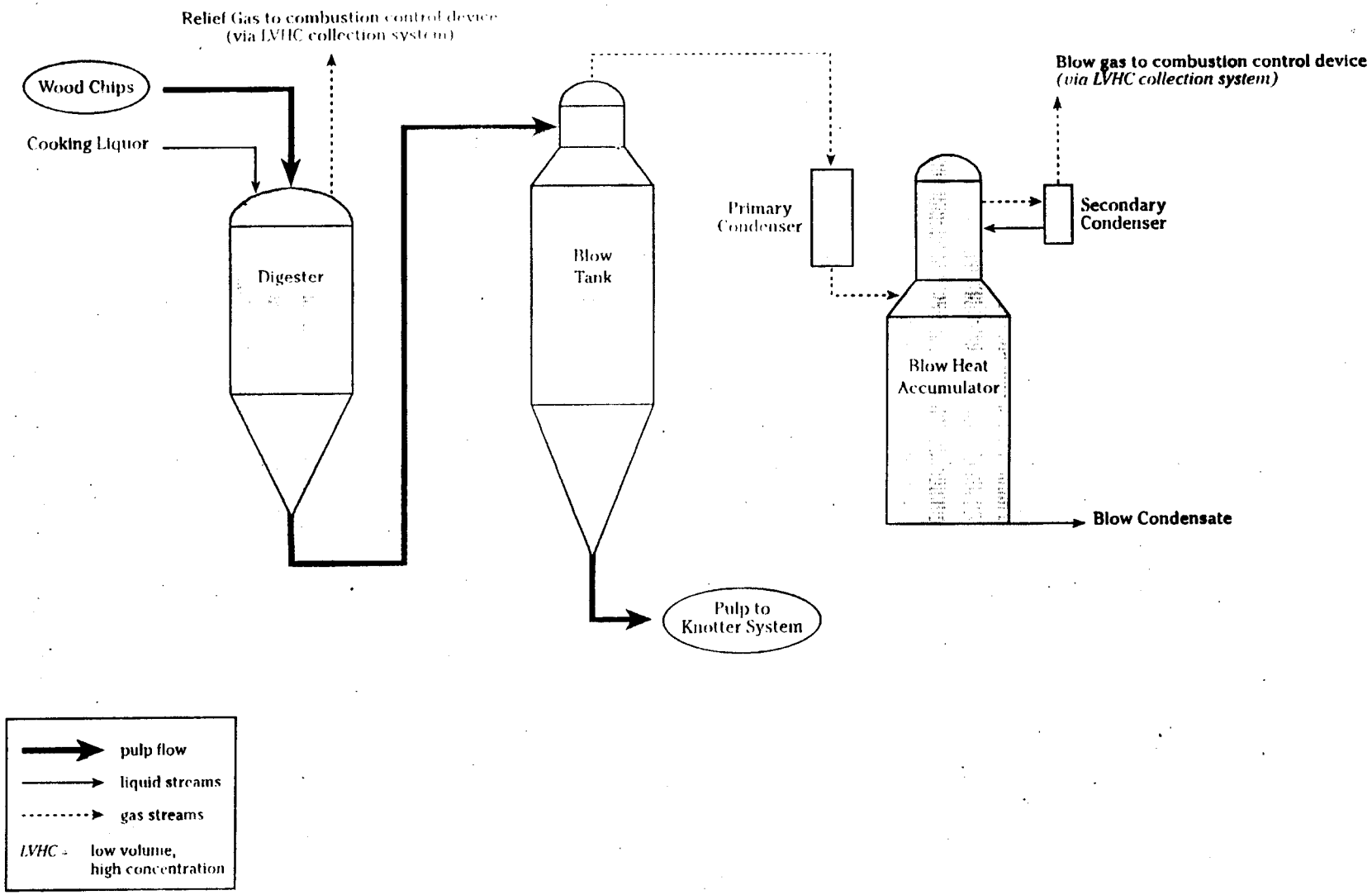
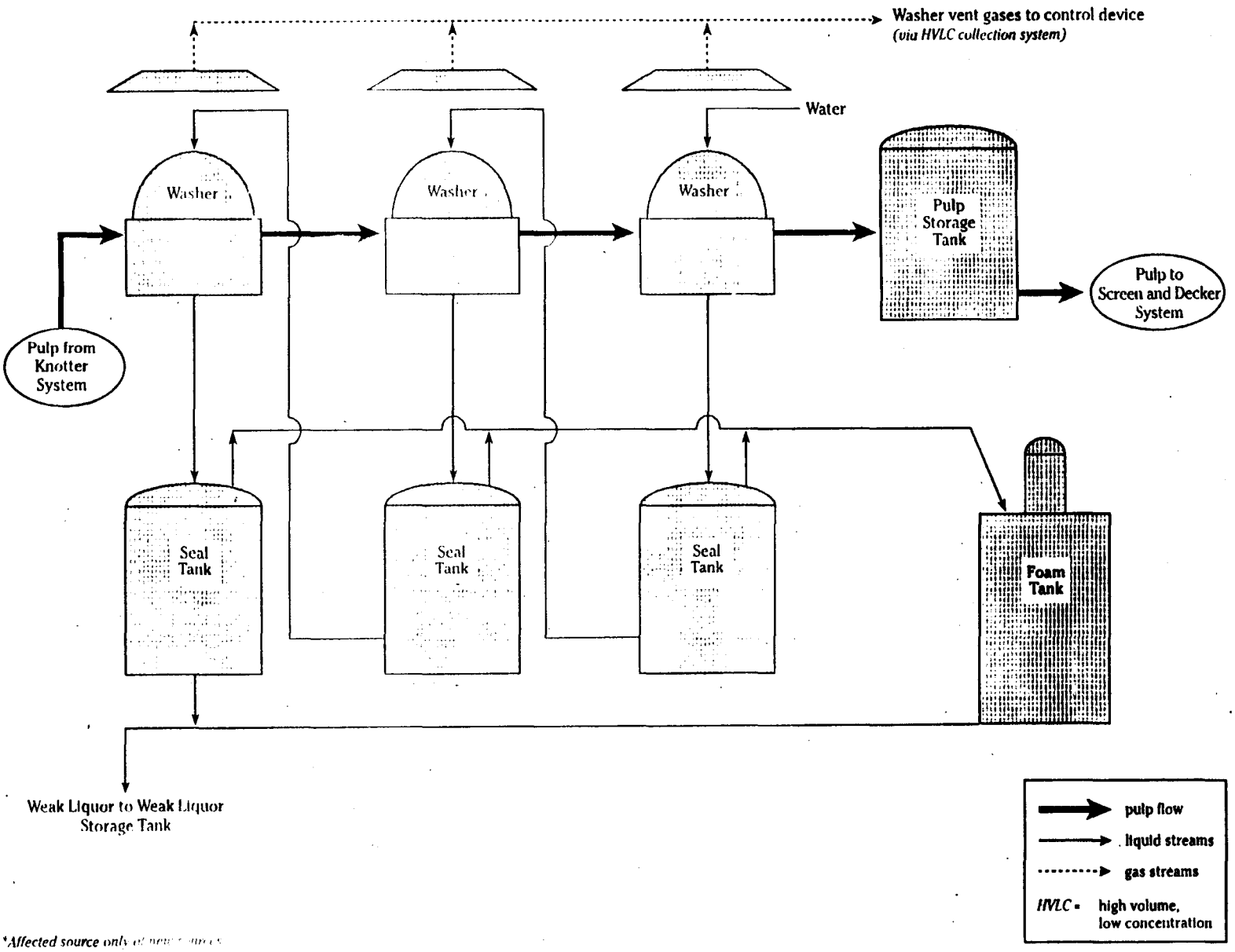
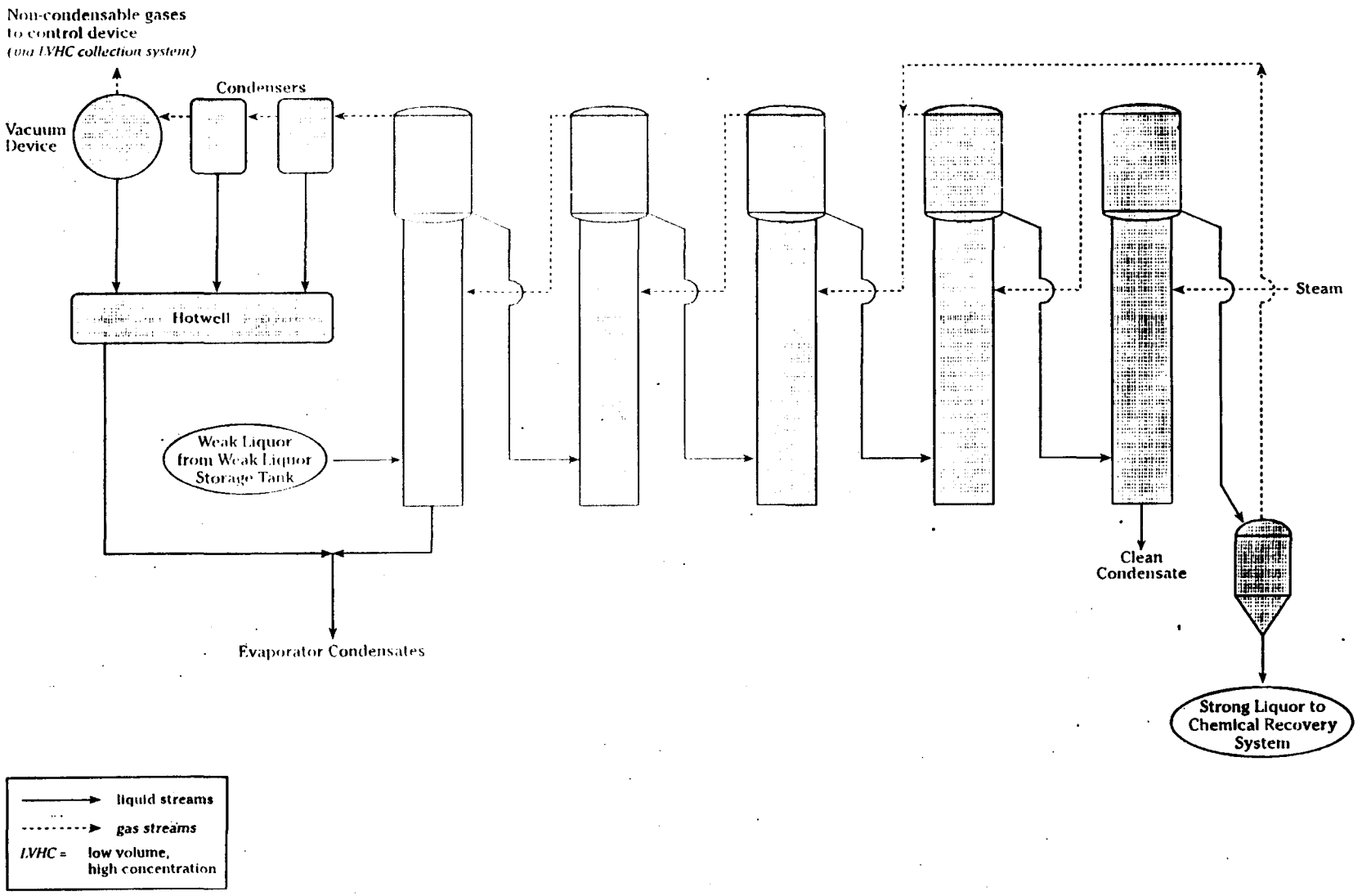


