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Kraft Pulp Mill Compliance Assessment Guide
(CAA, CWA, RCRA and EPCRA)

United States Environmental Protection Agency
Office of Enforcement and Compliance Assurance
Office of Compliance
Manufacturing, Energy and Transportation Division

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APPENDIX A: Clean Air Act Regulatory Summary

Overview

Kraft pulp mills are subject to a variety of different requirements under the Clean Air Act (CAA), and state and local laws. These requirements are designed to limit emissions of several different air pollutants. Most of those requirements will apply separately to each specific point of emission, although some process-based or facility-based limits may apply as well. For many of these emission limits, the regulations and permit-specific requirements will establish associated monitoring, reporting and recordkeeping (MRR) requirements to provide an assurance of ongoing compliance with the emission limits. This appendix first outlines the basic elements of the air program and then summarizes how the air program affects kraft pulp mills.

Outline of Regulatory Programs

National Ambient Air Quality Standards

Primary NAAQS Impacts Related to Kraft Pulp Mills:

- **Particulate Matter**
- **Ozone (Emissions of VOC and NO_x)**
- **SO_2**

The CAA is designed to protect the public health and welfare. The centerpiece of the CAA are the national ambient air quality standards (NAAQS) that have been established for six "criteria" pollutants: carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone and sulfur dioxide. Areas that meet the NAAQS are called "attainment" areas: those that do not, are called "nonattainment" areas. Each State, through a State implementation plan (SIP), is responsible for developing strategies to achieve attainment within the State.

SIPs

A SIP will include all of the elements of a State's strategy to attain the NAAQS, including emission limits, permitting requirements, mobile source restrictions and so on. The EPA approves the SIP. If EPA finds that a SIP fails to adequately achieve attainment, EPA can issue a "SIP Call" to the affected State(s) to correct the deficiency and can impose direct federal requirements (a federal implementation plan or "FIP") if the SIP remains inadequate. The basic federal requirements for a SIP are set forth in 40 CFR Part 51.

Not all emission limit requirements established by a State will be part of a SIP -- only those designed to attain the NAAQS. Thus, requirements designed to solve local problems --such as general nuisance, odor, open burning and air toxic regulations -- often are not included within a SIP. This distinction is important for compliance assessment purposes because the State requirements that are included in the SIP are federally-enforceable while State-only requirements are enforced only by the State agencies (including implementing local agencies if applicable).

A required element of each SIP will be a process for reviewing, prior to construction, any new or modified source of air pollution to assure that the emissions from that source will not interfere with the State's implementation strategy or cause an exceedance of the NAAQS. These programs are generally referred to as "New Source Review" (NSR). As explained below, special NSR requirements apply to certain "major" sources.

Another common element of a SIP are emission limitations and standards. These limits will generally be structured in three different ways:

- Noncategorical limits
- Source category-specific limits
- Source-specific limits

Noncategorical limits apply to all sources of particular types of pollutants, although States will often treat combustion units and process units separately. For most States, the limits will at least cover particulate matter and SO_2 emissions. Requirements for other pollutants often either apply more narrowly to specific types of sources or are otherwise more limited in scope. For particulate matter, the two most common types of standards will be generic opacity standards (expressed as percent opacity) and mass emission limits (expressed usually as allowable weight of total suspended particulates (TSP) per million Btu of heat input or allowable TSP concentration per weight or volume of stack gas emitted). For SO_2, mass emission limits often will be expressed on a lb/hour or lb/million Btu basis, and specific limits on the sulfur content of fuel for combustion sources also will apply in most States.

Primary SIP Requirements Related to Kraft Pulp Mills:

- **Visible emission regulations**
- **Sulfur-in-fuel limits**
- **PM/SO_2 mass emission limits**
- **NO_x RACT/NO_x regional ozone transport reduction strategies**
- **Specific pulp mill standards**

Categorical limits are standards established for specific industries that will apply in addition to the general, non-categorical emission limits. Many of the States with operating kraft pulp mills have adopted these types of standards, especially for TRS emissions, but also for particulate matter and SO_2 in some States as well. However, as noted above, control of odorous emissions, such as TRS, is generally not considered SIP-related. Thus, State emission limits for TRS emissions from kraft pulp mills likely will not be considered part of a State's SIP.

The third type of limit that may apply is a site-specific emission limit directly adopted into a SIP. These limits generally are used where a source has a significant impact on attainment, including situations where the source by itself can cause a particular area within a State to be classified as nonattainment. Because these limits are site-specific, any such limits that apply to kraft pulp mills are not addressed or summarized in this manual.

An additional SIP consideration is the control of ozone precursors for ozone attainment purposes. Prior to the 1990 amendments to the Clean Air Act, ozone attainment strategies focused on controlling emissions of volatile organic compounds (VOC). The 1990 amendments generally required that States with ozone nonattainment areas modify their control strategies to include nitrogen oxide (NO_x) emission controls in addition to VOC controls. Therefore, since the 1990 amendments, many States with ozone nonattainment areas have developed NO_x limits for existing sources, especially combustion sources. These standards are generally based on "reasonably available control technology" (RACT). Some areas of the country, most notably the Mid-Atlantic/Northeast region, have developed emission trading programs as a least-cost compliance tool for achieving NO_x emission reductions beyond the RACT levels of control. To address regional NO_x transport, EPA is currently considering additional NO_x reductions for a 22-State region in the eastern U.S., including States that currently are in attainment with the ozone standards. Because of the significant on-site power generation and other combustion sources at a pulp mill, State NO_x requirements may apply to pulp mills in those States that have ozone nonattainment areas or that are affected by EPA's regional transport initiatives.

Finally, although technically not part of a SIP, under section 111(d) of the CAA, States are required to submit regulations for existing sources of certain non-criteria pollutants that are regulated under the New Source Performance Standards (NSPS). One such pollutant, TRS, is emitted from kraft pulp mills. Many States with kraft pulp mills have TRS regulations that have been approved under section 111(d). Other States have adopted TRS regulations that are not considered section 111(d) regulations, but are considered as State-only requirements. This distinction is important for compliance assessment purposes because only the section 111(d) requirements will be federally enforceable.

New/Modified Sources

Each State must have an NSR procedure in place as part of a SIP. In addition, for new major sources (or modifications to a major source that result in a significant emission increase), EPA requires more specific elements for an NSR program. These requirements vary depending on whether the source is located in an attainment or nonattainment area for the pollutant(s) that trigger NSR review.

- *In attainment areas*, major NSR involves a strategy to prevent significant deterioration (PSD) of air quality. The PSD NSR program involves pre-construction permitting in which the source must demonstrate that the project will not cause a violation of the NAAQS or PSD increments (air quality concentrations established to keep clean air clean). For projects located near designated "Class 1" areas (e.g., national parks), the source must also document that the project will not interfere with certain air quality related values such as visibility. Finally, the PSD permit must establish an emission limit that reflects the use of "best available control technology" (BACT) at the new/modified source.

- *In nonattainment areas*, major NSR focuses on assuring that the source achieves the lowest achievable emission rate (LAER) and obtains emission offsets so that the nonattainment problem is not made worse by the addition of the new/modified source.

Primary NSPS/NSR Requirements Related to Kraft Pulp Mills:

- **NSPS Subpart BB standards for kraft pulp mill process units**
- **NSPS Subparts D, Db, Dc standards for power boilers**
- **Minor and Major NSR permitting requirements (primarily SO_2, NO_x and PM)**
- **Additional controls mandated by the Cluster Rules could potentially increase SO_2 emissions and trigger major NSR permitting for some mills**

In addition to these permit-based requirements, EPA has promulgated new source performance standards (NSPS) for many types of new/modified industrial sources. The NSPS apply to specific units at various source categories (such as lime kilns and recovery furnaces at kraft pulp mills, fuel gas combustion devices at petroleum refineries, etc.). The standards are based on the best available technology (BAT), taking environmental, energy and economic factors into account, that has been commercially demonstrated. The NSPS apply to all facilities constructed/modified after the date the NSPS is proposed in the Federal Register. The NSPS act as a floor in the context of NSR permitting (i.e., BACT, LAER or minor source NSR requirements must be at least as stringent as an applicable NSPS). The EPA has established NSPS requirements (summarized in Sections 4 and 5 of the manual) that are applicable to several process units at kraft pulp mills that are constructed/modified on or after September 24, 1976. In addition, the NSPS establish a number of requirements applicable to steam and power generating facilities (summarized in Section 8 of the manual).

Hazardous Air Pollutants

NESHAP/MACT standards. Under section 112 of the CAA, EPA is authorized to regulate hazardous air pollutants. These requirements are separate from control requirements designed to achieve attainment with the NAAQS. Prior to the 1990 amendments, EPA promulgated relatively few standards (called National Emission Standards for Hazardous Air Pollutants or "NESHAP") for these pollutants. Prior to the 1990 amendments, the stringency of a NESHAP emission limit was based on health risk considerations -- not available technology. The 1990 amendments required EPA to establish NESHAP generally on "maximum available control technology" (MACT), with a subsequent review of the residual risk from a source category after implementation of the MACT requirements.

Under the pre-1990 NESHAP standards, EPA has not promulgated any standards specifically applicable to kraft pulp mills. However, two standards -- Subpart M (asbestos) and Subpart E (mercury) may apply. The asbestos NESHAP will apply to any demolition or renovation activity at a mill that will disturb a significant amount of asbestos-containing material. The mercury NESHAP applies to any sludge dryers or incinerators used to treat industrial wastewater treatment sludges.

Primary HAP/Other CAA Requirements Related to Kraft Pulp Mills:

- **The Cluster Rules MACT Standards (Pulping and Bleaching)**
- **Proposed MACT Standards (Chemical Recovery)**
- **Asbestos NESHAP (Demolition and Renovation Activities)**
- **Mercury NESHAP (Sludge Incinerators/Dryers)**
- **Section 112(r) Risk Management Plans**
- **Section 111(d) and State-only TRS rules**

Under the post-1990 MACT standards, EPA has promulgated a number of standards, including requirements for pulp mill pulping and bleaching operations as part of the Cluster Rules (see 63 FR 18503, April 15, 1998). At the same time, EPA proposed MACT requirements for pulp mill chemical recovery operations (see 63 FR 18753).

In addition to federal hazardous air pollutant standards, some States have developed their own air toxics regulations. Some of these may apply to kraft pulp mills, including State rules applicable to bleaching operations (see Section 6).

Risk management plans. Another requirement based on the 1990 Clean Air Act Amendments is the requirement to develop and maintain a Risk Management Plan (RMP) under section 112(r) of the Act. The EPA has promulgated regulatory criteria and procedures applicable to RMPs at 40 CFR Part 68. Under those regulations, kraft pulp facilities in SIC Code 2611 are subject to the most stringent RMP requirements (so-called "Program 3" requirements). The main elements of the RMP include:

NOTE! See http:/www.epa.gov/swercepp for EPA guidance on section 112(r) RMP compliance.

- An executive summary
- A registration form with basic facility, contact and other pertinent data
- Offsite consequence analyses based on worst-case scenarios for all regulated toxic and flammable substances
- A five-year accident history
- A prevention program. The program must include process safety information (for each process, safety-related data pertaining to: the hazards of the regulated substances used, the technology used, and the equipment used). The program must

also include information on process hazard analyses (PHAs) conducted by the mill, compliance audits, and other internal checking measures
- An emergency response program, including information on the emergency response plan developed by the mill and emergency response training for employees

Because mills are subject to the Program 3 requirements, additional prevention program requirements apply, including:

- Written operating procedures that provide clear instructions for operating all processes safely
- Initial and refresher safety and health hazards training for all employees involved with process operations
- Mechanical integrity requirements for critical process equipment (including written operating procedures, training requirements, inspection and testing requirements, and corrective action and quality assurance obligations)
- Procedures for addressing new safety and health issues as part of changes in operations (including changes to process chemicals, equipment, technology or procedures)
- Pre-startup review of safety and health issues
- Compliance audits for compliance with RMP requirements at least every 3 years
- Incident investigation procedures for any incidents that did involve or could have involved a catastrophic release of a regulated substance

Compliance with the RMP requirements may be delegated by the State air permitting agency to a separate State or local agency -- most air agencies will likely delegate implementation of the RMP program to State or local agencies directly involved with emergency response issues. For all sources, the delegated agency must verify that the required RMP has been registered and submitted, and that the source has submitted either a compliance certification or a compliance schedule related to RMP requirements. Also, for at least some of the sources, each delegated agency must use a procedure such as a completeness check, source audit, record review or source inspection to ensure that sources are in compliance. Where deficiencies in an RMP are found, the regulations allow the agency to issue a preliminary determination of what changes are necessary, followed by an opportunity for the source to respond and suggest alternative changes, and then a final determination by the agency as to what changes are necessary.