Figure 20 – Example Soda Pulp Washing System*



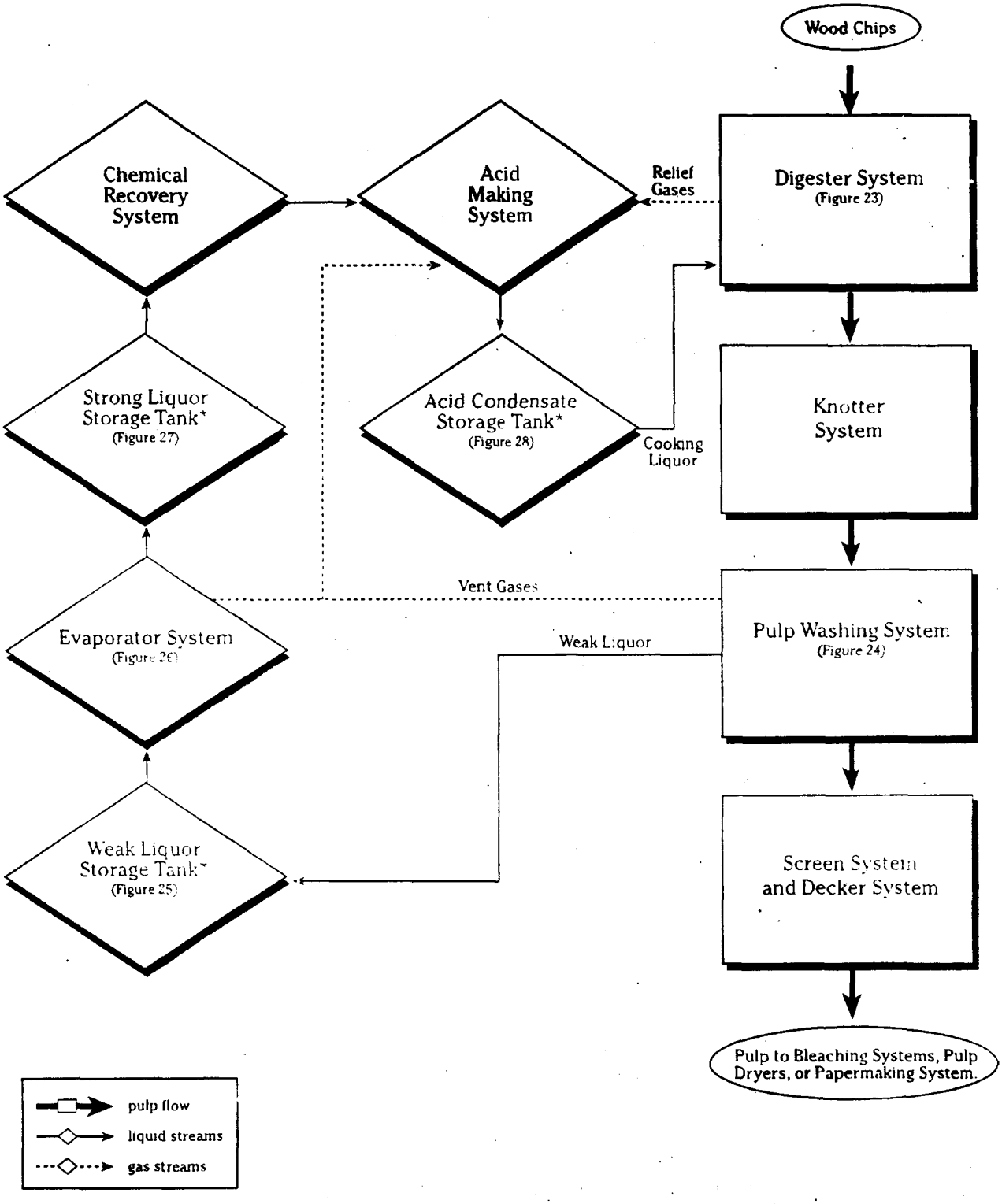
*Affected source only of new sources

Figure 21 – Example Soda Evaporator System



Clean
Condensate

Figure 22 – Example Sulfite Pulping System



*Affected source only at new sources.

Figure 23 – Example Sulfite Digester System (batch)

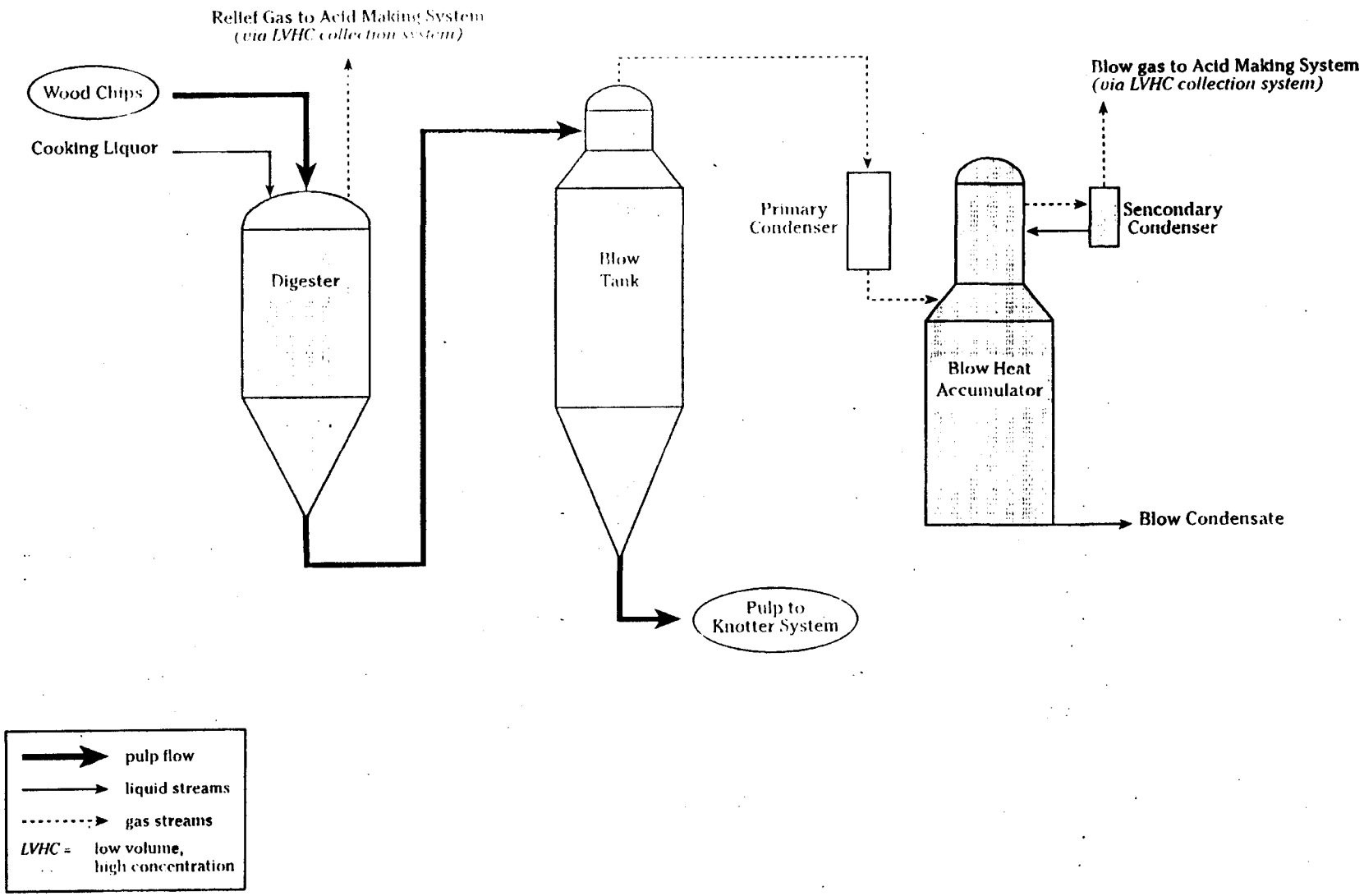


Figure 24 – Example Sulfite Pulp Washing System

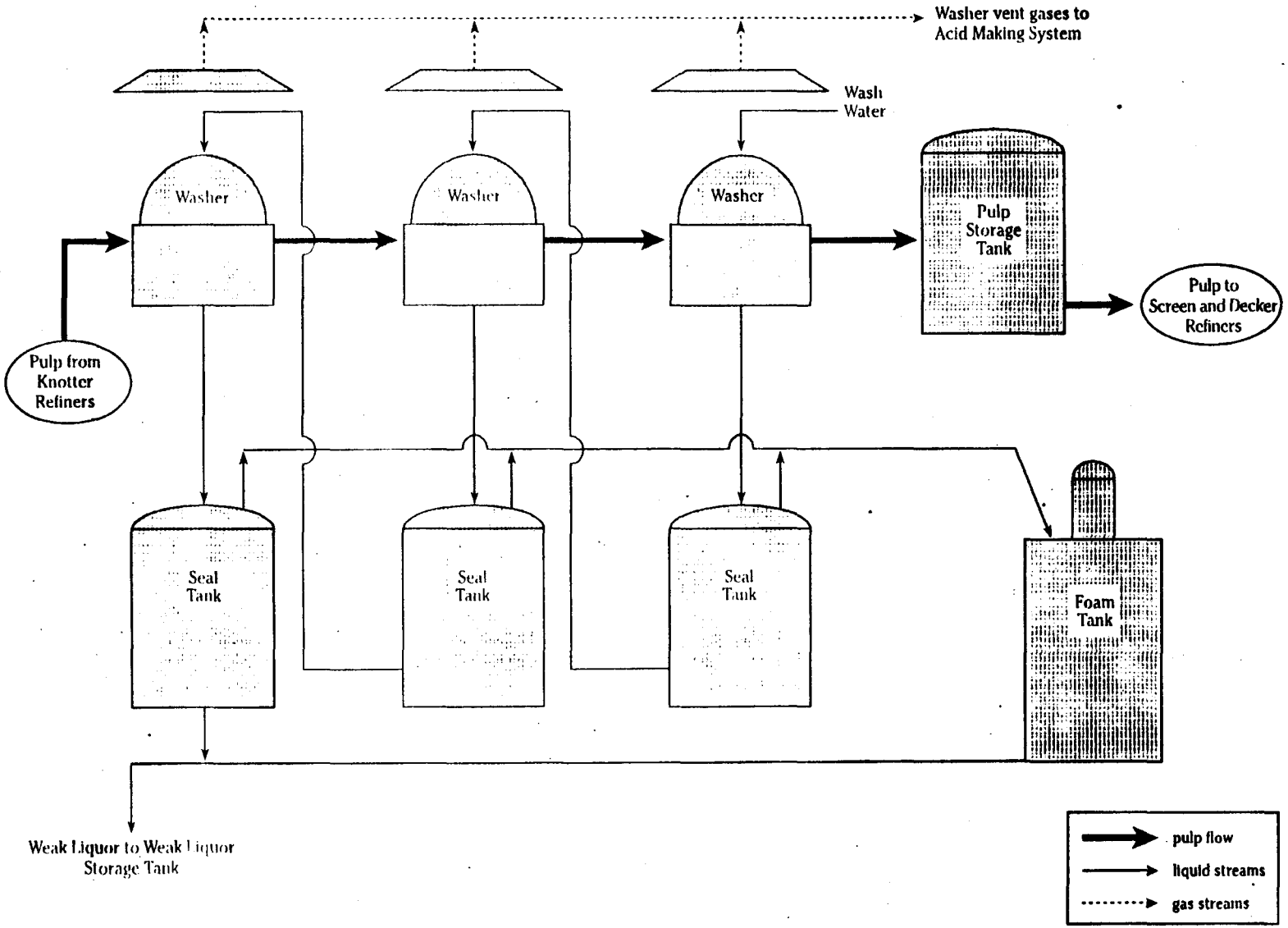
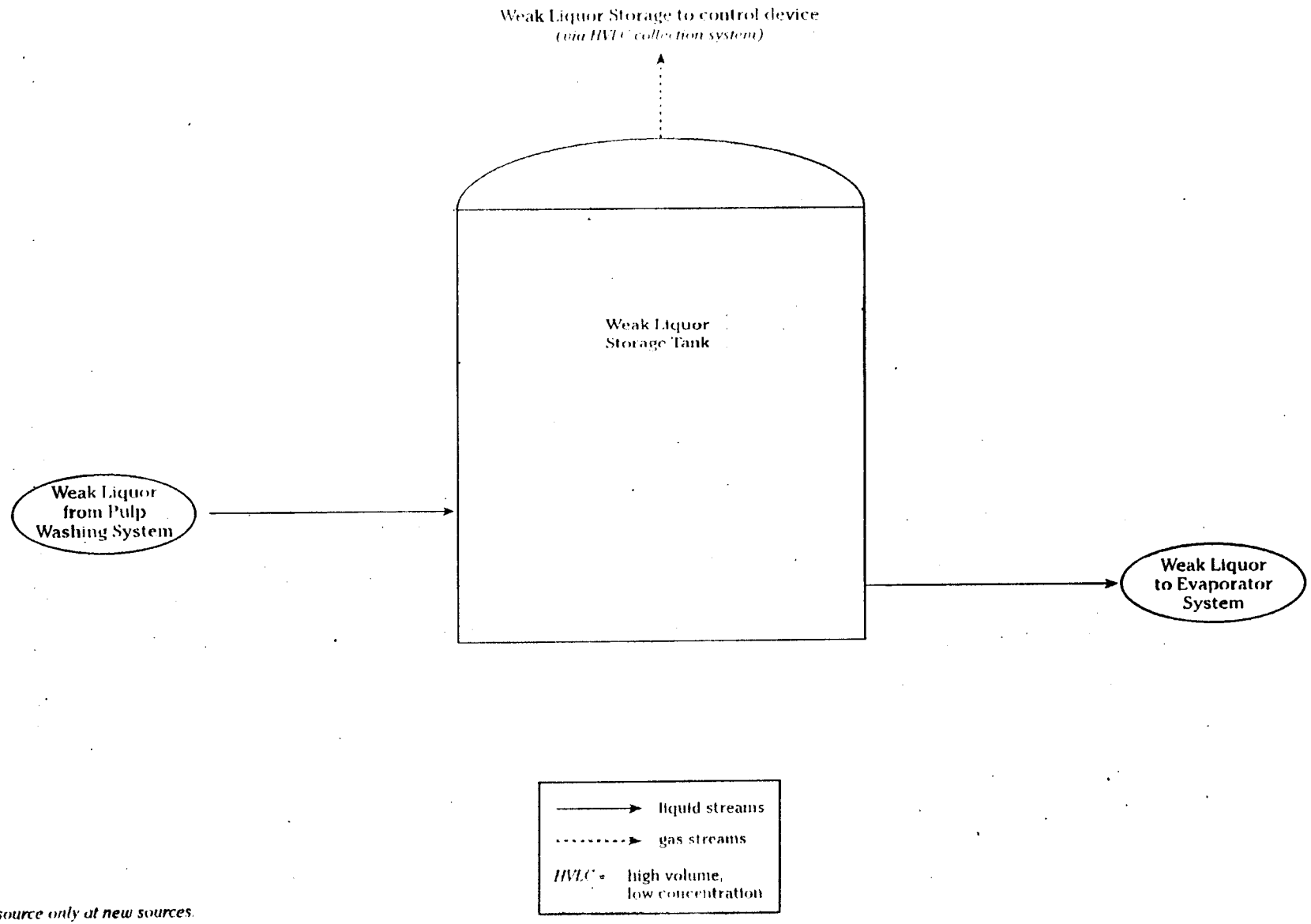


Figure 25 – Example Sulfite Weak Liquor Storage Tank*



*Affected source only at new sources.

Figure 26 – Example Sulfite Evaporator System

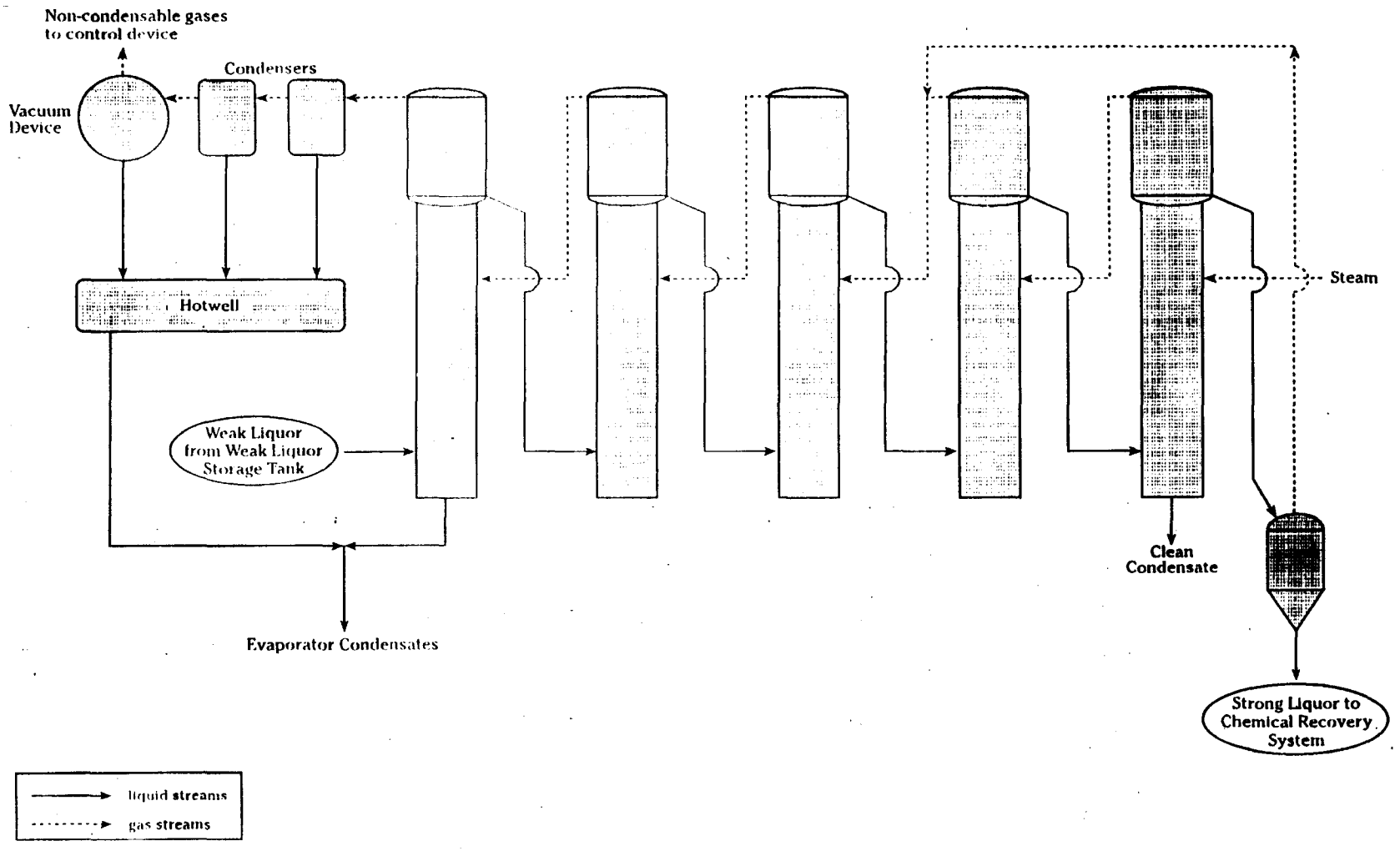
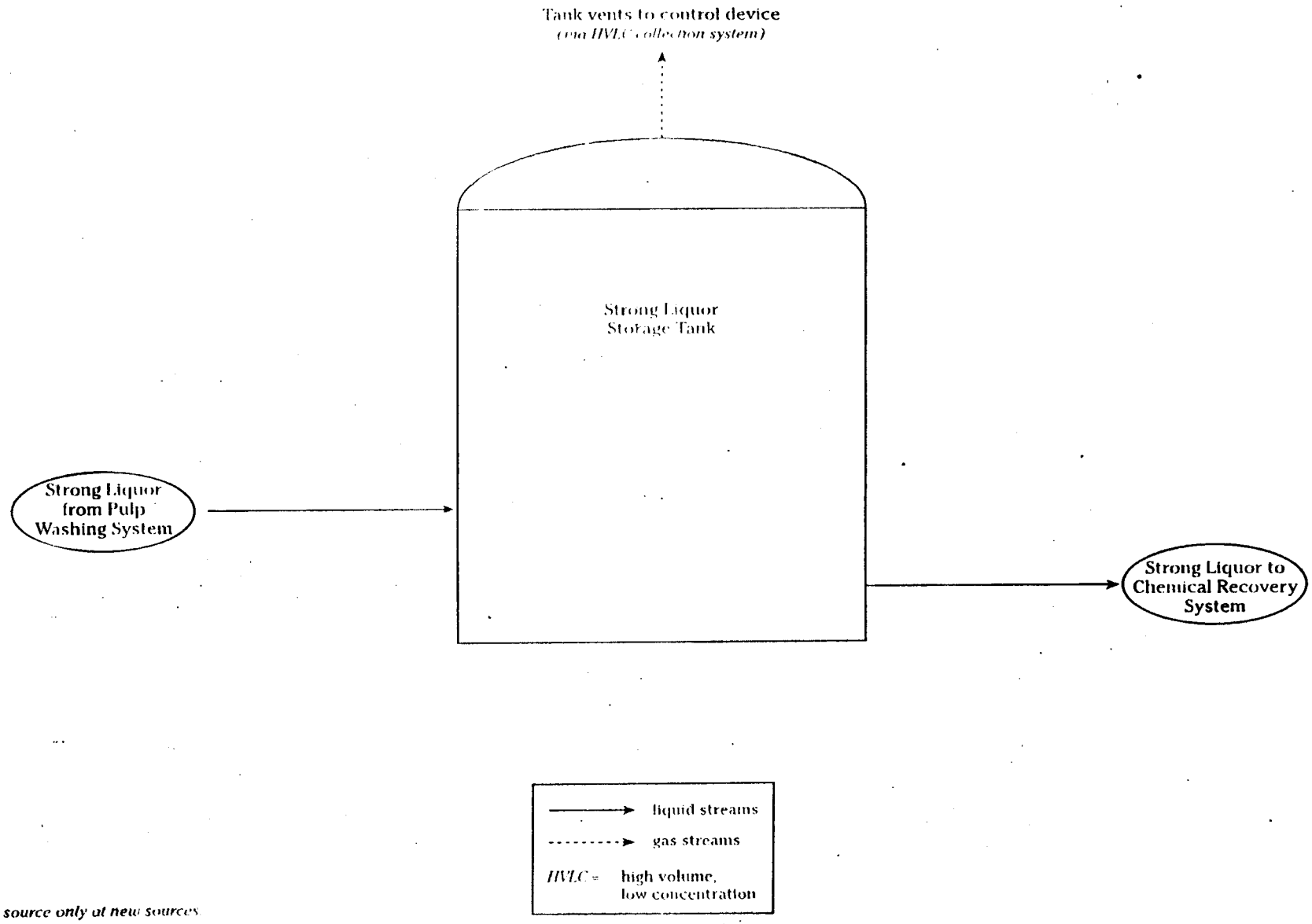
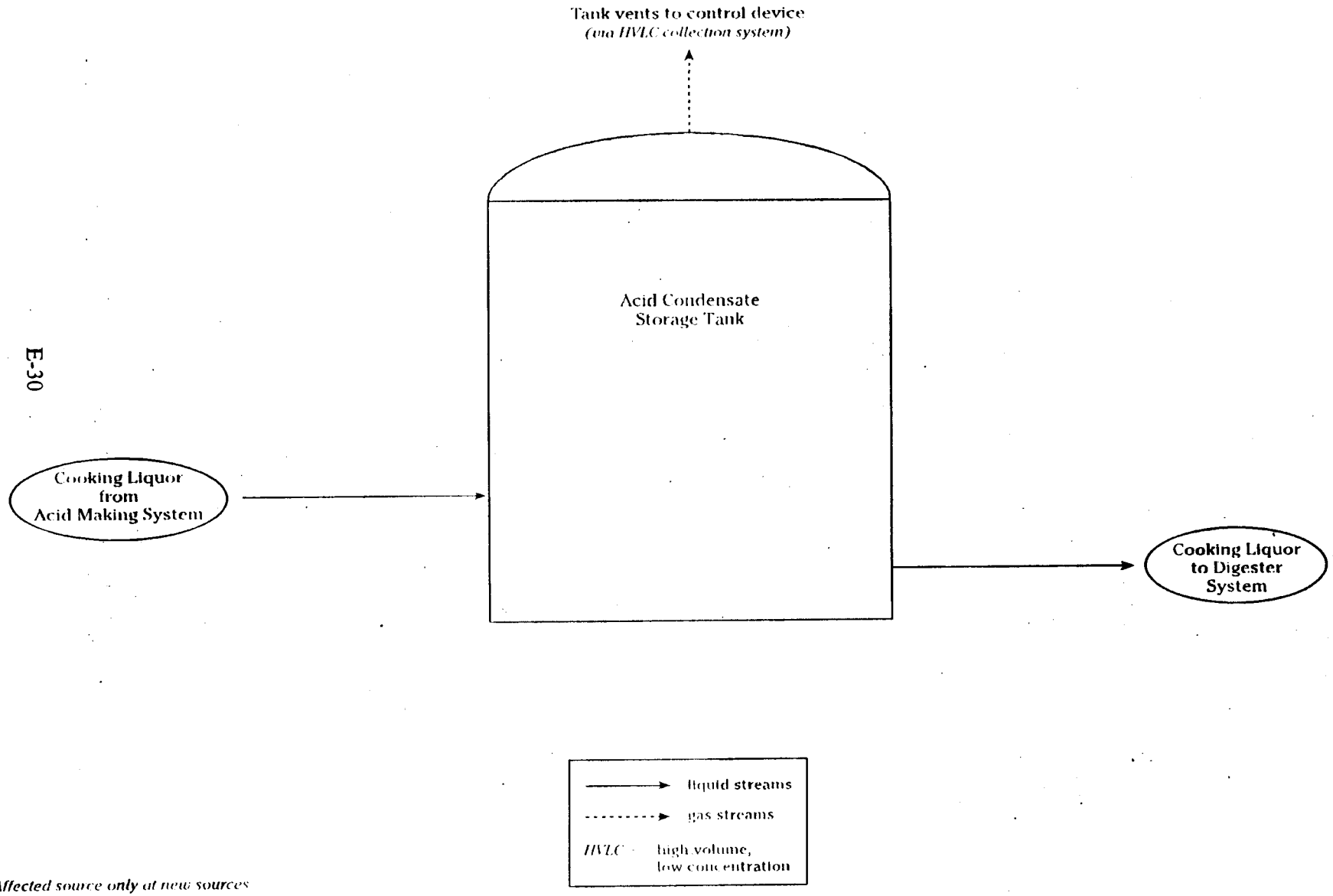