Title V Permitting

Prior to the 1990 amendments to the CAA, there was no federal requirement for a source to obtain and maintain an air operating permit. Title V of the 1990 amendments established a requirement for an air program operating permit similar to the NPDES permit required under the Clean Water Act. The concept of the permit is to consolidate all applicable requirements into a single document and to clarify (and potentially streamline) requirements that are vague or overlapping. Because of their size, all kraft pulp mills will have to obtain Title V operating permits.

Primary Title V Requirements Related to Kraft Pulp Mills:

- **Consolidate applicable requirements in a single permit**
- **Application will include emission and control device information, as well as general process information**
- **Periodic monitoring and compliance assurance monitoring requirements may impose new monitoring requirements on various emissions units, especially units subject to particulate matter limits**

One area of Title V permitting that is likely to affect kraft pulp mills is the periodic and compliance assurance monitoring requirements that are being implemented through the permitting process. These requirements may add monitoring requirements for many kraft pulp mill units -- especially for circumstances (e.g., smaller controlled units) where no on-going monitoring may have been conducted in the past. For these units, a mill will likely have to develop some form of control device parameter monitoring with established parameter excursion levels established for reporting purposes.

Title VI Stratospheric Ozone Protection

Title VI of the Act establishes certain restrictions on the manufacture, use and disposal of ozone-depleting substances, including chlorofluorocarbons (CFCs). Among other aspects of this program, section 608 of the Act establishes a comprehensive program to limit emissions of CFCs and other ozone-depleting substances during the maintenance, service, repair, and disposal of air conditioning and refrigeration equipment that contains these materials. EPA's implementing regulations impose technician certification and technician work practice requirements. The regulations also establish equipment and reclaimer certification programs, and disposal restrictions. Finally, for owners of covered equipment, there are leak repair requirements as well. This last requirement is the key element for kraft pulp mills that may operate industrial process refrigeration units, such as chillers for chlorine dioxide plants.

Primary Title VI Requirements Related to Kraft Pulp Mills:

- **Leak repair obligations for industrial process refrigeration units (e.g., chlorine dioxide plant chillers)**

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APPENDIX B: Clean Water Act Regulatory Summary

Overview

The Clean Water Act (CWA) gives EPA the responsibility and authority to regulate most forms of water pollution in the United States and its Territories. Discharges of pollutants into the nation's waters are regulated by several CWA programs, including the National Pollutant Discharge Elimination System's (NPDES) permitting program for point-source discharges, the storm water permitting program (a sub-category of NPDES) for all storm water discharges from point sources, and a pretreatment program which establishes pretreatment standards for discharges by industrial users into Publicly Owned Treatment Works (POTWs). The EPA has developed specific requirements for kraft pulp manufacturing operations as described below.

NPDES Permitting

The NPDES permitting program, outlined primarily in 40 CFR Part 122, establishes permitting requirements for the discharge of pollutants from point sources into waters of the United States. The scope of the NPDES program is quite broad, and as a practical matter most point source discharges associated with the pulp and paper industry will be subject to NPDES permitting requirements. The program is administered either by EPA or the State in which a facility is located. EPA may authorize a State to administer the NPDES permitting program upon a showing that the State's program is at least as strict as the federal program, and that the State has adequate legal authority to implement and enforce the NPDES program. The vast majority of States now have federally approved NPDES permitting programs.

NPDES permits typically incorporate five components:

! Technology-based effluent limitations
! Water quality-based effluent limitations
! Monitoring and reporting requirements
! Standard conditions applicable to all permittees
! Special conditions developed on a site-specific basis by the permitting authority

Technology-based effluent limitations are defined by industry-specific guidelines contained in the Code of Federal Regulations, and are designed to reflect actual production (if mass-based) at a facility. The pulp and paper regulations [40 CFR 430] provide specific definitions of production; see Section 7.3.4.

Types of pollutants limited by the technology-based standards include "toxic pollutants" listed in 40 CFR 401.15, "conventional pollutants" (BOD_5, TSS, pH, fecal coliform, and oil and grease), and "nonconventional pollutants" (pollutants that are neither toxic nor conventional). Potential pollutants of concern for kraft pulp mills as reflected in the effluent limitations guidelines and standards promulgated by EPA and in a sampling of NPDES permits, are summarized in Figure B-1.

Figure B-1
Regulated Pollutant Parameters for Kraft Pulp Facilities

Effluent Guidelines/ Standards	Other Potential Permit-Specific Parameters
BOD_5 TSS pH Pentachlorphenol Trichlorophenol AOX Chloroform 2, 3, 7, 8-TCDD 2, 3, 7, 8-TCDF Chlorinated phenols (12 pollutants)	Total cadmium Total mercury Total silver Total zinc Total copper Lead Mercury Temperature and thermal load Dissolved oxygen Total phosphorous Ammonia Aluminum Color COD

Guides to the technology-based standards and their application are contained in Figures B-2 and B-3. See Sections 6 and 7 of this manual for a discussion of the relevant effluent limitations guidelines and standards established for kraft pulp mills.

Water quality-based effluent limitations (WQBELs) apply in situations where the technology-based standards are insufficient to protect water quality. All receiving waters have ambient water quality standards which are established by the States or EPA in accordance with federal regulations to maintain and protect designated uses of the receiving water (e.g., aquatic life-warm water habitat, public water supply, and primary contact recreation). States can use the total maximum daily load (TMDL) process to quantify the allowable pollutant loadings in receiving waters, based on the relationship between pollution sources and in-stream water quality standards.

Some permitting authorities may find that the application of the technology-based effluent limitations guidelines result in pollutant discharges that still cause exceedances of the water quality standards in particular receiving waters. In such cases, permitting authorities are required to develop more stringent WQBELs for the pollutant to ensure that the water quality standards are met. For a description of how water quality standards are developed and incorporated into permits, refer to *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001) and *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001).

Figure B-2
Technology-Based Regulations: A Guide to the Acronyms

BPT	=	"Best Practical Control Technology Currently Available," a baseline standard, applicable in all circumstances to all pollutants.
BCT	=	"Best Conventional Pollutant Control Technology," potentially more stringent limitations for conventional pollutants than BPT. Only applies if certain cost tests are met. Must be "cost-reasonable." See 51 Fed. Reg. 24,974, 24,976 (July 9, 1986), for EPA's BCT methodology.
BAT	=	"Best Available Technology Economically Achievable," a "best of the best" standard for toxic and non-conventional pollutants.
NSPS	=	"New Source Performance Standards," a standard at least as stringent as BAT, applicable to new sources, as defined in 40 CFR 122.2.
PSES	=	"Pretreatment Standards for Existing Sources," industry-by-industry pretreatment standards, existing sources.
PSNS	=	"Pretreatment Standards for New Sources," industry-by-industry pretreatment standards, new sources.

Figure B-3
A Guide to Technology-Based Limitations For Regulated Discharges

Discharger	Type of Discharge	Direct Receiver	Required Standard
existing sources	conventional pollutants	surface waters	BPT or BCT
existing sources	toxic and nonconventional pollutants	surface waters	BAT
new sources	all pollutants	surface waters	NSPS
existing sources	all pollutants determined to "pass-through" or interfere with POTWs	POTW	PSES
new sources	all pollutants determined to "pass-through" or interfere with POTWs	POTW	PSNS
Regulatory Source: 40 CFR 125.3			

Other NPDES permit conditions will also apply to reflect the general conditions in 40 CFR 122.41. Those general conditions address matters such as:

- Monitoring and reporting
- The duty to mitigate adverse effects of discharges

- The permitting authority's right to conduct on-site inspections
- The permittee's duty of compliance (where applicable) with other environmental protection laws

All permittees are also subject to the "bypass" and "upset" provisions of the regulations. "Bypass," or the intentional diversion of waste streams from a treatment facility, is prohibited, except where no feasible alternative exists and it is necessary to preserve life or property. "Upset," or unintentional and temporary noncompliance with technology-based permit effluent limits due to factors beyond the permittee's control, may operate as an affirmative defense to permit violations in appropriate cases, as detailed in the regulations.

With regard to monitoring and reporting, NPDES regulations impose self-monitoring requirements on all permittees. Under the Cluster Rules, some monitoring is required within the spent pulping liquor and bleach plant process areas; see Sections 4.6, 6 and 7 of this manual for further discussion. In addition to monitoring levels of pollutants covered by the effluent limitations, paper and pulp facilities typically are required by permit condition to conduct additional monitoring, such as flow monitoring, outfall observations, and whole effluent toxicity (wet) testing. Other similar permit-specific requirements could include, for example, developing a Dioxin Minimization Program (DMP), or a Program for Effective Residuals Management (PERM).

Monitoring must be carried out using those methods specified in 40 CFR Part 136, or as otherwise required by the permit and must be reported on a standardized Discharge Monitoring Report (DMR) form. A mill must submit DMRs at intervals stated in the permit, but in no case less than once per year. Permittees are subject to a host of other reporting requirements as well, which generally cover any change or anticipated change in the facility or nature or level of pollutant discharge, as more fully outlined in 40 CFR 122.41(l).

Pretreatment Programs

The general NPDES program described above is aimed at controlling the direct discharge of pollutants into the nation's waters. To address the indirect discharge of pollutants through POTWs, CWA section 307(b)(1) directs EPA to develop pretreatment standards for pollutants that interfere with the operation of a POTW, or pass through the POTW in quantities or concentrations that will violate the limitations contained in the POTW's NPDES permit.

To carry out this mandate, EPA has developed pretreatment standards. The standards consist of both general standards applicable to all industrial users of POTWs, and industry-specific categorical standards (covering the pulp and paper industry, among others), expressed as quantities or concentration limits of pollutants dischargeable to a POTW. The categorical pretreatment standards applicable to paper and pulp facilities are contained in 40 CFR Part 430, and are listed by industry subcategory and type of facility (new or existing). New sources of pollutant discharges subject to pretreatment are addressed by "Pretreatment Standards for New Sources (PSNS)," while discharges from existing sources are addressed by "Pretreatment Standards for Existing Sources (PSES)." Although the categorical standards in Part 430 cover kraft pulp mills, most kraft pulp mills are direct dischargers subject to NPDES permit requirements and not the pretreatment standards.

Pursuant to the pretreatment regulations, most (if not all) POTWs receiving effluent from kraft mills are required to develop pretreatment plans and submit those plans to EPA or the State (if the State has been authorized to administer its pretreatment programs) for approval. If approval is granted, those POTWs are then required to develop local limits to implement EPA's general and categorical standards. The pretreatment requirements become part of the POTW's NPDES permit. Non-approved POTWs are only required to develop local limits if a prohibited pass-through or interference event has occurred. Because local limits will vary, this summary only highlights the national standards developed by EPA.

Approved POTWs may in turn issue "individual control mechanisms" to each industrial user of the POTW. Individual control mechanisms set out all effluent limitations and standards, monitoring and reporting requirements, compliance schedules, and other regulatory requirements. The POTW is the "Control Authority" for purposes of ensuring industrial user compliance with applicable pretreatment standards.

EPA-promulgated general standards that prohibit all pass-through and interference, and impose specific prohibitions against the following discharges of pollutants into POTWs:

- Pollutants which create a fire or explosion hazard in the POTW including, but not limited to, wastestreams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21
- Pollutants which will cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, unless the works is specifically designed to accommodate such discharges
- Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in interference
- Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the POTW
- Heat in amounts which will inhibit biological activity in the POTW resulting in interference, but in no case heat in such quantities that the temperature at the POTW treatment plant exceeds 40 degrees Centigrade (104 degrees Fahrenheit) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits
- Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through

- Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems
- Any trucked or hauled pollutants, except at discharge points designated by the POTW

The pretreatment regulations prohibit the use of dilution as a substitute for meeting pretreatment requirements. At the same time, however, many industries generate regulated wastewaters which are combined with unregulated wastewaters, or wastewaters subject to a separate categorical standard, and this combination necessarily dilutes the discharge. To address this reality, EPA has developed a "combined waste stream formula," contained in 40 CFR 403.6(e)(1), which must be applied to mixed effluent as a substitute for application of the categorical standards. The formula may be used to establish alternative concentration limits or alternative mass limits, but may not be applied if the alternative limit generated is below the analytical detection limit for the regulated pollutant.