Figure 27 – Example Sulfite Strong Liquor Storage Tank*



*Affected source only at new sources

Figure 28 – Example Sulfite Acid Condensate Storage Tank*



*Affected source only at new sources

Figure 29 – Example Bleaching System

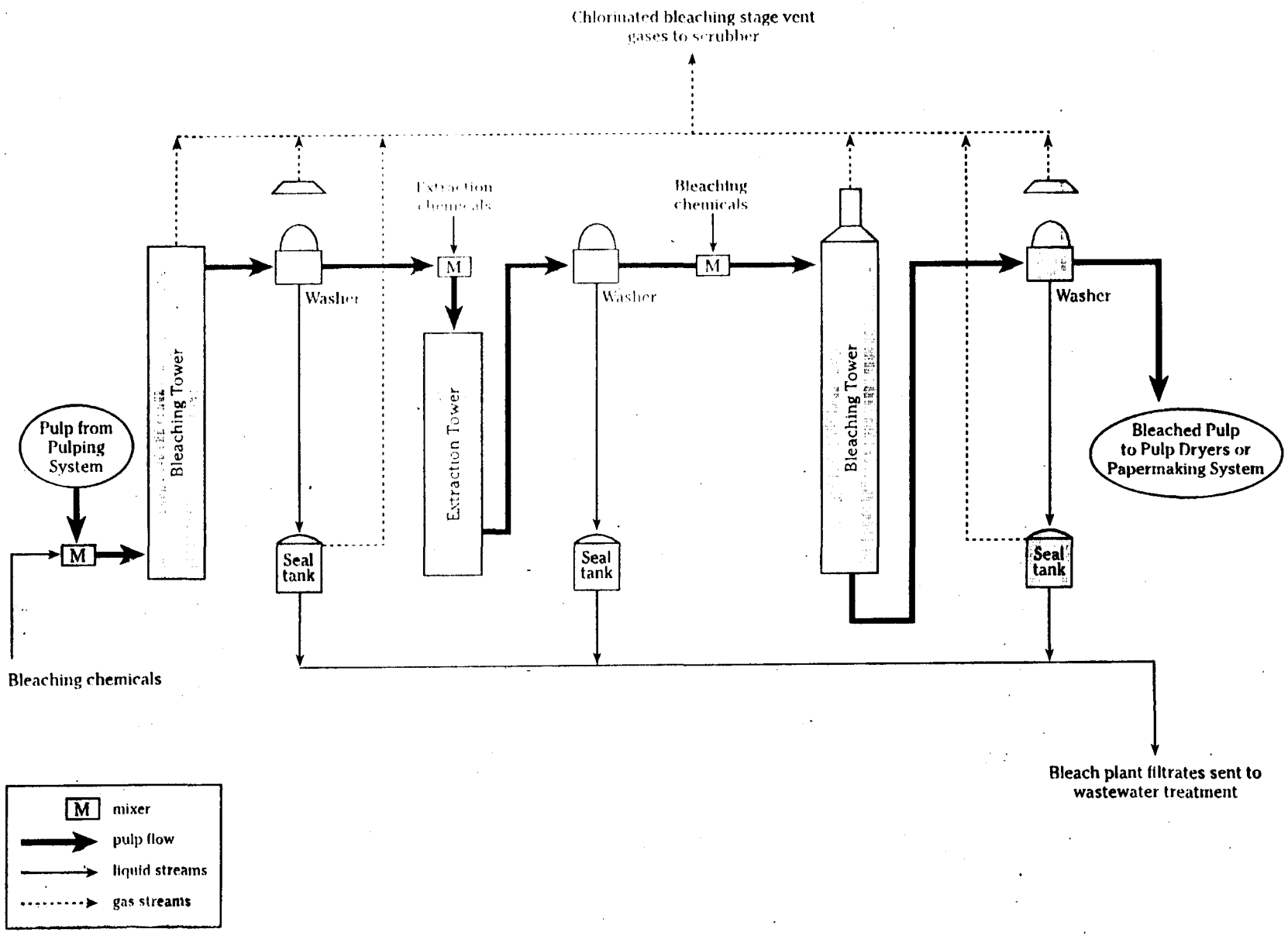


Figure 30 – Example Steam Stripping System with Methanol Rectification

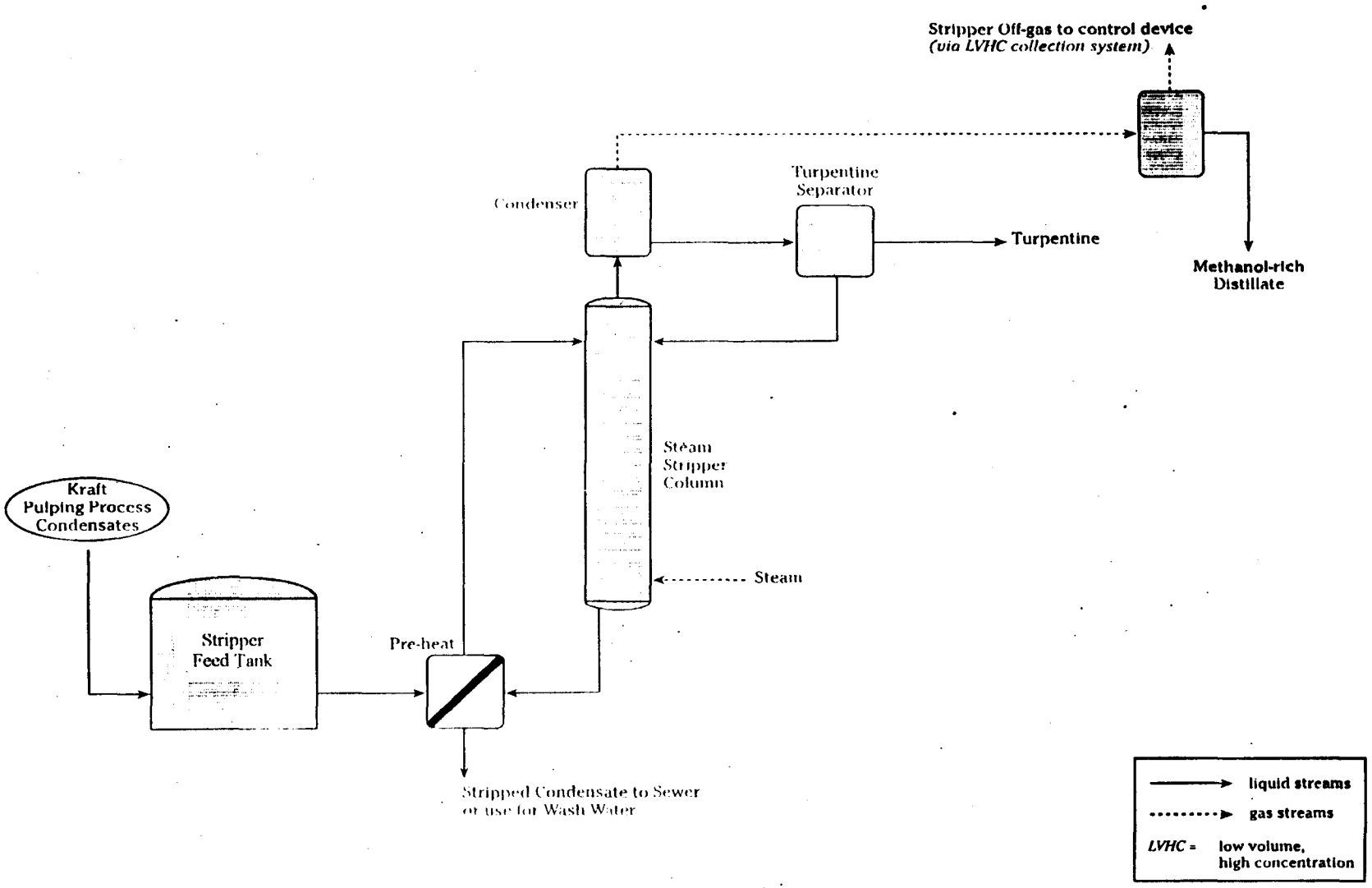
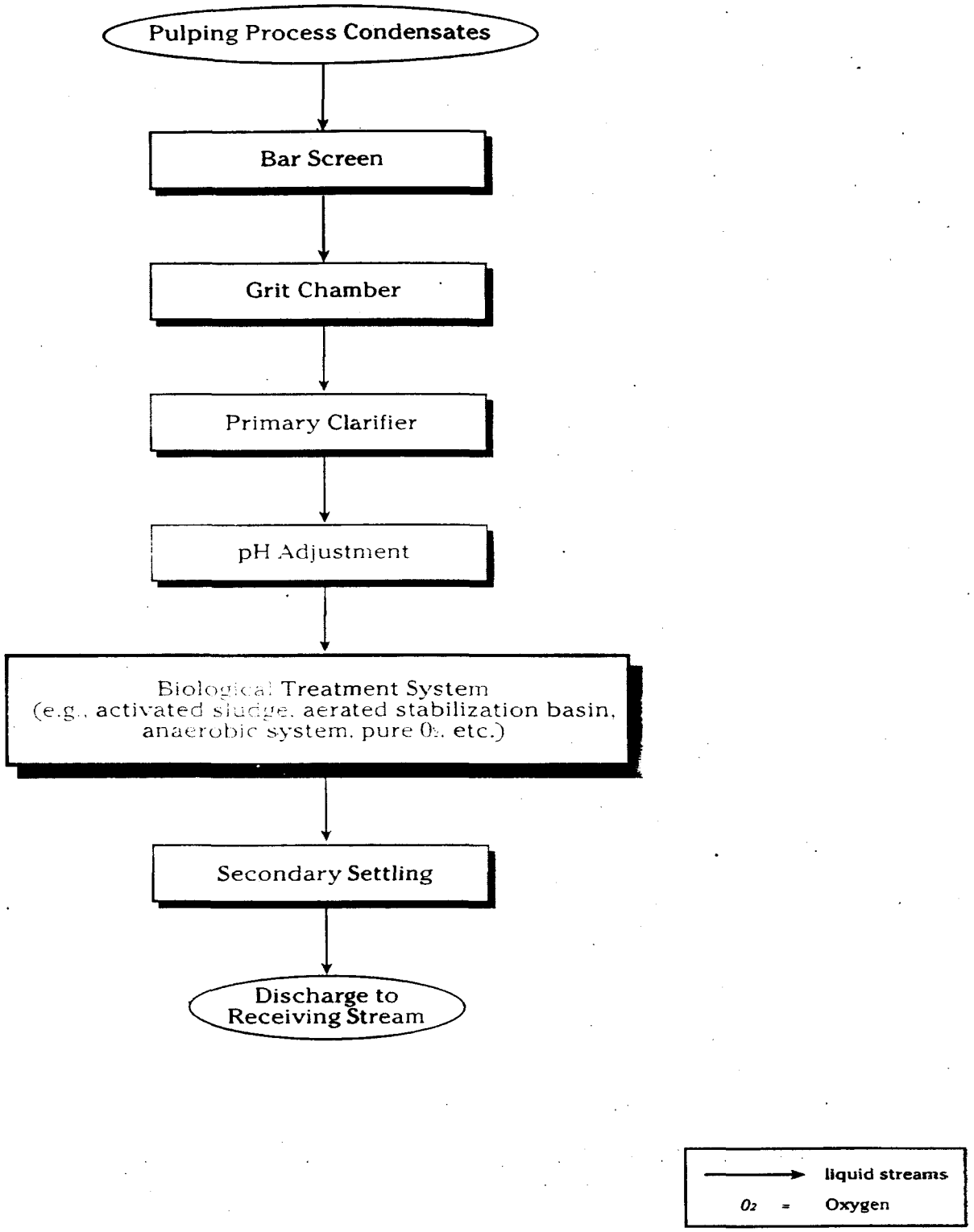


Figure 31 – Example Biological Treatment System



Appendix F

List of Equipment Affected by the NESHAP

For Purposes of Determining Applicability to the NESHAP (Subpart S)	
The Following System...	**Includes...**
Decker	decker vents, filtrate tanks, and vacuum pumps*
Digester	continuous or batch digester, associated flash tanks, chip steamers not using fresh steam, blow heat recovery accumulators, relief gas condensers, and prehydrolysis units preceding the pulp washing system*
Evaporator	pre-evaporators, multi-effect evaporators, concentrators, vacuum systems, associated condensers, hotwells, and condensate streams*
Knotter	knotter, knot drainer tanks, and ancillary tanks*
Oxygen delignification	blow tank, washers, filtrate tanks, and interstage pulp storage tanks*
Pulp washing	vacuum drum washers, diffusion washers, rotary pressure washers, horizontal belt filters, intermediate stock chests, associated vacuum pumps, filtrate tanks, foam breakers or tanks*
Screen	equipment in which oversized particles are removed from the pulp slurry prior to bleaching or papermaking system washed stock storage*
Steam stripper	stripper column, associated stripper feed tanks, condensers, heat exchangers, methanol rectification equipment (which includes rectifiers, condensers, decanters, and storage tanks)*
Turpentine recovery	condensers, decanters, and storage tanks*

* and any other equipment serving the same function

Appendix G

Pulp and Paper NESHAP Control Requirements

Appendix G

Pulp and Paper NESHAP Control Requirements

If You Have...	Then Control Your Operations By...	And Monitor By...
Kraft Pulping, Soda Pulping, or Semi-chemical Pulping	• 98% reduction by weight of total HAP,[b] or • Introduce HAP emission stream with primary fuel or into flame zone of a boiler, lime kiln, or recovery furnace; or • Introduce HAP emission stream with combustion air of a boiler or recovery furnace with a heat input capacity of 150 MMBtu/hr or greater; or • Minimum of 1600° F and 0.75 seconds in an incinerator; or • Reduction to 20 ppmv corrected to 10 percent oxygen outlet concentration of total HAP[b] from an incinerator	Continuous parametric monitoring, except for pulping vent systems routed to a power boiler, lime kiln, or recovery furnace
Sulfite Pulping • Calcium-based and sodium-based pulping systems • Ammonium-based and sodium-based pulping systems	• Outlet total HAP[b] emission level of 0.89 lb/ton ODP or less; or 92% reduction by weight of total HAP (includes air vents, wastewater and condensate streams from the control device[c]) • Outlet total HAP[b] emission level of 2.2 lb/ton ODP or less; or 87% reduction by weight of total HAP (includes air vents, wastewater and condensate streams from the control device[c])	Continuous parametric monitoring
Mechanical Pulping	N/A (Bleaching requirements only)	N/A
Non-wood Pulping	N/A (Bleaching requirements only)	N/A
Secondary Fiber Pulping	N/A (Bleaching requirements only)	N/A
Bleaching[d]	99% reduction by weight of chlorinated HAPs,[e] or achieve outlet chlorinated HAP[e,f] concentration of 10 ppmv or less; or achieve an outlet chlorinated HAP[e,f] emission level of 0.002 lb/ton ODP or less; and separate chloroform control options	Continuous parametric monitoring
Kraft Pulping Process Condensates[g]	• Recycle to controlled piece of process equipment; or • Reduce total HAP[h] loading by at least 92% by weight; or • Achieve a minimum total HAP[h] mass removal of 10.2 lb/ton ODP (bleached mills) or 6.6 lb/ton ODP (unbleached mills); or • Achieve a maximum total HAP[h] outlet concentration[i] of 330 ppmw (bleached mills) or 210 ppmw (unbleached mills)	Continuous parametric monitoring[j]

[a] All components require monthly visual inspections for equipment leaks using Method 21.
[b] Measured as total HAPs or methanol.
[c] Mass emission limit and percent reduction includes emissions from regulated equipment system and vents, wastewater, and condensate streams from the control device.
[d] Refer to Chapter 4 of this document for specific requirements for bleaching systems.
[e] Excluding chloroform.
[f] Chlorine is used as a surrogate for chlorinated HAPs.
[g] Except for open biological treatment systems, HAPs removed during treatment or handling must be controlled to meet kraft pulping system vent standards.
[h] For open biological treatment systems, total HAPs are measured as the sum of acetaldehyde, methanol, methyl ethyl ketone, and propionaldehyde. For other treatment devices, total HAPs can be measured as the sum of acetaldehyde, methanol, methyl ethyl ketone, and propionaldehyde, or as methanol.
[i] The outlet concentration control option is not available to open biological treatment systems.
[j] Excluding open biological treatment systems, which use a combination of daily parameter monitoring and quarterly performance tests.

Appendix H

Compliance Milestones Timeline for Existing Sources

Timeline of Applicable Notifications and Filings Pursuant to the General Provisions and Pulp and Paper NESHAP (Existing Sources)

APRIL 15, 1998	APRIL 15, 1999	APRIL 16, 2001	AUGUST 14, 2001	AUGUST 29, 2001	OCTOBER 13, 2001	DECEMBER 12, 2001
Effective Date of Rule	Initial notification Control strategy report	Control strategy report update Startup, shutdown, malfunction plan completed (LVHC, bleaching, condensates) Compliance deadline (LVHC, bleaching, condensates)	Notification of performance test (LVHC, bleaching, condensates) Submission of site-specific test plan (LVHC, bleaching, condensates) Notice of CMS performance evaluation (LVHC, bleaching, condensates)	Request for performance audit samples (LVHC, bleaching, condensates)	Deadline for conducting initial performance test (LVHC, bleaching, condensates)VLC)	Report results of performance test (LVHC, bleaching, condensates) Report CMS performance evaluation results (LVHC, bleaching, condensates) Notification of compliance status (LVHC, bleaching, condensates)

Timeline of Applicable Notifications and Filings Pursuant to the General Provisions and Pulp and Paper NESHAP (Existing Sources) *continued*

JULY 12, 2002	JANUARY 11, 2003	APRIL 16, 2003	JULY 12, 2003	JANUARY 11, 2004	APRIL 15, 2004	JULY 11, 2004
Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report	Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report	Control strategy report update	Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report	Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report	Startup, shutdown, malfunction plan completed (bleaching systems in Incentives Program) Compliance deadline (bleaching systems in Incentives Program)	Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report

Timeline of Applicable Notifications and Filings Pursuant to the General Provisions and Pulp and Paper NESHAP (Existing Sources) *continued*

AUGUST 13, 2004	AUGUST 28, 2004	[illegible]	DECEMBER 11, 2004	JANUARY 10, 2005	APRIL 15, 2005	JULY 11, 2005
Notification of performance test (bleaching systems in Incentives Program) Submission of site-specific test (bleaching systems in Incentives Program) Notice of CMS performance evaluation (bleaching systems in Incentives Program)	Request for performance audit samples (bleaching systems in Incentives Program)	Deadline for conducting initial performance test (bleaching systems in Incentives Program)	Report results of performance test (bleaching systems in Incentives Program) Report CMS performance evaluation results (bleaching systems in Incentives Program) Notification of compliance status (bleaching systems in Incentives Program)	Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report	Control strategy report update	Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report

Timeline of Applicable Notifications and Filings Pursuant to the General Provisions and Pulp and Paper NESHAP (Existing Sources) *continued*

JANUARY 10, 2006	APRIL 17, 2006	JULY 11, 2006	AUGUST 15, 2006	AUGUST 30, 2006	OCTOBER 14, 2006	DECEMBER 13, 2006
Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report	Startup, shutdown, malfunction plan completed (HVLC) Compliance deadline (HVLC)	Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report	Notification of performance test (HVLC) Submission of site-specific test (HVLC) Notice of CMS performance evaluation (HVLC)	Request for performance audit samples (HVLC)	Deadline for conducting initial performance test (HVLC)	Report results of performance test (HVLC) Report CMS performance evaluation results (HVLC) Notification of compliance status (HVLC)

Timeline of Applicable Notifications and Filings Pursuant to the General Provisions and Pulp and Paper NESHAP (Existing Sources) *continued*

JANUARY 10, 2007	JULY 11, 2007	JANUARY 10, 2008	JULY 10, 2008
Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report	Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report	Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report	Startup, shutdown, malfunction report (part of summary report) Excess emissions report (part of summary report) Summary report

Appendix I

Summary of Effluent Limitations Guidelines for Bleached Papergrade Kraft Mills

Appendix I

Summary of Effluent Limitations Guidelines for Chlorinated Pollutants for Subpart B - Bleached Papergrade Kraft

Pollutant	Effluent Limitations Guidelines and Standards		Point of Compliance
	1 Day Maximum	Monthly Average	
TCDD	<ML	--	Bleach Plant Effluent
TCDF	31.9 pg/L	--	Bleach Plant Effluent
Chloroform	6.92 g/kkg	4.14 g/kkg	Bleach Plant Effluent
trichlorosyringol	<ML	--	Bleach Plant Effluent
3,4,5-trichlorocatechol	<ML	--	Bleach Plant Effluent
3,4,6-trichlorocatechol	<ML	--	Bleach Plant Effluent
3,4,5-trichloroguaiacol	<ML	--	Bleach Plant Effluent
3,4,6-trichloroguaiacol	<ML	--	Bleach Plant Effluent
4,5,6-trichloroguaiacol	<ML	--	Bleach Plant Effluent
2,4,5-trichlorophenol	<ML	--	Bleach Plant Effluent
2,4,6-trichlorophenol	<ML	--	Bleach Plant Effluent
tetrachlorocatechol	<ML	--	Bleach Plant Effluent
tetrachloroguaiacol	<ML	--	Bleach Plant Effluent
2,3,4,6-tetrachlorophenol	<ML	--	Bleach Plant Effluent
pentachlorophenol	<ML	--	Bleach Plant Effluent
AOX	X	X	X
COD	Reserved	Reserved	Reserved

"<ML" means less than the minimum level specified in section 430.01(i) for the particular pollutant.
"--" This regulation does not specify this type of limitation for this pollutant; however, permitting authorities may do so as appropriate.
X = Effluent limitations guidelines and standards vary for AOX depending on whether the mill is an existing or a new source, a direct or an indirect discharger.
Note = Production based limits are based on kkg of unbleached pulp entering the bleach plant.

Effluent Limitations Guidelines and Standards for AOX	Continuous Dischargers		Non-continuous Dischargers	Point of Compliance
	Maximum for any 1 day	Monthly Average	Annual Average	
BAT for existing direct dischargers	0.951 kg/kkg	0.623 kg/kkg	0.512 kg/kkg	Final Effluent
PSES for existing indirect dischargers	2.64 kg/kkg	1.41 kg/kkg	NA	Bleach Plant Effluent
NSPS for new direct dischargers	0.476 kg/kkg	0.272 kg/kkg	0.208 kg/kkg	Final Effluent
PSNS for new indirect dischargers	1.16 kg/kkg	0.814 kg/kkg	NA	Bleach Plant Effluent

NA = Not applicable for indirect dischargers
Note = Production based limits are based on kkg of unbleached pulp entering the bleach plant.