Within 180 days after the effective date of applicable categorical standards, facilities subject to those standards must submit a certified baseline monitoring report to the Control Authority (the POTW, if an approved pretreatment program is in place). Along with general information about the facility and its operations, that report must include the results of flow measurements and sampling and analysis of pollutants, and a compliance schedule where additional pretreatment measures and/or O&M are required. Additionally, facilities subject to pretreatment standards must submit regular compliance reports and notify the Control Authority of any potential problems, changes in discharges, or violations. Facilities must also notify the POTW, EPA, and State hazardous waste authorities in the event that hazardous wastes are discharged to the POTW. Reporting requirements and applicable time deadlines are summarized in Figure B-4. Monitoring records must be kept for at least three years, and must be made available for inspection by regulatory authorities upon request.

With EPA approval, the categorical standards applicable to industrial users of POTWs, discussed above, may be modified by the award of "removal credits" reflecting the pollutant removal levels consistently achieved by the POTW; by way of a "fundamentally different factors variance" which takes into account facility-specific concerns not reflected in the categorical standards; or by application of a "net/gross calculation" which adjusts the standards to account for the presence of pollutants in the industrial user’s intake water, but only if the pollutant is listed in 40 CFR Subchapter N. EPA is considering changing this provision to allow industrial users to obtain removal credits for other pollutants upon a showing that there would be no adverse effect on the public health or the environment from the concentration or quantity of the pollutant to be found in sludge if a removal credit is granted.

Figure B-4
Permittee Reporting Requirements

Type of Activity	Reporting Deadline
Planned physical alterations or additions to permitted facility which have potential to significantly increase pollutant discharges or significantly alter sludge use/disposal practices, or which may subject facility to NSPS	As soon as possible
Anticipated noncompliance	In advance of event
Transfer of permit	In advance of event
Compliance/noncompliance schedule reporting (per permit)	Within 14 days after each schedule date
Unanticipated bypass	Within 24 hours of becoming aware of problem
Upset exceeding permit effluent limitation	Within 24 hours of exceedance
Violation of maximum daily discharge limitations for pollutants identified in permit as requiring 24-hour reporting	Within 24 hours of violation
Monitoring reports (DMRs)	As required by permit, but in no case less than once per year, or as provided in 40 CFR Part 503 (for sewage sludge)
Other noncompliance not covered by monitoring reports, compliance schedule reporting, or 24-hour reporting requirements	Along with monitoring reports

Permitting for Storm Water

As the result of 1987 amendments to the CWA, including the enactment of CWA section 402(p), the NPDES program now includes a separate section addressing storm water discharges. As with the NPDES program generally, EPA has authorized many States to issue permits for storm water.

Storm water permit application rules are published at 40 CFR 122.26. Because EPA administers the NPDES permitting program in a few remaining jurisdictions (including some States, U.S. territories, and Indian country), the Agency has published general permits for storm water in the *Federal Register*. For purposes of coverage under the program, "storm water" subject to regulation is defined as "storm water runoff, snow melt runoff, and surface runoff and drainage." Storm water discharge "associated with industrial activity" is defined as "the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant." To further clarify industrial coverage, the regulations provide a list of eleven industrial categories subject to storm water permitting requirements. That list defines covered industries by SIC codes and/or narrative descriptions of activity, and includes all of SIC 26--paper and allied products, except paperboard containers and products.

Pulp and paper facilities currently have two options for obtaining storm water permit coverage in locations in which EPA acts as the permitting authority: the individual (facility-specific) permit, or coverage under the "multi-sector general permit (MSGP)," developed for the industry sector as a whole. The MSGP, published at 60 FR 50804 (September 29, 1995) and recently amended at 63 FR 52430 (September 30, 1998), incorporates basic requirements applicable to all industry groups, including monitoring, reporting, and pollution prevention plan requirements. Development of a storm water pollution prevention (SWPP) plan, a central feature of storm water permitting, involves:

- Formation of a team of qualified plant personnel who will be responsible for plan preparation and implementation
- Assessment and description of potential storm water pollution sources (including drainage maps, inventory of exposed materials, 3 year history of significant spills and leaks, certification of testing for non-storm water discharges, sampling data, and a summary of potential pollution sources)
- Selection and implementation of appropriate pollution prevention measures, best management practices (BMPs) and other controls (including good housekeeping, preventive maintenance, spill prevention and response procedures, inspections, employee training, internal recordkeeping/reporting procedures, sediment and erosion control, and runoff management)
- Periodic comprehensive site compliance evaluation and subsequent SWPP plan modification

The MSGP establishes special requirements (including general permit eligibility restrictions) for storm water discharges that:

- Affect a property that is listed or is eligible for listing on the National Registry of Historic Places
- Are subject to CWA New Source Performance Standards (NSPS)
- Mix with non-storm water
- Contain hazardous substances or oil in excess of reporting requirements established under 40 CFR Parts 117 or 302 during any 24-hours period
- Discharge into large and medium municipal separate storm sewer systems
- Are subject to Toxic Release Inventory (TRI) reporting requirements in section 313 of the Emergency Planning and Community-Right-To-Know Act (EPCRA)
- Store salt

The MSGP requirements that are specific to paper and pulp facilities identify BMPs for the pulp and paper sector, and establish special monitoring and reporting requirements for chemical oxygen demand (COD) for paperboard mills. In addition, because different types of storm water discharges are covered under the structure of the NPDES permitting program for storm water, MSGP coverage is available for each of the types of covered sectors that are co-located at a facility. Thus, MSGP requirements for landfills/land application sites and steam electric generating facilities are potentially applicable to kraft pulp mills. The MSGP also includes a separate sector for sewage treatment works. Although not directly applicable to industrial wastewater treatment facilities, the BMPs designed for sewage treatment are relevant for wastewater treatment operations at kraft pulp mills. The recommended BMPs established by EPA are discussed in Sections 7 through 9 of this manual, as applicable to each process area.

The MSGP requirements generally provide that all facilities conduct visual examinations of storm water quality at each outfall and, in some cases, by the grab sample method collected within thirty minutes of the first storm water runoff discharge. This visual examination must take place at least once per quarter, and should be conducted in a well-lit area by a member of the pollution prevention team (preferably the same person each time). Reports of this visual examination must be maintained on site with the facility's pollution prevention plan. If samples cannot be collected over the entire course of the quarter due to extreme weather, this fact must be documented. In addition to this basic monitoring, the MSGP establishes additional analytical or chemical monitoring requirements for certain activities in some sectors (such as paperboard mills within the overall paper and allied products sector).

Limits on Oil Discharges

The CWA establishes specific requirements to limit discharges of oil to receiving waters. These requirements may be applicable to certain kraft pulp mills that operate oil-fired boilers. The basic structure of these requirements is as follows:

- *Section 110 of the CWA* prohibits discharges of oil that violate applicable water quality standards, cause a film or sheen upon (or a discoloration of) the surface of the water or the adjoining shoreline, or cause a sludge or emulsion to be deposited beneath the surface of the water or on the adjoining shoreline. If a prohibited discharge occurs, then the owner or operator must provide immediate notification to the National Response Center.

- *Section 112* requires a Spill Prevention Control and Countermeasure (SPCC) plan for oil-storing/consuming facilities, except where underground storage is $\leq$ 42,000 gallons and unburied storage is $\leq$ 13,20 gallons (with no single container > 660 gallons). In addition to developing the plan, section 112 imposes reporting requirements, a duty to provide plan updates, and training obligations.

- *Sections 116 and 117* designate hazardous substances and reportable quantities (RQs) for those substances. Except for allowable discharges to a POTW or under an NPDES permit, discharges of a designated substance in excess of the applicable RQ must be reported to the federal government in accordance with applicable Department of Transportation regulations.

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APPENDIX C: RCRA Regulatory and Assessment Procedures Overview

Overview

Subtitle C of the Resource Conservation and Recovery Act (RCRA), 42 USC 6901 et seq., establishes a comprehensive "cradle-to-grave" regulatory program for hazardous waste management. The program is directed by EPA and implemented in part by authorized States. Federal regulations relevant to the hazardous waste program, contained in 40 CFR Parts 260-281, address hazardous waste management by generators, transporters, and the treatment, storage, and disposal facilities (TSDFs) that ultimately receive hazardous wastes. Generators who treat hazardous wastes on site may be subject to both generator and TSDF regulations. Because kraft pulp facilities typically ship all hazardous wastes off site for disposal, however, this overview focuses on generator requirements. Subtitle I of RCRA governs underground storage tanks. Because various processes at a pulp mill may have underground storage tanks covered by this part of RCRA, these requirements are also addressed in this Appendix rather than in a process-specific chapter of the manual. Subtitle D of RCRA establishes requirements for non-hazardous solid wastes. These requirements are not discussed in this Appendix, but are discussed briefly in Section 9 of the manual in the context of on-site solid waste landfills that may be used at a kraft pulp mill. Finally, on-site remediation efforts or other corrective action subject to RCRA are not discussed, although particular mills may be engaged in such activities. Figure C-1 provides a quick guide to the RCRA statutory and regulatory scheme.

NOTE! This Appendix provides a brief RCRA overview only -- consult the regulations for specific requirements that apply. Also contact the RCRA Hotline -- 1-800-424-9346 -- for further information.

In addition to providing a brief general overview of RCRA, this Appendix is designed to assist both agency and plant personnel in conducting RCRA compliance assessments at kraft pulp mill facilities. The primary assessment tools discussed include record reviews, personnel interviews, and visual inspection of the facility. RCRA requirements and compliance assessment techniques are discussed separately from the process-specific sections of the Manual (Sections 6 through 12), because RCRA issues at kraft pulp mills generally are not highly process-specific. However, as in the main part of the manual, this Appendix does not attempt to cover assessment issues related to topics such as enforcement, inspector responsibilities and authority, and inspector health and safety concerns. Agency inspectors seeking guidance on such issues may wish to consult EPA's RCRA Inspection Manual,[1] or similar resources. The References section at the end of this Appendix lists several resources for obtaining additional information about RCRA issues.

Figure C-1
RCRA Title II Statutory and Regulatory Structure

Subtitle C Hazardous Waste Management	! 40 CFR Part 261 Hazardous Waste Identification ! 40 CFR Part 262 Hazardous Waste Generators ! 40 CFR Part 263 Hazardous Waste Transportation ! 40 CFR Part 264-265 Treatment, Storage, Disposal ! 40 CFR Part 266 Specific Hazardous Wastes/Specific Hazardous Waste Management Facilities (Subpart H-Boilers/Industrial Furnaces) ! 40 CFR Part 268 Land Disposal Restrictions ! 40 CFR Part 270 RCRA Permit Program ! 40 CFR Part 279 Used Oil Management
Subtitle D State or Regional Solid Waste Plans	! 40 CFR Part 257 Solid Waste Disposal Criteria ! 40 CFR Part 258 Municipal Waste Landfills
Subtitle I Regulation of Underground Storage Tanks	! 40 CFR Part 280 Underground Storage Tanks

The Hazardous Waste Determination

Subtitle C of RCRA regulates "solid waste" that is "hazardous." Thus, to be subject to any hazardous waste regulations, one must first determine whether the material at issue is a solid waste within the meaning of applicable statutes and regulations, and if so, whether that waste is hazardous.

Under RCRA, "solid waste" is defined as "any garbage, refuse, sludge . . . and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial . . . operations[.]" (42 USC 6903(27)). Clearly, solid waste need not be solid in the ordinary sense of the word to fall within this definition. The regulations provide a more detailed definition of "solid waste" in 40 CFR 261.2, and provide a long list of exclusions in § 261.4. Spent pulping liquor falls within an exclusion (§ 261.4(a)(6)). Another exemption generally applicable for pulp facilities is that industrial wastewater discharges from NPDES-regulated outfalls are not considered "solid wastes" and are thus not regulated as hazardous wastes (§ 261.4(a)(2)).

The regulations also exclude from coverage certain recyclable materials which are directly reused by excluding them from the definition of "solid waste" (§ 261.2(e)). Excluded recyclable materials include those which are reused without reclamation:

- as ingredients in an industrial process,
- as substitutes for a commercial product, or
- as substitutes for a primary feedstock in the process from which they were generated.

Some materials that must be reclaimed prior to reuse are also excluded, if, for example, they are reclaimed and reused in the process through a closed-loop system (§ 261.4(a)(8)), or, in the cases of reclaimed sludges and by-products, if they are hazardous by characteristic only (§ 261.2(c), Table 1)). The regulations also exclude reclaimed commercial chemical products (§ 261.2(c), Table 1) and wastewater treatment tanks.

If a waste is determined to be a non-excluded solid waste, a determination must then be made as to whether that waste is hazardous. A waste may be deemed hazardous either because it is specifically listed as a hazardous waste by the EPA, or because it exhibits one of four hazardous characteristics, including ignitability, corrosivity, reactivity, or toxicity (42 USC 6921(a), (b)).

Listed Wastes

Forty CFR Part 261, Subpart D identifies several hundred "listed" wastes. The regulations assign each listed waste a hazardous waste number (typically a letter followed by three numbers). The letter preceding the hazardous waste number indicates the category into which the listed waste falls (see Figure C-2). In addition to the waste number, the regulatory waste lists also include a hazard code which identifies the basis for the listing (e.g., "I" for ignitability, "T" for toxicity, etc.). Note that EPA has considered listing kraft pulp mill wastewater treatment plant sludges as a hazardous waste. However, because of the Cluster Rules effluent limitations guidelines and standards, EPA has determined that no such listing is required. See discussion in Section 7.5 of this manual.

Figure C-2
Listed Hazardous Wastes

"F" Wastes	Hazardous wastes from nonspecific sources (§ 261.31(a))
"K" Wastes	Hazardous wastes from specific sources (§ 261.32)
"U" Wastes	Hazardous wastes from discarded commercial chemical products, off-specification species, container residues, and spill residues (§ 261.33(f))
"P" Wastes	Acutely hazardous wastes from discarded commercial chemical products, off-specification species, container residues, and spill residues (§ 261.33(e))

State hazardous waste lists should also be consulted (if applicable) before making a final determination on the question of listing. Once listed, wastes remain listed until delisted by EPA, either on the EPA's initiative or in response to a delisting petition filed by a facility, in which the facility may illustrate that the listed waste is not truly toxic, due (for example) to unique facility processes (see § 260.22).

Characteristic Wastes

If a waste is not on a hazardous waste list, it may nonetheless be subject to regulation as a hazardous waste if it exhibits characteristics of ignitability, corrosivity, reactivity, or toxicity, as determined either by testing or by knowledge. Once deemed hazardous due to the presence of hazardous characteristics, a waste remains hazardous and subject to regulation until such time as those characteristics are no longer present. Each characteristic and its applicable test method(s) are identified and discussed in detail in 40 CFR Part 261, Subpart C. Figure C-3 summarizes the basic definitions, and indicates the relevant waste code numbers that are used to identify characteristic hazardous wastes.

Figure C-3
Characteristic Hazardous Waste

Ignitability (D001)	! Liquid: Not an aqueous solution containing <24% alcohol (by vol.) and has a flashpoint below 140°F, determined by tests in ASTM Standards D-93-79, D-93- 80 or D-3278-78 (§ 261.21(a)(1)) ! Non-liquids: Capable of causing vigorous and persistent fire hazard through friction, absorption of moisture, or spontaneous chemical change (at std. temp. and pressure) (§ 261.21(a)(2)) ! Other: Ignitable compressed gas or oxidizer (as defined in 49 CFR 173.300 or 173.151, respectively) (§ 261.21(a)(3) and (4))
Corrosivity (D002)	Liquids with a pH equal to or below 2 or equal to or above 12.5, or which corrode steel at a specified rate; uses tests in EPA Publication SW-846 (§ 261.22(a)(1) & (2))
Reactivity (D003)	Among other things, reacts violently with water or other substances to create toxic gases (§ 261.23(a))
Toxicity (D004-D043)	A waste that leaches specified amounts of metal, pesticides, or organic chemicals using the Toxicity Characteristic Leaching Procedure (TCLP) in EPA Publication SW-846 (§ 261.24(a)); or, for liquids, a waste that contains greater than the designated constituent concentration levels

Special Rules for Certain Waste Types

The EPA has developed several rules to address combinations of hazardous and non-hazardous solid wastes. The **"mixture rule"** provides that mixtures of listed hazardous and non-hazardous solid wastes are regulated as "listed wastes," unless expressly exempted by the regulations, and that mixtures of characteristic hazardous and non-hazardous solid wastes are likewise subject to regulation, unless the mixture no longer exhibits hazardous characteristics (§§ 261.3(a)(2)(iii)-(iv)). Similarly, the **"derived-from rule"** provides that any solid waste generated by the treatment, storage, or disposal of a hazardous waste is considered a hazardous waste as long as it exhibits hazardous characteristics. There is an exception for "derived-from" wastes that are reclaimed and reused, but the exemption excludes reclaimed materials which are burned for energy recovery or used in a manner constituting disposal (§ 261.3(c)(2)(i)).

To address combinations of hazardous wastes and things other than solid wastes, such as soil or groundwater contamination resulting from spills, EPA applies the **"contained in rule,"** which provides that a hazardous waste combined with an environmental medium must be managed as a hazardous waste. Unlike the mixture rule, the media contaminated by the hazardous waste can lose its status as hazardous waste once it no longer contains the hazardous waste. The "contained in rule" was first articulated by EPA in the Federal Register (53 FR 31138 (Aug. 17, 1988)), and has been upheld against industry challenge by the courts (see, e.g., Chemical Waste Management, Inc. v. EPA, 869 F.2d 1526, 1539 (D.C. Cir. 1989)).

Recycled materials not qualifying for an exclusion from regulation which would otherwise be considered hazardous wastes may nonetheless be subject to exemptions from some or all of the regulatory requirements, as detailed in 40 CFR 261.6. That section lists certain recycled materials that are exempt from all hazardous waste regulation. Other recycled materials listed in § 261.6 qualify for a partial exclusion from regulation and are typically subject only to the special recycling standards set forth in 40 CFR Part 266, and to any applicable provisions of Part 124 and 270.

Finally, **residues in empty containers** have a qualified exemption from regulation as hazardous waste (§ 261.7(b)). Empty containers, as well as the inner liners from empty containers, are not regulated as hazardous wastes, provided that:

- All wastes have been removed using commonly employed practices, **AND**
- No more than 2.5 centimeters (one inch) of residue remains on the container bottom or liner, **OR**
- No more than 3 percent by weight of the total capacity of the container remains in the container or inner liner, if the container is less than or equal to 110 gallons in size, **OR**
- No more than 0.3 percent by weight remains in the container, if the container is greater than 110 gallons in size.

Containers that held compressed gas are considered empty and thus exempted from regulation when the pressure in the container approaches atmospheric pressure. A container or inner liner that held an acute hazardous waste is empty and thus exempted from regulation if it has been triple rinsed using solvent, or cleaned by an equivalent method, or if the inner liner which prevented contact with commercial chemical products has been removed.

Assessment Considerations for Waste Determinations:

- Prior to an assessment, the inspector must be familiar with the processes occurring at the facility.
- The generator must determine if a waste is hazardous and the inspector must substantiate the determination. Knowledge of definitions and exceptions for hazardous waste is essential for both.
- When making a hazardous waste determination under §261.3, remember that listing takes precedence over characteristics.
- The inspector should confirm that listed wastes are managed as hazardous waste, and verify that generators have tested or apply their knowledge to wastes that are suspected of exhibiting hazardous characteristics.
- The inspector should request documentation for wastes claimed to be exempt as "recycled" or "reclaimed" wastes, and determine whether regulatory criteria applicable to these exemptions have been met.
- With regard to the empty container exemption, has the waste been removed by commonly employed practices (spilling, pouring, pumping, etc.)? If so, is there no more than 1 inch of residue remaining?
- If the residues in an empty container are subsequently exhumed and managed, § 261.7 exempts the resulting material from hazardous waste regulation, including the requirement to determine if the solid waste exhibits a hazardous characteristic under Part 261, Subpart C.

Obligations of Generators

Those who generate hazardous waste, as defined above, are subject to a variety of notification, accumulation and storage, labeling, tracking (by use of manifests), and hazardous waste minimization requirements under 40 CFR Part 262. Generators who provide on-site treatment, storage, and disposal are also subject to the TSDF permitting or interim requirements of Parts 265 and 270. However, most paper and pulp facilities ship their hazardous waste to an off-site TSDF and thus avoid the complex requirements of the permitting and interim status regulations.

For purposes of regulation, EPA has identified three categories of generators, defined according to the amount of hazardous waste generated or accumulated. Those categories include large quantity generators (LQGs), small quantity generators (SQGs), and conditionally exempt small quantity generators (CESQGs). Figure C-4 summarizes the considerations used for this categorization. Because generator categories are based upon quantities generated per month and total accumulation, a facility could conceivably change categories over time (so-called "episodic generation"). Note that in determining the status of a generator based on the quantity of hazardous waste generated, certain hazardous wastes are excluded from the calculation (see § 261.5(c)). Generally, only those hazardous wastes subject to substantive RCRA regulation under 40 CFR Parts 262 through 268 are counted.

Figure C-4
Hazardous Waste Generators

Large Quantity Generators	In one calendar month: ! generate 2,200 pounds (1,000 kg) or more of hazardous waste, or ! generate 2,200 pounds (1,000 kg) or more of spill cleanup debris containing hazardous waste, or ! generate more than 2.2 pounds (1 kg) of acutely hazardous waste, or ! generate more than 220 pounds (100 kg) of spill cleanup debris containing an acutely hazardous waste, or At any time: ! accumulate more than 2.2 pounds (1 kg) of acutely hazardous wastes on-site, or ! accumulate more than 13,230 pounds (6,000 kg) of hazardous waste on-site
Small Quantity Generators	In one calendar month: ! generate more than 220 pounds (100 kg) but less than 2,200 pounds (1,000 kg) of hazardous waste, or ! generate more than 220 pounds (100 kg) but less than 2,200 pounds (1,000 kg) of spill cleanup debris containing hazardous waste, or At any time: ! accumulate more than 2.2 pounds (1 kg) of acutely hazardous waste on-site
Conditionally Exempt Small Quantity Generators	In one calendar month: ! generate 220 pounds (100 kg) or less of hazardous waste, or ! generate 220 pounds (100 kg) or less of spill cleanup debris containing hazardous waste, or ! generate 2.2 pounds (1kg) or less of acutely hazardous waste, or At any time: ! accumulate up to 2.2 pounds (1 kg) of hazardous wastes on-site

Assessment Considerations for Generator Status:

- Confirm that generators that claim to be SQGs are not generating more than the limit for SQGs (Note that 100-1,000 kg/mo is between 220 and 2,200 lb/mo or about 25 - 300 gallons). This may be done by reviewing manifests for quantities and doing a mass balance to convert to probable weight for waste on-site.
- Calculate the maximum quantity of hazardous waste in tanks based upon storage volumes of tanks. This may be determined based upon the quality of waste characteristics, the density of the waste and the volume available for waste storage. The waste must not exceed 6,000 kg, unless the facility has interim status, a permit or an emergency extension. If the maximum volume of tanks will exceed 6,000 kg, but the actual waste quantity is less, this is not a current violation, but the assessment should note the potential for a status change based on tank capacity.

Notification

Upon determining that a waste is a hazardous waste, a generator must notify EPA before transporting, treating, storing, or disposing of that waste. Notifications are made using EPA Form 8700-12 (45 FR 12746 (1988)). The notification form elicits the generator's name and address, identifies a facility contact person, provides the EPA hazardous waste number for the waste being managed (as indicated in the hazardous waste regulations), and provides a brief description of the type of regulated activity being conducted at the facility. Upon receiving this notification, EPA issues a generator ID number which is used to track all wastes generated by the facility (40 CFR 262.12).

CESQGs are exempt from the notification and ID number requirements (§ 261.5(b)), as are those who generate certain recycled materials specified in § 261.6(a)(3). All other generators must provide notification and obtain an ID number before offering a waste for transport, or otherwise disposing of that waste.

Accumulation and Storage

As a general rule, generators who store hazardous waste on site must obtain a RCRA permit or interim status under 40 CFR Parts 265 and/or 270, in addition to meeting all generator requirements of 40 CFR Part 262. Recognizing that facilities cannot dispose of waste the moment it is generated, however, EPA allows generators to store hazardous wastes at the facility for up to 90 days (for LQGs) or 180 days (for SQGs accumulating no more than 6000 kg) without being subject to permitting or interim status requirements if the facility complies with the accumulation regulations of 40 CFR 262.34. The accumulation period applicable to SQGs may be extended to 270 days, if the SQG must transport the waste over a distance of 200 miles or more for treatment (§ 262.34(e)). CESQGs are exempt from Part 262, so long as waste quantity limitations of the regulations are met (§ 261.5(b),(e),(f),(g), and (j)).