Appendix J

Compliance Checklists

NOTE: The following fifteen checklists provide only a summary of the requirements of the standards and do not supersede the standards in any manner. Compliance determinations are based on the standards published in the Code of Federal Regulations.

Summary of Pulping System Vent Inspection Checklists

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

The table below explains which inspection checklists you should use for determining compliance with the pulping system vent requirements:

If you are complying with this emission standard . . .	Using this control device or technique . . .	Then use the following checklists[a,b] . . .	Starting on page number . . .
Pulping systems at kraft, soda, and semi-chemical processes	A thermal oxidizer	2	5
	A boiler, lime kiln, or recovery furnace in which the vent gases are introduced with the primary fuel or into the flame zone	3	7
	A boiler or recovery furnace with a heat input rate greater than 44 megawatts in which the vent gases are introduced with the combustion air	3	7
	Any other control device	4	8
Pulping systems at kraft processes	The clean condensate alternative	5	10
Pulping systems at sulfite processes	A gas scrubber	7	13
	Any control device other than a gas scrubber	8	15

[a]Checklist 1 applies only if the extended compliance period is used for high volume, low concentration (HVLC) pulping system vents at kraft mills.
[b]Checklist 9 applies to all vent control options.

Summary of Bleaching System Vent Inspection Checklists

Facility Name: _____

Facility Location: _____

Facility TRI ID #: _____

Inspector: _____

Date: _____

The table below explains which inspection checklists you should use for determining compliance with the bleaching system vent requirements for total chlorinated HAP.

If you are using this device . . .	Then use the following checklists[a,b] . . .	Starting on page number . . .
A gas scrubber	7	13
Any other control device or technique	8	15

[a]Checklist 6 applies only if the extended compliance period is used for bleaching systems participating in the Voluntary Advanced Technologies Incentives Program.
[b]Checklist 9 applies to all vent control options.

Checklists for Kraft Pulping System Condensate Inspections

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

The table below explains which inspection checklists you should use for determining compliance with the pulping system condensate requirements.

If you are complying with this control device or using this technique to comply with the standards . . .	Then use the following checklists[a,b] . .	Starting on page number . . .
A steam stripper	11	23
An open biological treatment system	12	25
Recycling to a controlled piece of pulping system process equipment	13	28
Any other control device	14	29

[a]Checklist 10 applies only if the volume reduction options are used to segregate regulated kraft pulping system condensate streams for treatment.
[b]Checklist 15 applies to all condensate control options.

Checklist 1:
Kraft Pulping Vent Extended Compliance Periods (§63.440(d)(1))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

The questions in the tables below are applicable to existing high volume, low concentration (HVLC) pulping system vents that receive the extended compliance period (April 17, 2006). The questions are also applicable to HVLC pulping system vents that achieve compliance using the Clean Condensate Alternative. A "no" response to any question in this checklist means noncompliance with the HVLC pulping system standards.

A.	Recordkeeping and Reporting Requirements			Comments
1.	Did you submit an initial control strategy report with your Notification of Compliance Status Report? *§63.9(h), §63.455(b)*	☐ Yes	☐ No	
2.	For vents that have not achieved compliance, do you update the control strategy report every two years? *§63.455(b)*	☐ Yes	☐ No	
3.	Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 2:
Requirements for Thermal Oxidizers (§63.443(d)(1) through (d)(3))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

Note: A "no" response to any question in this checklist means noncompliance with the pulping system vent standards.

A.	Monitoring and Inspection Requirements			Comments
1.	Do you measure the firebox temperature, the temperature in the ductwork immediately downstream of the firebox (before any heat exchange occurs), or the outlet total HAP concentration during the periods that the device is being used to comply with the pulping vent standards? *§63.453(b)*	☐ Yes	☐ No	
2.	Do you check the zero (low-level) and high-level calibration drifts at least once per day in accordance with your continuous monitoring system (CMS) performance evaluation test plan? *§63.8(c)(6)*	☐ Yes	☐ No	

B.	Recordkeeping and Reporting Requirements			Comments
1.	Did you submit in your Notification of Compliance Status Report all of the following:			
	• results of the initial performance test or design evaluation? *§63.9(h)*	☐ Yes	☐ No	
	• documentation to establish the minimum firebox or ductwork temperature or total HAP concentration monitoring parameter value, monitoring frequency, and averaging time? *§63.453(n)*	☐ Yes	☐ No	
	• results of CMS performance evaluation? *§63.10(e)(2)(i)*	☐ Yes	☐ No	

(Continued)

Checklist 2: ***(Concluded)***
Requirements for Thermal Oxidizers (§63.443(d)(1) through (d)(3))

B. Recordkeeping and Reporting Requirements			Comments
2. Do you keep records of the firebox or ductwork temperature or outlet total HAP concentration measurements? *§63.10(c)*	☐ Yes	☐ No	
3. Do you submit in your Excess Emission and Summary Reports **all** of the following *§63.10(e)*			
• all monitoring data for all operating days or blocks when the average firebox or ductwork temperature is lower than the minimum temperature established during the initial or subsequent performance tests?	☐ Yes	☐ No	
• identification of all operating days or blocks when insufficient monitoring parameter data were collected?	☐ Yes	☐ No	
Excess emissions allowances (including periods of monitoring parameter deviations and periods when the thermal oxidizer was inoperable) during a semi-annual reporting period are 1 percent for LVHC system vents and 4 percent for HVLC and combined HVLC and LVHC system vents. The excess emissions do not include periods of startup, shutdown, and malfunction. §63.443(e)			
4. Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 3:
Requirements for Boilers, Lime Kilns, and Recovery Furnaces (§63.443(d)(4))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

Note: A "no" response to any question in this checklist means noncompliance with the pulping system vent standards.

A. Recordkeeping and Reporting Requirements			Comments
1. Did you submit results of the design evaluation in your Notification of Compliance Status Report? *§63.9(h)*	☐ Yes	☐ No	
2. Do you identify in your Excess Emission and Summary Reports all of the operating days or blocks when the boiler, lime kiln, or recovery furnace was not operable? *§63.10(e)*	☐ Yes	☐ No	
Excess emissions allowances (including periods of monitoring parameter deviations and periods when the combustion device was inoperable) during a semi-annual reporting period are 1 percent for LVHC system vents and 4 percent for HVLC and combined HVLC and LVHC system vents. The excess emissions do not include periods of startup, shutdown, and malfunction. §63.443(c)			
3. Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 4:
Requirements for Other Kraft Pulping System Vent Control Devices (§63.443(d)(1))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

Note: A "no" response to any question in this checklist means noncompliance with the pulping system vent standards.

A.	Monitoring and Inspection Requirements			Comments
1.	Did you get approval from the Administrator for the parameters to be monitored and the parameter value(s)? *§63.453(n)*	☐ Yes	☐ No	
2.	Did you install a continuous monitoring system (CMS) to measure approved monitoring parameters? *§63.453(m)*	☐ Yes	☐ No	
3.	Do you measure the approved monitoring parameter(s) during the periods that the device is being used to comply with the pulping vent standards? *§63.453(b)*	☐ Yes	☐ No	
4.	Do you check the zero (low-level) and high-level calibration drifts at least once per day in accordance with your continuous monitoring system (CMS) performance evaluation test plan? *§63.8(c)(6)*	☐ Yes	☐ No	

B.	Recordkeeping and Reporting Requirements			Comments
1.	Did you submit all of the following in your Notification of Compliance Status Report:			
	• results of the initial performance test or design evaluation? *§63.9(h)*	☐ Yes	☐ No	
	• documentation to establish the monitoring parameter value(s), monitoring frequency, and averaging time? *§63.453(n)*	☐ Yes	☐ No	

(Continued)

Checklist 4: ***(Concluded)***
Requirements for Other Kraft Pulping System Vent Control Devices (§63.443(d)(1))

B. Recordkeeping and Reporting Requirements			Comments
• results of CMS performance evaluation? *§63.10(e)(2)(i)*	☐ Yes	☐ No	
2. Do you keep records of the monitoring parameter measurements? *§63.10(c)*	☐ Yes	☐ No	
3. Do you submit in your Excess Emission and Summary Reports **all** of the following: *§63.10(e)*			
• all monitoring data for all operating days or blocks when the monitoring parameter(s) are outside the value(s) or range(s) established during the initial or subsequent performance tests?	☐ Yes	☐ No	
• identification of all operating days or blocks when insufficient monitoring parameter data were collected?	☐ Yes	☐ No	
Excess emissions allowances (including periods of monitoring parameter deviations and periods when the control device was inoperable) during a semi-annual reporting period are 1 percent for LVHC system vents and 4 percent for HVLC and combined HVLC and LVHC system vents. The excess emissions do not include periods of startup, shutdown, and malfunction. *§63.443(e)*			
4. Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 5:
Requirements for the Clean Condensate Alternative (§63.447)

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

The questions below are applicable to HVLC pulping system vents that achieve compliance using the Clean Condensate Alternative (CCA). A "no" response to any question in this checklist means noncompliance with the HVLC pulping system standards.

A. Monitoring and Inspection Requirements			**Comments**
1.	Did you install a continuous monitoring system (CMS) to measure approved monitoring parameters? *§63.447(b)*	☐ Yes	☐ No
2.	Did you get approval from the Administrator for the parameters to be monitored and the parameter value(s)? *§63.453(n)*	☐ Yes	☐ No
3.	Do you measure the approved monitoring parameter(s) during the periods which the CCA is being used to demonstrate compliance with the HVLC pulping system vent requirements? *§63.447(b)*	☐ Yes	☐ No
4.	Do you check the zero (low-level) and high-level calibration drifts at least once per day in accordance with your continuous monitoring system (CMS) performance evaluation test plan? *§63.8(c)(6)*	☐ Yes	☐ No

B. Recordkeeping and Reporting Requirements			**Comments**
1.	Did you submit an initial control strategy report? *§63.447(g)*	☐ Yes	☐ No
2.	Did you update the control strategy report every two years? *§63.447(g)*	☐ Yes	☐ No

(Continued)

Checklist 5: ***(Concluded)***
Requirements for the Clean Condensate Alternative (§63.447)

B.	Recordkeeping and Reporting Requirements			Comments
3.	Did you report the rationale, calculations, test procedures, and data documentation used to demonstrate compliance using the CCA? *§63.447(h)*	☐ Yes	☐ No	
4.	Did you submit in your Notification of Compliance Status Report **all** of the following:			
	• results of the initial performance test? *§63.9(h)*	☐ Yes	☐ No	
	• documentation to establish the monitoring parameter value(s), monitoring frequency, and averaging time? *§63.453(n)*	☐ Yes	☐ No	
	• results of CMS performance evaluation? *§63.10(e)(2)(iii)*	☐ Yes	☐ No	
5.	Do you submit in your Excess Emission and Summary Reports all of the following: *§63.10(e)*			
	• all monitoring data for all operating days or blocks when the monitoring parameter(s) are outside the value(s) or range(s) established during the initial or subsequent performance tests?	☐ Yes	☐ No	
	• identification of all operating days or blocks when insufficient monitoring parameter data were collected?	☐ Yes	☐ No	
6.	Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 6:
Bleaching System Vent Extended Compliance Periods (§63.440(d))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

The questions in the tables below are applicable to existing bleaching systems that receive the extended compliance period (April 15, 2004) by limiting the application rates of chlorine and hypochlorite. A "no" response to any question in this checklist means noncompliance with the bleaching systems standards.

A.	Monitoring and Inspection Requirements			Comments
1.	Do you monitor the average daily application rates (kilograms bleaching agent per megagram of oven-dried pulp) of chlorine and hypochlorite? *§63.453(e)*	☐ Yes	☐ No	

B.	Recordkeeping and Reporting Requirements			Comments
1.	Do you record the average daily application rates of chlorine and hypochlorite? *§63.454(c)*	☐ Yes	☐ No	
2.	Did you submit an initial control strategy report with your Notification of Compliance Status Report? *§63.9(h), §63.455(b)*	☐ Yes	☐ No	
3.	For vents that have not achieved compliance, do you update the control strategy report every two years? *§63.455(b)*	☐ Yes	☐ No	
4.	Do you certify in your Excess Emission and Summary Reports that the daily application rates of chlorine and hypochlorite have not increased above the rates used over the three month period prior to June 15, 1998? *§63.440(d)(3)ii)(B)(1), §63.455(c)*	☐ Yes	☐ No	
5.	Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 7:
Requirements for Gas Scrubbers (§63.444(c), §63.445(c))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

The questions in the table below apply to gas scrubbers used to control HAP emissions from bleaching system and sulfite pulping system vents. Gas scrubbers have the option of monitoring either operating parameters (question 1.a.) or outlet concentration (question 1.b.). A "no" response to any question in this checklist means noncompliance with the bleaching or sulfite pulping systems standards.

A.	Monitoring and Inspection Requirements			Comments
1.a	Do you measure the following parameters during the periods that the gas scrubber is being used to comply with the applicable standard: *§63.453(c)*			
	• pH or the oxidation/reduction potential of the gas scrubber effluent?	☐ Yes	☐ No	
	• gas scrubber vent gas inlet flow rate?	☐ Yes	☐ No	
	• gas scrubber liquid influent flow rate?	☐ Yes	☐ No	
1.b	Do you measure the gas scrubber outlet concentration during the periods that the gas scrubber is being used to comply with the applicable standard? *§63.453(c)*	☐ Yes	☐ No	
	Note: Gas scrubbers are allowed the option of monitoring outlet concentration (chlorine for bleaching systems, methanol for sulfite pulping systems) as an option to measuring the parameters listed in question 1.a.			
2.	Do you check the zero (low-level) and high-level calibration drifts at least once per day in accordance with your continuous monitoring system (CMS) performance evaluation test plan? *§63.8(c)(6)*	☐ Yes	☐ No	

(Continued)

Checklist 7: ***(Concluded)***
Requirements for Gas Scrubbers (§63.444(c), §63.445(c))

B. Recordkeeping and Reporting Requirements			Comments
1. Did you submit in your Notification of Compliance Status Report **all** of the following:			
• results of the initial performance test or design evaluation? *§63.9(h)*	☐ Yes	☐ No	
• documentation to establish the monitoring parameter values, monitoring frequency, and averaging time? *§63.453(n)*	☐ Yes	☐ No	
• results of CMS performance evaluation? *§63.10(e)(2)(i)*	☐ Yes	☐ No	
2. Do you submit in your Excess Emission and Summary Reports **all** of the following: *§63.10(e)*			
• all monitoring data for all operating days or blocks when the monitoring parameter(s) are outside the value(s) or range(s) established during the initial or subsequent performance tests?	☐ Yes	☐ No	
• identification of all operating days or blocks when insufficient monitoring parameter data were collected?	☐ Yes	☐ No	
3. Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 8:
Requirements for Other Sulfite Pulping and Bleaching System Vent Control Devices (§63.444(c) and §63.445(c))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

A "no" response to any question in this checklist means noncompliance with the bleaching system or sulfite pulping systems standards.

A.	Monitoring and Inspection Requirements			Comments
1.	Did you get approval from the Administrator for the parameters to be monitored and the parameter value(s)? *§63.453(n)*	☐ Yes	☐ No	
2.	Did you install a continuous monitoring system (CMS) to measure approved monitoring parameters? *§63.453(m)*	☐ Yes	☐ No	
3.	Do you measure the approved monitoring parameter(s) during the periods that the device is being used to comply with the applicable standard? *§63.453(n)*	☐ Yes	☐ No	
4.	Do you check the zero (low-level) and high-level calibration drifts at least once per day in accordance with your continuous monitoring system (CMS) performance evaluation test plan? *§63.8(e)(6)*	☐ Yes	☐ No	

B.	Recordkeeping and Reporting Requirements			Comments
1.	Did you submit in your Notification of Compliance Status Report **all** of the following:			
	• results of the initial performance test or design evaluation? *§63.9(h)*	☐ Yes	☐ No	
	• documentation to establish the monitoring parameter value(s), monitoring frequency, and averaging time? *§63.453(n)*	☐ Yes	☐ No	

(Continued)

Checklist 8: ***(Concluded)***
Requirements for Other Sulfite Pulping and Bleaching System Vent Control Devices (§63.444(c) and §63.445(c))

B. Recordkeeping and Reporting Requirements			Comments
• results of CMS performance evaluation? *§63.10(e)(2)(i)*	☐ Yes	☐ No	
2. Do you submit in your Excess Emission and Summary Reports **all** of the following: *§63.10(e)*			
• all monitoring data for all operating days or blocks when the monitoring parameter(s) are outside the value(s) or range(s) established during the initial or subsequent performance tests?	☐ Yes	☐ No	
• identification of all operating days or blocks when insufficient monitoring parameter data were collected?	☐ Yes	☐ No	
3. Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 9:
Requirements for Enclosures and Closed-vent Systems (All Vent Control Options)

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

A "no" response to any question in this checklist means noncompliance with the closed-vent system standards.

A. Monitoring and Inspection Requirements		Comments
1. Do you visually inspect each enclosure opening every 30 days to ensure that the opening is maintained in the closed position and sealed, except when necessary for sampling, inspection, maintenance, or repairs? *§63.450(b), §63.453(k)(1)* *Note: Enclosure openings that were not closed during the initial or subsequent performance tests are not required to be closed and sealed*	☐ Yes ☐ No	
2. Do you visually inspect the closed-vent system (including duct work, piping, enclosures, and connections to covers) every 30 days for visible evidence of defects? *§63.453(k)(2)*	☐ Yes ☐ No	
3. For closed-vent systems (or portions of systems) that are operated under positive pressure, do you demonstrate annually that no detectable leaks exist? *§63.453(k)(3)*	☐ Yes ☐ No	
4. Do you demonstrate annually that each enclosure is maintained at negative pressure? *§63.453(k)(4)*	☐ Yes ☐ No	
5. Do you visually inspect the bypass line valve or closure mechanism every 30 days to ensure the valve is maintained in the closed position? *§63.453(k)(5)*	☐ Yes ☐ No	

(Continued)

Checklist 9:
Requirements for Enclosures and Closed-vent Systems (All Vent Control Options)

A. Monitoring and Inspection Requirements			Comments
6. If your closed-vent system has bypass lines that could divert a vent stream away from the control device, have you done one of the following:			
• used a flow indicator that takes a reading at least every 15 minutes? *§63.450(d)(1)*	☐ Yes	☐ No	
• for non-computer controlled bypass line valves, secured the bypass line valve in the closed position with a car-seal or a seal placed on the valve in such a way that the valve cannot be opened without breaking the seal? *§63.450(d)(2)*	☐ Yes	☐ No	
7. For any defects identified during the inspections: *§63.453(k)(6)*			
• did you make the first effort of repair within 5 calendar days after detection?	☐ Yes	☐ No	
• did you complete the repair within 15 calendar days?	☐ Yes	☐ No	

B. Recordkeeping and Reporting Requirements			Comments
1. For each enclosure opening, do you have **all** of the following records *§63.454(b)*			
• date of visual inspections?	☐ Yes	☐ No	
• the enclosure type and identification?	☐ Yes	☐ No	
• position of opening (i.e., open or closed and sealed)?	☐ Yes	☐ No	
• results of negative pressure tests?	☐ Yes	☐ No	
• the nature of any defects and method of detection (i.e., visual inspection or instrument detection)?	☐ Yes	☐ No	

(Continued)

Checklist 9:
Requirements for Enclosures and Closed-vent Systems (All Vent Control Options)

B. Recordkeeping and Reporting Requirements			Comments
• the date the defect was detected and the date of each attempt to repair the defect?	☐ Yes	☐ No	
• repair methods applied in each attempt to repair the defect?	☐ Yes	☐ No	
• the reason for delay if the defect was not repaired within 15 days after discovery?	☐ Yes	☐ No	
• the date of successful repair of the defect if the repair was not completed within 15 days after discovery?	☐ Yes	☐ No	
2. For each closed-vent system, do you have all of the following records: *§63.454(b)*			
• date of visual inspections?	☐ Yes	☐ No	
• the closed-vent system type and identification?	☐ Yes	☐ No	
• results of leak detection tests (only for systems or portions of system operated under positive pressure)?	☐ Yes	☐ No	
• the nature of any defects or leak and method of detection (i.e., visual inspection or instrument detection)?	☐ Yes	☐ No	
• the date the defect or leak was detected and the date of each attempt to repair the defect?	☐ Yes	☐ No	
• repair methods applied in each attempt to repair the defect or leak?	☐ Yes	☐ No	
• the reason for delay if the defect or leak was not repaired within 15 days after discovery?	☐ Yes	☐ No	

(Continued)

Checklist 9: ***(Concluded)***
Requirements for Enclosures and Closed-vent Systems (All Vent Control Options)

B. Recordkeeping and Reporting Requirements			Comments
• the date of successful repair of the defect or leak if the repair was not completed within 15 days after discovery?	☐ Yes	☐ No	
3. For each bypass line valve that is not computer-controlled, do you have **all** of the following records: *§63.454(b)*			
• date of visual inspections?	☐ Yes	☐ No	
• condition of any valve seals?	☐ Yes	☐ No	
• position of the bypass line valve?	☐ Yes	☐ No	
• duration of bypass line valve opening?	☐ Yes	☐ No	
4. For each bypass line valve that is computer-controlled, do you have **all** of the following records: *§63.454(b)*			
• 15 minute readings?	☐ Yes	☐ No	
• times and durations of periods when the flow indicator is not operating?	☐ Yes	☐ No	
• times and durations of periods when the vent stream is diverted from the control device?	☐ Yes	☐ No	
5. Do you maintain records for 5 years? *§63.10(b)(1)*	☐ Yes	☐ No	

Checklist 10:
Requirements for Condensate Volume Reduction Options (§63.446(c))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

A "no" response to any question in this checklist means noncompliance with the kraft pulping system condensate standards.

A.	Monitoring and Inspection Requirements			Comments
1.	Did you get approval from the Administrator for the parameters to be monitored and the parameter value(s)? *§63.453(n)*	☐ Yes	☐ No	
2.	Did you install a continuous monitoring system (CMS) to measure approved monitoring parameters? *§63.453(a)*	☐ Yes	☐ No	
3.	Do you measure the approved monitoring parameter(s) during the periods which the device is controlling HAP from an emission stream? *§63.453(i)*	☐ Yes	☐ No	
4.	Do you check the zero (low-level) and high-level calibration drifts at least once per day in accordance with your continuous monitoring system (CMS) performance evaluation test plan? *§63.8(c)(6)*	☐ Yes	☐ No	

B.	Recordkeeping and Reporting Requirements			Comments
1.	Did you submit in your Notification of Compliance Status Report **all** of the following:			
	• results of the initial performance test or design evaluation? *§63.9(h)*	☐ Yes	☐ No	
	• documentation to establish the monitoring parameter value(s), monitoring frequency, and averaging time? *§63.453(n)*	☐ Yes	☐ No	

(Continued)

Checklist 10: ***(Concluded)***
Requirements for Condensate Volume Reduction Options (§63.446(c))

B. Recordkeeping and Reporting Requirements			Comments
• results of CMS performance evaluation? *§63.10(e)(2)(i)*	☐ Yes	☐ No	
2. Do you submit in your Excess Emission and Summary Reports **all** of the following: *§63.10(e)*			
• all monitoring data for all operating days or blocks when the monitoring parameter(s) are outside the value(s) or range(s) established during the initial or subsequent performance tests?	☐ Yes	☐ No	
• identification of all operating days or blocks when insufficient monitoring parameter data were collected?	☐ Yes	☐ No	
3. Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 11:
Requirements for Steam Strippers (§63.446(e)(2) through (e)(5))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

Steam strippers have the option of monitoring either operating parameters (question 1.a) or outlet concentration (question 1.b). A "no" response to any question in this checklist means noncompliance with the kraft pulping system condensate standards.