The accumulation regulations mandate that all hazardous wastes must be stored in containments buildings, containers, or tanks, or on drip pads, which comply with the standards of 40 CFR Part 265 (40 CFR section 262.34(a)(1)), and must be managed in accordance with any applicable air emission standards (see 40 CFR Part 265, Subparts AA, BB and CC). Key requirements from Part 265 are detailed in Figure C-5.

Figure C-5
Storage Requirements for Temporary Accumulation
(40 CFR 262.34)

CONTAINERS: PART 265 SUBPART I
Generators must: ! Note the date that accumulation began and be clearly labeled with the words "Hazardous Waste" ! Construct containers of appropriate material and maintain them in good condition ! Keep containers closed at all times except when wastes are being removed or added ! Inspect containers weekly ! Take additional precautions to reduce the chance of explosion or fire if incompatible wastes are stored ! Note that air emission standards under Part 265, Subpart CC may apply
TANKS: PART 265, SUBPART J **(Note: These requirements do not apply to wastewater treatment tanks.)**
Generators must: ! Assess existing tank system's integrity ! Design and install new tank systems or components according to regulatory specifications ! Provide secondary containment for tanks of a certain age, or for those storing specified hazardous wastes ! Comply with regulatory operating requirements, including spill, overfill, and overtopping prevention controls and practices ! Inspect the tank, spill control equipment, and monitoring data daily ! Inspect any cathodic protection systems at least bimonthly ! Immediately remove any leaking or unfit tanks from operation, take appropriate containment action, and provide notice/reporting of any release to the environment ! Refrain from storing ignitable, reactive, or incompatible wastes in tanks, unless regulatory treatment or other special requirements are met ! Comply with closure and post-closure requirements ! Apply modified requirements for tank storage, reflected in 40 CFR 265.201 (for SQGs) ! Note that air emission standards under Part 265, Subpart CC may apply Note: ! These requirements do not apply to wastewater treatment tanks

Figure C-5 (cont.)
Storage Requirements for Temporary Accumulation
(40 CFR 262.34)

DRIP PADS: PART 265, SUBPART W
Generators must: ! Assess existing drip pad integrity ! Design, install, and operate new drip pads according to regulatory specifications ! Inspect liners and cover systems during construction or installation ! Have liners inspected and certified by independent qualified, registered professional engineer immediately after construction or installation ! Inspect drip pads weekly during operation, and after any storms ! Comply with closure requirements of regulations ! Maintain specific waste removal records
CONTAINMENT BUILDINGS: PART 265, SUBPART DD

Generators must:
 	
! Design building and operate according to regulatory standards
! Establish procedures and regularly document the fact that the unit is emptied within the accumulation time frame
! Avoid the land disposal restrictions of Part 268 by ensuring that the unit:
    ! Is completely enclosed
    ! Is constructed out of use-appropriate materials
    ! Has a durable primary barrier
    ! Has a primary barrier that will prevent migration, a liquid collection system to protect the primary barrier, and a secondary containment system (if unit used to manage liquids)
    ! Has controls to prevent fugitive dust emissions, if applicable
    ! Is designed and operated to ensure containment (design and operating standards are provided in the regulations) (40 CFR 262.34 (a)(1)(iv))
! Comply with closure and post-closure standards

Generators may accumulate as much as 55 gallons of hazardous waste or one quart of acutely hazardous waste listed in § 261.33(e) in containers at or near the generation point without triggering the 90-day (180-day for SQGs) accumulation regulations. This is referred to as "satellite accumulation." The minimal requirements of § 262.34(c) must be met for satellite accumulation, including proper marking of containers and compliance with specified container management practices. Once these limits are exceeded, however, the generator has only three days to comply with the 90-day (180-day for SQGs) rules (§ 262.34(c)(2)).

Assessment Considerations for Accumulation/Storage Practices:

- Inspect accumulation area to assure that all containers are marked with the accumulation start date and the words "Hazardous Waste."
- Because tanks are reused, the generator is not required to mark the tank with the accumulation start date. Therefore, review records and manifests to verify that tanks have been emptied within 90 days.
- Observe satellite accumulation areas (facilities may have multiple) and insure that there is no waste in excess of 55 gallons, or in excess of one quart for acutely hazardous waste. If satellite containers are full, check "full" date to assure containers are removed from satellite area w/i 3 day limit.
- Verify that satellite accumulation areas are at or near the point of waste generation and under the control of a close-by operator.
- Verify that satellite accumulation containers are closed except when waste is being added or removed.

Pretransportation Requirements: Packaging and Marking the Waste

With the exception of CESQGs, all generators are subject to the pretransportation requirements of §§ 262.30-262.33. Those regulations adopt by reference the Department of Transportation (DOT) regulations governing packaging, labeling, and marking of hazardous waste, and the placarding of the vehicle used to transport that waste. Figure C-6 summarizes pretransportation requirements and identifies applicable EPA and DOT regulations.

Figure C-6
Correlation with Applicable DOT Regulations

DOT Cite	EPA Cite	Requirements
49 CFR 173, 178, 179	40 CFR 262.30	Packaging must meet specific standards outlined in 49 CFR 173 (requirements for shipping and packaging), 178 (shipping container specifications), and 179 (specifications for tank cars).
49 CFR 172	40 CFR 262.31-262.32	Containers must be marked and clearly labeled according to 49 CFR 172 (see Hazardous Waste Tables), with the statement: "Hazardous Waste -- Federal Law prohibits improper disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency."
49 CFR 172, Subpart F	40 CFR 262.33	Placecards must be provided in accordance with DOT regulations for hazardous materials.

The DOT provides technical assistance in complying with these pretransportation requirements through its Hazardous Materials Information Center, (202) 366-4488.

Assessment Considerations for Packaging/Marking:

- If hazardous waste is ready for shipment, the inspector should:
  - Check that containers are in good condition, and not damaged, corroded or leaking.
  - Check each container for the appropriate DOT label, manifest number and generator's name and address.
- If there is no waste ready for shipment, compliance with these requirements must be deduced by questioning appropriate facility personnel. The inspector should request to see placards, if they are required, and printed hazardous waste labels. If the facility has these items on hand, they are likely being used.

Pretransportation Requirements: The LDR Determination

Prior to shipment, generators must determine whether the hazardous waste is prohibited from land disposal. The regulations prohibit land disposal of virtually all hazardous wastes, except where the treatment standards of 40 CFR Part 268 have been met. Land disposal includes any placement of hazardous waste into a landfill, land treatment unit, waste pile, injection well, salt dome or salt bed formation, underground mine or cave, surface impoundment or placement in a concrete vault or bunker intended for disposal purposes (§ 268.2(c)). Although the ultimate responsibility for treatment lies with the person disposing the waste, generators must notify the designated TSDF of any necessary treatment requirements under the LDRs in order to ensure that proper treatment occurs.

As a first step to meeting generator LDR obligations, the generator must determine, by knowledge or testing, whether the hazardous waste meets the treatment standards of §§ 268.40, 268.45 or 268.49 (§ 268.7(a)(1)). After this determination is made, the generator is subject to a multitude of notice, certification, and recordkeeping requirements. The regulations, as recently amended to reduce paperwork (see 62 FR 25998, May 12, 1997, effective August 11, 1997), require notice of LDR status to each TSDF receiving hazardous waste only with the initial shipment, unless the waste or the generating facility change, in which case another notice reflecting the change must be provided. The notice must include all of the relevant information reflected in the "Generator Paperwork Requirements Table" of § 268.7 (reproduced below as Figure C-7).

Figure C-7
Generator Paperwork Requirements Table

Required Information	If waste does not meet treatment standard (40 CFR 268.7 (a)(2))	If waste meets treatment standard at point of origination (40 CFR 268.7 (a)(3))	If exemptions to LDR treatment standards apply (40 CFR 268.7 (a)(4))	If managing a lab pack and using alternative treatment standards of §268.42 (c) (40 CFR 268.7 (a)(9))
1. EPA Hazardous Waste and Manifest numbers	✓	✓	✓	✓
2. Statement: this waste is not prohibited from land disposal			✓	
3. The waste is subject to the LDRs. Identify the constituents of concern for F001-F005, and F039, and underlying hazardous constituents (for wastes that are not managed in a Clean Water Act (CWA) or CWA-equivalent facility), unless the waste will be treated and monitored for all constituents. If all constituents will be treated and monitored, there is no need to put them all on the LDR notice	✓	✓		
4. The notice must include the applicable wastewater/nonwastewater category (see §§ 268.2(d) and (f)) and subdivisions made within a waste code based on waste-specific criteria (such as D003 reactive cyanide)	✓	✓		
5. Waste analysis data (when available) .	✓	✓	✓	
6. Date the waste is subject to the prohibition			✓	
7. For hazardous debris, when treating with the alternative treatment technologies provided by § 268.45: the contaminants subject to treatment, as described in § 268.45(b); and an indication that these contaminants are being treated to comply with § 268.45			✓	
8. A certification is needed (see applicable section for exact wording)		✓		✓

As reflected in § 268.9(a)-(c), the generator must identify each applicable waste code before determining what (if any) treatment is required. Where wastes are both listed and characteristic, the treatment standard for the listed waste controls, provided that the treatment standard addresses the hazardous constituents that cause the waste to exhibit a hazardous characteristic. Otherwise, all applicable treatment standards must be met. The treatment standards for all waste types are specified in Subpart D of Part 268. These standards are expressed either as a specific concentration level (in mg/l^3) or as application of a specific technology. Where characteristic waste is no longer hazardous, a one-time notification and certification are placed in the generator's file and copies sent to the EPA Regional Office or authorized State (§ 268.9(d)).

In addition to the preceding requirements, Part 268 contains surface impoundment exemptions to the LDRs (Subpart B), and waste-specific prohibitions on land disposal that are not generally applicable to kraft pulp mills. Note also that § 268.3(b) allows in certain circumstances for dilution of characteristic wastes in a wastewater treatment unit that discharges under a NPDES permit (or, to a POTW if subject to pretreatment standards), or to a CWA-equivalent system. The wastes must be hazardous only because they exhibit a hazardous waste characteristic. Finally, the regulations exempt the following wastes from LDR requirements:

- Wastes generated by CESQGs,
- Wastes identified or listed as hazardous after November 8, 1984, for which no land disposal prohibitions or treatment standards have been promulgated, and
- De minimis losses of characteristic wastes to waste waters (defined as losses from normal material handling operations, minor leaks, etc.).

Assessment Considerations for LDR Requirements:

- Determine whether the generator produces wastes subject to the LDRs.
- Review how the generator determines the waste is restricted by reviewing documentation/data used to support that determination.
- Check that LDR notifications are retained and have a corresponding manifest, and determine whether all notification/certification requirements of § 268.7 were met.
- If a generator is treating a restricted waste in accumulation tanks or containers, review the waste analysis plan.

Tracking and the Manifest System

The manifest system used to track hazardous waste from generation to final disposal is a central feature of the RCRA regulatory scheme. Pursuant to 40 CFR Part 262, Subpart B, generators of hazardous waste must prepare a Uniform Hazardous Waste Manifest (EPA Form 8700-22, reprinted in the Appendix to Part 262), or the equivalent form developed by the consignment or generating State, for each hazardous waste shipment. The manifest must identify the permitted TSDF designated to receive the waste, and may identify an alternate TSDF in the event that an emergency prevents delivery to the TSDF of choice.

At the time of hazardous waste transportation to an off-site TSDF, the generator signs and dates the manifest, and obtains the signature of the initial transporter. The manifest consists of sufficient carbon copies so that the generator, each transporter, and the TSDF may each retain one copy, with one additional copy being returned to the generator by the TSDF (§§ 262.22, 262.23). Generators must retain a copy of the manifest for at least three years (§ 262.40(a)).

LQGs who do not receive a signed copy of the manifest from the TSDF within 35 days of shipment must contact the TSDF and/or transporter to determine the status of the hazardous waste. If no manifest is received within 45 days of shipment, notwithstanding the LQG's efforts to locate the manifest, the LQG must file an "Exception Report" with EPA, which consists of a copy of the manifest and a cover letter explaining efforts taken to locate the manifest. SQGs are subject to similar requirements, except that they need not attempt to locate the manifest, and are only required to submit an Exception Report after 60 days have passed (§ 262.42(a), (b)).

The manifest requirements as outlined above apply to all LQGs, and to all SQG's, unless the SQG reclaims waste under a contractual agreement meeting the requirements of 40 CFR section 262.20(e)(1) and maintains a copy of the reclamation agreement on file for three years after termination or expiration of the agreement (§ 262.20(e)(2)). CESQGs are exempt from manifest requirements (§ 261.5(b)).

Assessment Considerations for Manifests:

- Has the facility used the correct manifest (consignment State, generator State, or other)?
- Review generator's manifest files to determine whether manifests were completed correctly.
  - Are the original manifests signed and dated by the generator and first transporter?
  - Is the EPA ID number clearly marked for the generator, transporter and TSDF?
  - Have all spaces been completed correctly, and all changes/cross-outs initialed?
  - If the State requires hazardous waste codes to be included on the manifest, has the correct waste code been entered?
- The TSDF should return the signed copy of a manifest to an LQG within 35 days, and to an SQG within 60 days, from the date upon which the waste was accepted by the initial transporter. A copy of the returned and signed manifest must be retained for three years (the original may be discarded once the signed manifest is returned).
- Obtain explanations for unusual gaps in the frequency of off-site shipment. Are subsequent shipments larger? This could indicate an exceedance of the 90-day accumulation limit.

Recordkeeping and Reporting

Generators are required to prepare and retain copies of the following records for at least three years: (1) manifests, (2) Exception Reports, (3) Biennial Reports detailing shipments to TSDFs, and (4) laboratory test data generated by the initial hazardous waste determination (if testing, rather than knowledge, was used) (40 CFR Part 262, Subpart D). The three-year retention period is automatically extended where unresolved EPA enforcement actions are pending, or as otherwise requested by EPA (§ 262.40(d)).

Exception Reports are discussed in the preceding section. Biennial Reports (EPA Form 8700-13A) must be prepared by generators who ship hazardous waste to an off-site TSDF within the United States, and filed with the EPA Regional Administrator by March 1 of each calendar year. Biennial Reports include the following information:

- EPA ID number, name, and address of generator
- Calendar year covered by report
- EPA ID number, name and address for each TSDF to which waste was shipped
- EPA ID number and name of any transporter used during the year
- Description, EPA hazardous waste number, DOT hazard class, and quantity of each hazardous waste shipped to a TSDF
- Description of waste minimization efforts
- Description of changes in volume and toxicity actually achieved, as compared to previous years
- Certification

SQGs are subject to slightly less stringent recordkeeping and reporting requirements, inasmuch as the regulations exempt them from the Biennial and Exception Report retention requirements of § 262.40(b), and impose simplified Exception Report reporting requirements under § 262.42(b). However, both LQGs and SQGs may be required to furnish additional reports concerning hazardous waste quantity and disposition at the Administrator's discretion, as authorized by § 262.43. CESQGs are entirely exempt from recordkeeping and reporting requirements (§ 261.5(b)).

Assessment Considerations for Recordkeeping/Reporting:

- Are all required reports and records being retained? If additional reports were required by the Regional Administrator, verify that they are present.
- If the State has a shorter time frame for the manifest to be returned to the generator, verify that the facility has been receiving the signed manifests within that timeframe.
- The inspector should review the on-site copy of the Biennial Report for completeness.

Waste Minimization Requirements

Generators are required to develop programs to minimize the quantity and toxicity of their hazardous wastes (typically by source reduction or recycling), to report minimization efforts on their Biennial Reports, and to certify on each manifest that they are engaged in such efforts. EPA's interim final guidance on waste minimization, 58 FR 31114 (May 28, 1993), provides that a waste minimization plan should incorporate: (1) top management support, (2) characterization of waste minimization and management costs, (3) periodic waste minimization assessments, (4) appropriate cost allocation, (5) encouragement of technology transfer, and (6) program implementation and evaluation. Additional guidance and specific examples of successful waste minimization programs may be found in The EPA Manual for Waste Minimization Opportunity Assessments (1988 ed.) (EPA/600-2-88-025). Five basic types of waste minimization are:

- **Source Separation (or segregation)** - Keep hazardous waste streams separated from nonhazardous waste streams through management practices to prevent contamination of the nonhazardous waste. This is an inexpensive and effective method for reducing the volume of hazardous waste to be handled, transported and eventually disposed of.

- **Recycling (also referred to as recover and reuse)** - The process of removing a substance from a waste returning it to productive use. Solvents, acids, and metals are commonly recycled. Assure that the recycling is not "sham recycling."

- **Raw Material Substitution** - Replacing a raw material that generates large amounts of hazardous waste with a material that generates less hazardous waste.

- **Manufacturing Process Changes** - Eliminate or alter a process so that it reduces or eliminates the amount of hazardous waste produced.

- **Product Substitution** - Eliminating a product that contributes to contamination and replacing it with a product that is innocuous.

Exporters of Hazardous Waste

Generators who export their hazardous wastes to foreign countries rather than sending them to a domestic TSDF are subject to the requirements of 42 USC 6938 and 40 CFR Part 262, Subpart E. The regulations require exporters to provide EPA with notice at each step of the export process and to comply with special manifesting, exception, and annual reporting requirements. Under Subpart E, exports of hazardous waste are prohibited, unless or until:

- Notice is given to EPA containing all of the information about the waste and its expected course of travel listed in 40 CFR 262.53,
- The receiving country consents to the shipment,

- ! a copy of the EPA Acknowledgment of Consent (i.e., receiving country consent as cabled by the U.S. Embassy in the receiving country) accompanies the shipment, and
- ! the shipment conforms to the receiving country's consent.

Copies of all essential documents must be retained for at least three years, and the retention period is automatically extended during any period of unresolved enforcement actions or as requested (40 CFR 262.57).

Special export requirements may apply if the hazardous waste is being shipped to a member country of the Organization for Economic Cooperation and Development (OECD), as defined in 40 CFR 262.58(a)(1).

Assessment Considerations for Waste Exports:

- Review the exporter file. Verify that all information is complete and correct, the point of departure from the US and the additional certification statement are areas commonly overlooked.
- Verify that the transporter has returned a signed copy of the manifest with the date and place of departure within 45 days. If not, has an Exception Report been filed?
- If the exporter is using a broker, the inspector should question the nature of the arrangements made to verify that all export requirements are being met.
- Insure that a copy of each notification of intent to export, EPA Acknowledgment of Consent, confirmation of delivery, and annual report have been retained for at least 3 years.

Personnel Training and Contingency Planning

Large quantity generators are subject to the same requirements for personnel training, preparedness and prevention, and contingency plan/emergency procedures as TSDFs (see § 265.16, and Subparts C and D of Part 265). **Training requirements** include classroom or on-the-job instruction, annual review of training received, and records of all training provided. **Preparedness and prevention requirements** relate to general facility operation and maintenance (O&M) practices, required equipment, access to alarms, required aisle space to allow for responding to emergencies, and arrangements with local and State emergency response agencies (police, fire, hospitals, emergency response teams) to familiarize them with site conditions and/or types of wastes generated/handled on site. **Contingency plan requirements** address the measures to be taken in response to any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents. The regulations impose several specific components of an acceptable plan.

For small quantity generators, the same preparedness and prevention procedures in Part 265, Subpart C apply, but the personnel training and contingency plan requirements in Part 265 do not apply. Instead, § 262.34(d)(5) requires that the facility:

- Have at least one employee on-site or on-call that serves as an emergency coordinator
- Properly notify the National Response Center (800-424-8802) immediately in the event of a release that could threaten human health outside the facility or that has reached surface waters
- Ensure that all employees are thoroughly familiar with proper waste handling procedures relevant to their responsibility during both normal operations and emergencies.
- Post next to the telephone the emergency coordinator's name and telephone number, the location of fire extinguishers, spill control material, and fire alarm, and the telephone number of the fire department (unless there is a direct alarm).

Standards for the Management of Used Oil

Used oil is one of a growing number of wastes classified as nonhazardous that have been singled out for special regulation outside of the general nonhazardous waste program of RCRA Subtitle D. Pursuant to the Used Oil Recycling Act of 1980, EPA adopted regulations for used oil (40 CFR Part 279) which establish standards for generators, transporters, and processors. Many States have established their own regulations for handling used oil. Inspectors should become familiar with a State’s used oil requirements prior to inspection.

For purposes of federal regulation, used oil means any oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is physically or chemically contaminated (§ 279.1). The EPA presumes that used oil is recycled, unless a used oil handler disposes of it, or sends it for disposal. Except as provided in § 279.11, the regulations in Part 279 apply to used oil whether or not it exhibits any characteristic of hazardous waste identified in Subpart C of 40 CFR Part 261. Used oil that exceeds any specification level is subject to Subpart C as an "off-specification used oil." Mixtures of used oil and other substances may generate separate or additional regulatory requirements. Figure C-8 lists different used oil mixtures and indicates how they are regulated.

Figure C-8
Used Oil and How it is Regulated

Used Oil	How Regulated
Mixtures of used oil and listed hazardous waste	Regulated as a listed hazardous waste under Subpart D of Part 261
Used oil containing more than 1,000 ppm total halogens	Regulated as hazardous waste under Subpart D of Part 261 (although may be rebutted)
Mixtures of used oil and hazardous waste that exhibit a characteristic other than ignitability	Regulated as hazardous waste under Parts 260 through 266, 268, 270, and 124
Mixtures of used oil and characteristic hazardous waste if the mixture does not exhibit any hazardous waste characteristic	Regulated as used oil under Part 279
Mixtures of used oils and characteristically ignitable hazardous waste that is not listed in Subpart D of Part 261	Regulated as used oil under Part 279, if resultant mixture does not exhibit the characteristic of ignitability
Mixtures of used oil and CESQG hazardous waste	Regulated as used oil under Part 279
Mixtures of used oil with products	Regulated as used oil under Part 279. Unless the mixture is used oil and diesel fuel for use in generator's vehicle. (Prior to mixture, used oil is subject to Subpart C of Part 279)

Standards for Generators of Used Oil

A used oil generator is any person, by site, whose act or process produces used oil, or whose act first causes used oil to become subject to regulation, except as provided in § 279.20(a)(1)-(4). The regulations address three generator activities: (1) used oil storage, (2) on-site burning in space heaters, and (3) off-site shipments.

Used oil generators that store used oil in underground storage tanks (USTs) are subject to regulation under 40 CFR Part 280 (see discussion below in this Appendix), and are also subject to all applicable spill prevention, control, and countermeasure requirements of 40 CFR Part 112. Other permissible storage units (tanks, containers, or units subject to regulation under Parts 264 or 265, and any fill-pipes used for oil transfer) must be maintained in good condition and labeled with the words "Used Oil." Upon detection of any release to the environment not covered by the UST regulations, generators must stop and contain the release, clean up and manage the released material, and if necessary, repair or replace any leaking used oil storage containers or tanks prior to returning them to service (§ 279.22).

Generators may burn used oil in on-site space heaters provided that the oil is generated only by the owner/operator, the heater has a maximum capacity of not more than 0.5 million Btu per hour, and the heater combustion gases are vented to the ambient air (§ 279.23).

When shipping used oil off-site, generators must ensure that their transporter has obtained an EPA ID number, except for:

- Generators who self-transport less than 55 gallons of their used oil at any time;
- Generators who self-transport less than 55 gallons of their used oil from the generator site to an aggregation point; or
- Generators who arrange for used oil to be transported pursuant to a tolling agreement under which the reclaimed oil is returned to the generator (§ 279.24).

Assessment Considerations for Used Oils:

- Determine how used oil is handled (disposed of or recycled).
- Determine if the used oil has been mixed with a listed waste or characteristically hazardous waste, if it contains more than 1,000 ppm or exhibits the characteristic of ignitability.
- Review test results and/or analysis of used oils.
- Assess the condition of the used oil storage unit. It should be labeled "Used Oil", as should fill pipes for USTs.
- Determine whether any used oil releases have occurred. If so, how were they managed and cleaned-up? (Review associated documentation.)
- Determine whether used oil is burned in a space heater. If so, do the space heater and the quantities burned meet all the required conditions?