A.	Monitoring and Inspection Requirements			Comments
1.a.	Do you measure the following parameters during the periods that the steam stripper is removing HAP from pulping system condensates: *§63.453(g)*			
	• process wastewater feed rate?	☐ Yes	☐ No	
	• steam feed rate?	☐ Yes	☐ No	
	• process wastewater column feed temperature?	☐ Yes	☐ No	
1.b.	Do you measure the steam stripper outlet methanol concentration during the periods that the steam stripper is removing HAP from pulping system condensates? *§63.453(h)*	☐ Yes	☐ No	
	Note: Steam stripper outlet methanol concentration can be measured as an option to measuring the parameters listed in question 1.a.			
2.	Do you check the zero (low-level) and high-level calibration drifts of the steam stripper continuous monitoring system (CMS) at least once per day in accordance with your CMS performance evaluation test plan? *§63.8(c)(6)*	☐ Yes	☐ No	

(Continued)

Checklist 11: *(Concluded)*
Requirements for Steam Strippers (§63.446(e)(2) through (e)(5))

B. Recordkeeping and Reporting Requirements			Comments
1. Did you submit **all** of the following in your Notification of Compliance Status Report:			
• results of the initial performance test? *§63.9(h)*	☐ Yes	☐ No	
• documentation used to establish the monitoring parameter values? *§63.453(n)*	☐ Yes	☐ No	
• results of CMS performance evaluation? *§63.10(e)(2)(i)*	☐ Yes	☐ No	
2. Do you submit in your Excess Emission and Summary Reports **all** of the following: *§63.10(e), §63.446(g)*			
• all monitoring data for all operating days or blocks when the monitoring parameter(s) are outside the value(s) or range(s) established during the initial or subsequent performance tests?	☐ Yes	☐ No	
• identification of all operating days or blocks when insufficient monitoring parameter data were collected?	☐ Yes	☐ No	
The excess emission allowances for steam strippers is 10 percent. The excess emissions include periods of monitoring parameter deviations, periods when the steam stripper was inoperable, and periods of startup, shutdown, and malfunction. §63.443(e)			
3. Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 12:
Requirements for Open Biological Treatment Systems (§63.446(e)(2))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

Open biological treatment systems have the option of monitoring either the parameters specified in the NESHAP or site-specific parameters (see question 1). A "no" response to any question in this checklist means noncompliance with the kraft pulping system condensate standards.

A. Monitoring and Inspection Requirements			Comments
1. Do you measure the following parameters during the periods that the open biological treatment system is removing HAP from pulping system condensates: *§63.453(j)(1)*			
• composite daily sample of composite BOD5 outlet concentration sample?	☐ Yes	☐ No	
• mixed liquor volatile suspended solids?	☐ Yes	☐ No	
• horsepower of aerator unit(s)?	☐ Yes	☐ No	
• inlet liquid flow	☐ Yes	☐ No	
• liquid temperature	☐ Yes	☐ No	
• daily inlet and outlet grab samples from each biological treatment unit (only if procedure 3 in Appendix C of Part 63 is used to demonstrate compliance)	☐ Yes	☐ No	
Note: Site-specific monitoring parameters can be measured as an option to measuring the parameters listed above.			
2. If procedure 3 in Appendix C of Part 63 is used to demonstrate compliance, do you store the grab samples for five days at a maximum temperature of 4°C (40°F)? *§63.457(n)*	☐ Yes	☐ No	

(Continued)

Checklist 12:
Requirements for Open Biological Treatment Systems (§63.446(e)(2))

A.	Monitoring and Inspection Requirements			Comments
3.	Do you check the zero (low-level) and high-level calibration drifts of the open biological treatment system continuous monitoring system (CMS) at least once per day in accordance with your CMS performance evaluation test plan? *§63.8(c)(6)*	☐ Yes	☐ No	

B.	Recordkeeping and Reporting Requirements			Comments
1.	Did you submit **all** of the following in your Notification of Compliance Status Report:			
	• results of the initial performance test? *§63.9(h)*	☐ Yes	☐ No	
	• documentation to establish the monitoring parameter value(s), monitoring frequency, and averaging time? *§63.453(n)*	☐ Yes	☐ No	
	• results of CMS performance evaluation? *§63.10(e)(2)(i)*	☐ Yes	☐ No	
2.	Did you prepare a written record of the specific conditions that would expose a worker to dangerous, hazardous, or otherwise unsafe conditions when conducting a performance test? *§63.454(e)*	☐ Yes	☐ No	
3.	Do you prepare a written record specifying the results of all performance tests conducted in response to a monitoring parameter deviation? *§63.454(f)*	☐ Yes	☐ No	

(Continued)

Checklist 12: ***(Concluded)***
Requirements for Open Biological Treatment Systems (§63.446(e)(2))

B.	Recordkeeping and Reporting Requirements		Comments
4.	If you used the results of a performance test, conducted in response to a monitoring parameter deviation, to revise the approved ranges or values of monitoring parameters, did you submit an initial notification of the performance test as soon as practicable, but no later than 15 days, before the test was scheduled? *§63.455(e)*	☐ Yes ☐ No	
5.	Do you notify the Administrator as soon as practicable, but within 24 hours, of the onset of the dangerous, hazardous, or otherwise unsafe conditions and specify the reasons that the compliance determination cannot be made? *§63.455(f)*	☐ Yes ☐ No	
6.	Do you maintain records for 5 years? *§63.10(b)*	☐ Yes ☐ No	

Checklist 13:
Requirements for Recycling Kraft Pulping Process Condensate to Controlled Pulping System Process Equipment (§63.446(e)(1))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

There are no monitoring requirements for mills using the recycle option to treat condensates. A "no" response to any question in this checklist means noncompliance with the kraft pulping system condensate standards.

B.	Recordkeeping and Reporting Requirements		Comments
1.	Did you submit the results of the design evaluation in your Notification of Compliance Status Report? *§63.9(h)*	☐ Yes ☐ No	

Checklist 14:
Requirements for Other Kraft Pulping Process Condensate Control Devices (§63.446(e)(3), (4), and (5))

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

A "no" response to any question in this checklist means noncompliance with the kraft pulping system condensate standards.

A.	Monitoring and Inspection Requirements			Comments
1.	Did you get approval from the Administrator for the parameters to be monitored and the parameter value(s)? *§63.453(n)*	☐ Yes	☐ No	
2.	Did you install a continuous monitoring system (CMS) to measure approved parameters? *§63.453(m)*	☐ Yes	☐ No	
3.	Do you measure the approved monitoring parameter(s) during the periods which the device is controlling HAP from an emission stream? *§63.453(a)*	☐ Yes	☐ No	
4.	Do you check the zero (low-level) and high-level calibration drifts at least once per day in accordance with your continuous monitoring system (CMS) performance evaluation test plan? *§63.8(c)(6)*	☐ Yes	☐ No	

B.	Recordkeeping and Reporting Requirements			Comments
1.	Did you submit **all** of the following in your Notification of Compliance Status Report:			
	• results of the initial performance test or design evaluation? *§63.9(h)*	☐ Yes	☐ No	
	• documentation to establish the monitoring parameter values, monitoring frequency, and averaging time? *§63.453(n)*	☐ Yes	☐ No	

(Continued)

Checklist 14: ***(Concluded)***
Requirements for Other Kraft Pulping Process Condensate Control Devices (§63.446(e)(3), (4), and (5))

B. Recordkeeping and Reporting Requirements			Comments
• results of CMS performance evaluation? *§63.10(e)(2)(i)*	☐ Yes	☐ No	
2. Do you submit in your Excess Emission and Summary Reports **all** of the following: *§63.10(e), §63.446(g)*			
• all monitoring data for all operating days or blocks when the monitoring parameter(s) are outside the value(s) or range(s) established during the initial or subsequent performance tests?	☐ Yes	☐ No	
• identification of all operating days or blocks when insufficient monitoring parameter data were collected?	☐ Yes	☐ No	
The excess emission allowances for control devices other than open biological treatment systems is 10 percent. The excess emissions include periods of monitoring parameter deviations, periods when the control device was inoperable, and periods of startup, shutdown, and malfunction. §63.443(e)			
3. Do you maintain records for 5 years? *§63.10(b)*	☐ Yes	☐ No	

Checklist 15:
Requirements for Closed Collection Systems (All Condensate Control Options)

Facility Name: _____
Facility Location: _____
Facility TRI ID #: _____
Inspector: _____
Date: _____

A "no" response to any question in this checklist means noncompliance with the kraft pulping system condensate standards..

A. Monitoring and Inspection Requirements		Comments
1. Do you visually inspect each closed collection system every 30 days for evidence of defects? *§63.453(l)(1)*	☐ Yes ☐ No	
2. For each condensate tank: *§63.446(d)(2)(i) and (ii), §63.453(l)(1)*		
• do you demonstrate annually that no detectable leaks exist?	☐ Yes ☐ No	
• do you verify that each tank opening is maintained in a closed, sealed position?	☐ Yes ☐ No	
Note: Tanks may be opened for condensate sampling or removal, or for equipment inspection, maintenance, or repair.		
3. For drains controlled by water seals, do you verify that the appropriate liquid levels are being maintained and do you inspect for any other defects that could reduce the water seal control effectiveness? *§63.453(l)(1), §63.964(a)(1)(i)(A)*	☐ Yes ☐ No	
4. For drains controlled using a closure device, do you verify that the closure device is in place and that there are no defects in the closure device? *§63.453(l)(1), §63.964(a)(1)(i)(B)*	☐ Yes ☐ No	
5. For junction boxes, do you verify that the closure device(s) is in place and that there are no defects in the closure device? *§63.453(l)(1), §63.964(a)(1)(ii)*	☐ Yes ☐ No	

(Continued)

Checklist 15:
Requirements for Closed Collection Systems (All Condensate Control Options)

A. Monitoring and Inspection Requirements			Comments
6. For unburied portions of the closed collection system, do you visually inspect the system to verify that all closure devices are in place and that there are no defects? *§63.453(l)(2), §63.964(a)(1)(iii)*	☐ Yes	☐ No	
7. For any defects identified during the inspections: *§63.453(l)(3), §63.964(b)*			
• did you make the first effort of repair within 5 calendar days after detection?	☐ Yes	☐ No	
• did you complete the repair within 15 calendar days?	☐ Yes	☐ No	

B. Recordkeeping and Reporting Requirements			Comments
1. For each closed collection system, do you have all of the following records: *§63.454(b)*			
• date of visual inspections?	☐ Yes	☐ No	
• the nature of the defect and method of detection (i.e., visual inspection or instrument detection)?	☐ Yes	☐ No	
• the date the defect was detected and the date of each attempt to repair the defect?	☐ Yes	☐ No	
• repair methods applied in each attempt to repair the defect?	☐ Yes	☐ No	
• the reason for delay if the defect was not repaired within 15 days after discovery?	☐ Yes	☐ No	
• the date of successful repair of the defect if the repair was not completed within 15 days after discovery?	☐ Yes	☐ No	
• repair methods applied in each attempt to repair the defect or leak?	☐ Yes	☐ No	

(Continued)

Checklist 15: ***(Concluded)***
Requirements for Closed Collection Systems (All Condensate Control Options)

B. Recordkeeping and Reporting Requirements			Comments
• the reason for delay if the defect or leak was not repaired within 15 days after discovery?	☐ Yes	☐ No	
• the date of successful repair of the defect or leak if the repair was not completed within 15 days after discovery?	☐ Yes	☐ No	
• duration of bypass line valve opening?	☐ Yes	☐ No	

TECHNICAL REPORT DATA

(please read instructions on the reverse before completing)

1. REPORT NO. EPA-456/R-01-002	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Pulp and Bleaching System NESHAP for the Pulp and Paper Industry: A Plain English Description		5. REPORT DATE September 2001 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT NO. 10203A 11. CONTRACT/GRANT NO. 68-D6-0011
12. SPONSORING AGENCY NAME AND ADDRESS Office of Air Quality Planning and Standards U.S. Environmental Protection Agency Research Triangle Park, North Carolina 27711		13. TYPE OF REPORT AND PERIOD COVERED Final Report 14. SPONSORING AGENCY CODE
15. SUPPLEMENTARY NOTES		

16. ABSTRACT

National emission standards for hazardous air pollutants (NESHAP) were promulgated for the pulp and paper industry under authority of Section 112(d) of the Clean Air Act as amended in 1990. This document provides plain English descriptions of the pulping and bleaching processes, the requirements of the NESHAP (Subpart S), the scope of effluent limitations guidelines and standards and additional references and sources of information about pulp and paper mills.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution MACT NESHAP subparts Pulp and paper mills Hazardous air pollutant Pulp Mills Paper mills	Air pollution MACT NESHAP subparts Pulp and paper mills Hazardous air pollutant Pulp Mills Paper mills	13b
18. DISTRIBUTION STATEMENT Unlimited	19. SECURITY CLASS (This Report) UNCLASSIFIED	21. NO. OF PAGES 167
	20. SECURITY CLASS (This Page) UNCLASSIFIED	22 PRICE