Regulation of Underground Storage Tanks

In 1984, Congress amended RCRA by enacting the Hazardous and Solid Waste Amendments (HSWA). Subtitle I of the HSWA mandated the creation of a program for the regulation of underground storage tanks (USTs) containing regulated substances other than hazardous wastes. The EPA responded to this mandate by promulgating comprehensive UST regulations, codified at 40 CFR Part 280. States may be authorized to operate their own UST programs, so long as State UST regulations are at least as strict as federal requirements.

A UST is defined as a tank that stores "regulated substances" and that has at least 10 percent of its volume below the surface of the ground, including piping connected to the tank (§ 280.12). Regulated substances include hazardous chemical products regulated under CERCLA (above de minimis concentrations) and any petroleum products that are liquid at standard conditions. As noted above, regulated substances do <u>not</u> include hazardous wastes covered by RCRA Subtitle C.

Other USTs excluded from regulation include:

- Heating oil tanks on the premises where the tank is located;
- Flow-through process tanks;
- Any wastewater treatment tank system regulated under the CWA;

- Tanks with less than 110 gallons capacity;
- Spill and overflow containment systems that are expeditiously emptied after use;
- Stormwater and wastewater collection systems; and
- Tanks situated on or above the floor of underground areas such as basements, shafts and tunnels.

The UST regulations establish conditions for design, construction, operation, installation, and notification; release detection, response, investigation, confirmation, reporting, and corrective action; out of service UST systems and closures; and financial responsibility. Figure C-9 provides a general overview of the UST requirements in 40 CFR Part 280.

Figure C-9
Underground Storage Tank Requirements (40 CFR Part 280)

Requirements	Description
Design, Construction, Installation, and Notification (Subpart B)	! New USTs (installed after December 1988) must meet performance standards detailed in 40 CFR 280.20 ! All existing UST systems (installed before December 1988) must be upgraded to add spill, overfill, and corrosion protection, and to meet other requirement detailed in 40 CFR 280.21, by December 1998, or close and/or replace the existing UST (40 CFR 280.21) ! Notify State and/or local agencies upon the installation and use of new UST systems (40 CFR 280.22)
General Operating Requirements (Subpart C)	! Must ensure the prevention of releases through spill and overfill control, proper corrosion protection, use of compatible materials, and appropriate repairs to the UST system (40 CFR 280.30 - 280.33) ! Reporting requirements include notification, reports of all releases (suspected and confirmed), corrective action, and permanent change in service or closure (40 CFR 280.34(a)) ! Recordkeeping requirements include documentation of corrosion controls, UST system repairs, and release detection compliance (40 CFR 280.34(b))

Figure C-9 (cont.)
Underground Storage Tank Requirements (40 CFR Part 280)

Requirements	Description
Release Detection (Subpart D)	! Must provide a method or combination of methods to detect leaks and releases from the UST system (40 CFR 280.40 - 280.41) ! Must comply with release detection requirements according to the schedule set forth in 40 CFR 280.40(c) ! Owners or operators of petroleum USTs must comply with release detection requirements under 40 CFR 280.41 ! Owners or operators of hazardous substance USTs must comply with release detection requirements under 40 CFR 280.42 ! Must maintain records demonstrating compliance with release detection requirements (40 CFR 280.45)
Release Reporting, Investigation, and Confirmation (Subpart E)	! Must report any suspected releases within 24 hours or another reasonable time period specified by implementing agency (40 CFR 280.50) ! Must investigate and confirm any suspected releases (40 CFR 280.52) ! Must contain and cleanup any release, and report to implementing agency (40 CFR 280.53)
Release Response and Corrective Action for UST Systems Containing Petroleum or Hazardous Substances (Subpart F)	In the event of a release ! Must notify implementing agency upon confirmation of a release and take action to prevent additional release (40 CFR 280.60, 280.61) ! Must submit report to implementing agency that summarizes initial abatement activities within 20 days (40 CFR 280.62) ! Must submit site characterization report (40 CFR 280.63) ! Must develop and implement a corrective action plan as directed by implementing agency (40 CFR 280.66)
Out-of-Service UST Systems and Closure (Subpart G)	! For temporary closure, must maintain operating practices to ensure prevention of releases (40 CFR 280.70) ! Must notify implementing agency 30 days prior to permanent closure or change in service (40 CFR 280.71) ! Must maintain records to demonstrate compliance with closure requirements in accordance with 280.34 (40 CFR 280.74)
Financial Responsibility (Subpart H)	! Must demonstrate financial responsibility for taking corrective action and for compensating third parties for bodily injury and property damage caused by accidental releases (40 CFR 280.90 - 280.116)

As indicated by Figure C-9, all existing USTs must add spill, overfill, and corrosion protection, close the existing UST, or replace the existing UST with a new UST by December 22, 1998 (§ 280.21). New USTs must have a suitable dielectric coating in addition to cathodic protection, and must be installed in accordance with an established code of practice and the manufacturer's instructions (§ 280.20(d)). Installation of new USTs must also be certified (§ 280.20(e)). Any facility that brings a UST into use after May 8, 1986 must submit the Notification Form prescribed in Appendix I of Part 280 (or a comparable State form) within 30 days. This form must be submitted to the State or local agency or department designated in Appendix II of Part 280 (§ 280.22).

Assessment Considerations for USTs:

- Interviews with facility personnel may cover the following:
  - Age, construction material, capacity of each tank on-site
  - Type of products stored in each tank
  - If tanks have been closed, determine whether there was contamination associated with the tank, and when and how such contamination occurred.
    - Type of corrosion protection and frequency of inspections (corrosion protection required on tanks by Dec. 22, 1998)
    - Type of overfill and spill protection
    - Inquire about release detection. Is monthly inventory control and/or annual tightness testing used?
- Visual observations may be used to determine if any spills or overfills have occurred that have not been remediated immediately. Look for USTs that may have gone unreported. Fill and/or vent pipes are an indication of an UST.
- Document reviews should consist of Notifications for UST systems, reports of releases (suspected releases), spills and overfills, initial site characterization and corrective action plans, notifications of permanent closure, corrosion expert's analysis if corrosion protection is not used, documentation of operation of corrosion protection equipment, recent compliance with leak detection requirements (including daily inventory sheets with monthly reconciliation), and results of site investigations.

Evaluating Compliance

There are several types of RCRA inspections which differ based upon the purpose, facility status, and probable use of the inspection results. The compliance evaluation inspection (CEI) is the primary mechanism for assessing RCRA compliance, however, and is the model for a RCRA assessment used in this Appendix. The various types of RCRA inspections and basic forms for preparing for and conducting RCRA inspections are included in EPA's RCRA Inspection Manual.[1] In addition, a screening assessment may be conducted by non-RCRA inspectors. See the sample screening checklist in Appendix E.

During the CEI, the inspector examines areas of the facility where hazardous waste is generated and stored to determine compliance with the applicable storage, labeling and handling requirements, and reviews all required records, including: manifests, Land Disposal Restrictions (LDR) Forms, appropriate plans and reports, training and certification records, and other documentation. Record review provides insight into the hazardous waste handling practices over the inspection period.

Under Section 3006 of RCRA, EPA may authorize a State to administer and enforce a State hazardous waste program in lieu of the federal Subtitle C program. States may include more stringent requirements than Federal regulations in their authorized program. States typically receive authorization incrementally, consistent with the gradual implementation of the federal RCRA program, due largely to the lag time between federal promulgation of Subtitle C standards, and development and adoption of equivalent standards by the States. There are also different levels of State authorization. States may be granted primacy for the base RCRA program (the pre-HSWA RCRA requirements), for land disposal requirements, and for the RCRA corrective action program. Where a facility is subject to joint federal/State authority, inspections may be conducted by both EPA and/or State inspectors. Inspectors who inspect areas not under their jurisdiction and identify conditions of non-compliance should report those conditions to the agency with jurisdiction for further action.

Assessment Preparation

Assessment preparation is discussed at length in Section 3 of this manual. Adequate preparation will provide the inspector with background information necessary to conduct an accurate assessment. Recommended preparation steps and step objectives specific to RCRA assessments are included in Figure C-10.

Figure C-10
Assessment Preparation Summary

Recommended Steps	Objectives
Define Scope of Assessment	! Define Assessment Objectives ▸ To evaluate general compliance ▸ To verify accuracy/completeness of permit ▸ To respond to citizen complaints ▸ To identify root cause of problem and/or evaluate effectiveness of corrective actions ▸ To develop information to support/respond to enforcement action ▸ To observe required sampling/testing ▸ To audit compliance monitoring systems ! Determine Assessment Type ▸ Compliance Evaluation Inspection (CEI) ▸ Case Development Inspection (CDI) ▸ Comprehensive Groundwater Monitoring Evaluation (CME) ▸ Compliance Sampling Inspection (CSI) ▸ Operation and Maintenance Inspection (O&M) ▸ Laboratory Audit ! Identify needed preparation and appropriate inspection activities

Figure C-10 (cont.)
Assessment Preparation Summary

Recommended Steps	Objectives
Review Facility File	! Review facility file, including past inspection reports, appropriate permits, correspondence, and enforcement file (such as obligations under orders and consent decrees) ! Develop and maintain separate facility inspection file
Coordinate/Schedule Inspection	! Identify interested offices or agencies ! Determine whether the inspection will be a joint effort ! Consult compliance officer/agency ‣ Inquire about pending enforcement issues
Review Applicable Regulations	! Identify and review applicable regulations, as determined through file review ! Obtain and understand relevant amendments to RCRA standards ! Determine State/Federal jurisdiction of new regulations, amendments
Develop Assessment Plan and Appropriate Checklist(s)	! Develop a plan on how to proceed during on-site assessment, highlight: ‣ Site-specific areas that need to be resolved, outstanding violations or enforcement ‣ Processes generating waste, waste accumulation areas ! Review existing checklists, determine their usefulness and modify where necessary
Identify Necessary Equipment	! Identify/obtain necessary equipment based on the type of assessment, e.g., camera, fieldbook
Complete Pre-Assessment Worksheet	! Complete pre-assessment worksheet ‣ Highlight areas of concern and/or unresolved violations ‣ Make appropriate changes to pre-assessment sheet

Worksheets are useful tools for organizing the pre-assessment information gathering stage. Worksheets may also identify areas of concern and/or questions that should be explored during the assessment. An example of a pre-assessment worksheet is included as Figure C-11. Any unresolved issues should be noted on an interview sheet and addressed accordingly.

Figure C-11
Pre-Assessment Worksheet

Completed	Pre-Assessment Tasks	Information Source
Obtain and Review Facility Information		
	Schematics of Process/Production Rates/Wastes	Facility File
	Manifest History	Facility File
	Previous Inspection Reports	Facility File
	Correspondence	Facility File
	Annual/Biannual Reports	Facility File
	Notification Form	Facility File
	Appropriate Permits	Permit File
	Permit Status	Permit Writer
	Facility Contact Name, Title, Phone and Fax Number	Facility File Previous Inspection Reports
Obtain and Review Enforcement Regulatory Information		
	NOVs, LOWs	Enforcement File
	Facility Responses	Enforcement File
	Consent Decrees/Orders	Enforcement File
	Compliance History	RCRIS
	Enforcement Status (if ongoing)	Enforcement File
	Review Pertinent and New Regulations	Regulations (CFR Fed Reg)
	Determine Jurisdiction	Regulations (Fed Reg)
	Identify and Contact Interested Offices and/or Agencies	N/A
Develop a Plan on How to Proceed with Assessment		
	Site specific area to be observed	Past Inspection Reports
	Process generating waste/waste accumulation area	Past Inspection Reports
	Past/outstanding violations	Facility File Enforcement File
	Review Existing Checklists, Determine Usefulness -- Modify Where Necessary	N/A
	Identify and Collect Necessary Inspection Equipment	N/A
	Schedule Inspection	N/A

Conducting the Assessment

With the pre-assessment steps completed, the inspector is ready to schedule and perform the assessment. By following the tasks listed on the pre-assessment worksheet, including developing a site-specific assessment plan and checklists, the inspector should be well prepared to conduct a thorough assessment. Key assessment steps and elements of each step are included in Figure C-12.

Figure C-12
Key Assessment Steps and Elements

Key Steps	Elements
Opening Conference/Interview	! Identify purpose of assessment ! Discuss agenda and scheduling ! Verify information on pre-assessment worksheet ! Update existing facility information ‣ Rate of production changes, changes in number of employees ‣ Changes in manufacturing processes (raw material inputs, process equipment, products, waste streams) ! Discuss new waste minimization/pollution prevention measures ! Discuss unresolved concerns/ongoing enforcement
Records Review	! Records needed for review: ‣ Map/facility drawings -- prior to facility walk-through ‣ Manifests, LDR notification and certification ‣ Appropriate Records Plans -- Contingency Plan, Waste Analysis Plan, Waste Minimization Plan, Training Records, Biennial Report, Annual Reports (if applicable) ‣ Exception reports ‣ List of wastes generated, their origins, rate of generation and accumulation area (compare with pre-inspection worksheet) ‣ Facility notification forms ‣ Summary of names, titles, locations, and phone numbers of persons involved in hazardous waste program
Visual Assessment	! Follow raw material (wood) through process and identify waste streams (solid and hazardous) ! Inspect points of generation and satellite accumulation, <90 day accumulation area ! Evaluate waste handling techniques and procedures ! Observe employees handling and management of hazardous wastes ! Check (randomly) solid waste containers for waste types ! Evaluate container condition, labeling, marking etc. ! Ask questions of facility personnel and the facility guide to identify any inconsistencies in procedures or gaps in facility training
Closing Conference	! Identify concerns/potential violations ! Discuss questions noted during record review and/or visual inspection

By following the steps listed in Figure C-12, the inspector will be better able to identify:

- Wastes that should have -- but may not have been -- considered hazardous
- Procedures and management practices that may not be in compliance with the current regulatory requirements
- Steps in the management process that may result in wastes being mishandled or misidentified, and that present opportunities for spills and/or releases
- Unusual situations that may be encountered that vary from the facility's stated normal operating procedures that may result in potential violation

When conducting an assessment, an agency inspector should ask questions of the facility representative guiding them as well as other facility personnel, such as process operators. By questioning different personnel, the inspector may identify inconsistencies in explanations of procedures or operations that could indicate possible non-compliance. In addition, speaking with additional personnel could identify gaps or inadequacies in the facility's training program.

The inspector may want to use an appropriate checklist (see the model checklists included at the end of this Appendix). The inspector should try to complete as much of the checklist as possible during the opening conference and the record review and leave the sections blank that require visual inspection to complete. If it is cumbersome to complete the checklist during the visual inspection, the inspector is advised to carry a field notebook to record observations, and refer to the checklist for general guidance. The checklist may be completed at a later time. Sole reliance on a checklist may limit the scope and thoroughness of an inspection. The inspector should be aware of, and investigate, all relevant waste generation and management activities. The inspector should attempt to understand how the facility operates, how and where wastes are generated, managed and stored at the facility, and should rely on the record review (manifests, LDRs, etc.) to assure that the waste is being handled appropriately after it is transported off-site.

If the facility is performing a self-assessment, the inspector may record observations in a fieldbook and present the findings on a finding form. An example of a finding form is included as Figure C-13. The "Finding Information" portion of the form may be completed after the visual inspection or record review and the "Comment" section may be completed during or after the closing conference. The finding form can be completed for both negative and positive findings, as well as for management practices.

Figure C-13
Sample Finding Form

Date ____________ Inspector ____________________________________

Type of Finding(+/−) _____ Bldg/Location (if applicable) __________________________

Section I - Finding Information

1. Condition ____
2. Regulatory Cite (Fed/State) ______________________________
3. Finding ID Code _______________ 4. Problem Type ______________
5. Finding Type ______________________ 6. Repeat Finding (Y/N) _________
7. Rating _______________________________

Section II - Comments

1. Cause(s) ____
2. Effect(s) ____
3. Suggested Solution(s) ___________________________________
4. Comments ____

Key

FINDING IDENTIFICATION CODES

3A	Accumulation Points
3B	TSD Facilities
3C	Training
3D	Waste Minimization
3E	Others

PROBLEM TYPE CODES

ADMINISTRATIVE

A1	Records
A2	Labels
A3	Reports
A4	Manifests
A5	Lack of a permit
A6	Inadequate/Missing Plan
A7	Public Notifications
A8	Operator Certification
A9	Fire Standard
A10	Program Planning
A11	Sampling
A12	Training
A13	Other

POTENTIAL DISCHARGE

P1	Operational Practices
P2	Inadequate Facility
P3	Inadequate Equipment/Containers
P4	Other

DISCHARGE

D1	Excess Chemical Parameter
D2	Excess Physical Parameter
D3	Groundwater Contamination
D4	Spill/Leak
D5	Other

PROBLEM TYPE DESCRIPTIONS:
DISCHARGE -- Spilling, leaking, pumping, pouring, emitting, emptying, or damping of a pollutant that is not covered by a permit or exceeds a permit limit.
POTENTIAL DISCHARGE -- Physical conditions and operating practices, if left uncorrected, could cause a discharge.
ADMINISTRATIVE -- Program management and oversight issues such as plans, permits, training, records, reports, etc.
FINDING TYPE:
REGULATORY -- Involves federal, State, or local environmental requirements.
MANAGEMENT PRACTICE -- Environmental procedures/policies which are good practices but are not REGULATORY OR PROCEDURAL.
RATING:
SIGNIFICANT -- Requires IMMEDIATE attention, poses a direct threat to human health/safety, can "shut you down."
MAJOR -- Requires less than immediate attention, could affect human health/safety, would probably result in a NOV.
MINOR -- Procedural, temporary, or occasional deficiencies of no immediate consequence.
MANAGEMENT PRACTICE -- Used for positive findings and when the finding is of the management practice type

Figure C-14 provides a list of basic equipment needed to perform a CEI, noting the benefits of each. Photographs provide accurate documentation of observations, and can be a significant and informative source for review prior to future inspections, informal meetings, and in preparation of enforcement documentation.

Figure C-14
Necessary Inspection Equipment and Its Use

Necessary Equipment	Purposes/Limitations
Field Notebook	! Accurate notes on ‣ Interviews/conversations with operators and environmental staff ‣ Observations ‣ Inspection Activity ! Photograph log ‣ Date, time ‣ Number of photo on roll ‣ Type of film, lens and camera ‣ Location on site (e.g. , view looking northeast at . . .) ! Weather conditions ! Record list of documents reviewed ! Remember -- take notes accurately and objectively
Checklists	! Remember Pre-Inspection Worksheet ! May be used as guidance tool ! May be completed during inspection ! Remember -- do not rely solely on a checklist; it is only a tool to organize your inspection and record inspection observations
Photographs	! Provide "snap-shot" of facility conditions at time of inspection -- validates observations on checklist or in field notebook
Schematics/Maps	! If facility is large, excellent tool for orienting oneself ! Provides graphic record, may mark map or schematic with: ‣ Waste generation areas ‣ Waste accumulations areas (satellite and <90 day) ‣ Spill or contamination parameters (size relative to site) ‣ Where photographs were taken (optional) ! Inspector may verify areas inspected by schematic

Maintaining and recording accurate and detailed information during the inspection is essential from an agency's viewpoint as the information may be used for enforcement and permitting. In addition, full documentation will be beneficial to future assessments to determine changes in processes and activities on-site.

After record review and visual inspection have been completed, the assessment team and facility staff should meet for a closing conference. This will offer an opportunity for the assessment team to resolve outstanding issues, answer questions, and review findings with the facility staff. At the same time the conference offers the facility staff the opportunity to respond to the inspector's concerns or questions, and provides a final opportunity for the facility to claim confidential business information protection for information collected during the inspection.

If the facility has performed a self-assessment, the appropriate facility staff should gather and discuss the findings of the assessment team. This is an ideal opportunity for the facility to involve the operators. The operators can offer insight into day-to-day concerns and procedures that are contributing to any negative findings the assessment team may have determined. In addition, this discussion provides a chance for management and staff problem solving and for development of waste minimization initiatives. The finding form (Figure C-13) is one way of recording the self-assessment findings, cause and effect of noted problems, and suggested solutions, all of which can be included in the assessment report.

Assessment Follow-up

The appropriate follow-up to the compliance inspection will vary depending on who conducted the assessment and what findings were made, but in all cases, developing an accurate, clear and concise report outlining the findings of the inspection is important. The assessment report should include the reason for the assessment, the scope of the assessment (what was covered), the findings of the assessment, a list of issues and concerns to be followed-up on, and an indication of what additional assessments may be necessary.

If the assessment has been performed by an agency, the findings are be recorded in the standard agency format, with all supporting documentation included. Since these findings may be used as part of a future enforcement action -- presentation and accuracy are crucial.

If the inspection is a facility self-assessment, the report should address many of the same factual items included in the agency report. In addition, the finding forms should be included as an attachment. As such, the self assessment may identify the root cause of a concern or issue, and recommend corrective actions to be taken to rectify these concerns or issues.

Assessment Checklists

Figure C-15 provides a starting point for developing a specific RCRA generator checklist appropriate for a particular facility. The form is based closely on a form used by one State agency.[2] Many States will use their own form, and will include State-specific requirements in addition to federally-based requirements. For a mill in a particular State, the applicable State agency's form (if available) is likely the best starting point as a model for use in that State. In addition, for a screening assessment that may be conducted by non-RCRA inspectors, see the sample screening checklist in Appendix E.

Figure C-15
Example RCRA Generator Checklist

I. BASIC DATA

Date of Inspection:____________________________

Inspector:____________________________________ Program:____________________________________

Weather Conditions:____

General Facility Information

U.S. EPA ID No.:____________________________

Site Name:____________________________________ Street:______________________________________

City:____ State:______________ Zip Code:______________

County:_____________________________________

Facility Contact:______________________________ Title:_______________________________________

Telephone No.:_______________________________

Type of Generator (circle appropriate type): SQG/CESQG/LQG

II. WASTE DATA

WASTE STREAM/EPA ID # (Describe each waste stream including Production Process)	Generation Rate (Per Month)	Disposition
1.		
2.		
3.		
4.		
5.		
6.		
7.		

III. WALK-THROUGH ASSESSMENT PROCEDURES

A. Pretransport, Containerization and Storage		Comments
1. Storage does not exceed 90 days (LQG) or 180 days (SQG)	☐ Yes ☐ No	
2. Containers in good condition	☐ Yes ☐ No	
3. Waste compatible with container	☐ Yes ☐ No	

Figure C-15 (cont.)
Example RCRA Generator Checklist

A. Pretransport, Containerization and Storage (cont.)			Comments
4.	Containers closed in storage	☐ Yes ☐ No	
5.	Containers storing incompatible waste separated or protected from each other by a dike, beam or wall	☐ Yes ☐ No	
6.	Date of accumulation marked on containers	☐ Yes ☐ No	
7.	Containers clearly marked "Hazardous Waste"	☐ Yes ☐ No	
8.	Facility inspected and maintained (weekly) [Ask for, review self-inspection sheets]	☐ Yes ☐ No	
9.	Daily inspection of areas subject to spills, i.e., waste handling areas [Ask for, review self-inspection sheets]	☐ Yes ☐ No	
10.	Adequate aisle space available [36"]	☐ Yes ☐ No	
11.	All containers packaged, marked, and labeled according to DOT requirements	☐ Yes ☐ No	
B. Satellite Accumulation			**Comments**
1.	Areas located at or near point where wastes initially accumulate and are under operator's control	☐ Yes ☐ No	
2.	Containers clearly labeled "Hazardous Waste"	☐ Yes ☐ No	
3.	Containers kept closed	☐ Yes ☐ No	
4.	Containers in good condition	☐ Yes ☐ No	
5.	Waste compatible with container	☐ Yes ☐ No	
6.	Quantities accumulated not exceeding 55 gal. (1 quart acutely haz. waste)	☐ Yes ☐ No	
7.	Container marked identifying contents, beginning date and "full" date	☐ Yes ☐ No	
8.	Satellite containers go to storage within 3 days of "full" date	☐ Yes ☐ No	
9.	Ignitable/reactive wastes located at least 50 ft. from property line	☐ Yes ☐ No	

Figure C-15 (cont.)
Example RCRA Generator Checklist

C. Preparedness and Prevention and Emergency Procedures			Comments
1.	Facility operated and maintained to minimize possibility of an emergency	☐ Yes ☐ No	
2.	Adequate and proper spill control, decontamination and safety equipment available (fire blankets, respirators, SCBA, absorbents, etc.) and properly tested and maintained	☐ Yes ☐ No	
3.	Adequate water supply and fire control equipment	☐ Yes ☐ No	
4.	Device in the hazardous waste operation area capable of summoning emergency assistance	☐ Yes ☐ No	
5.	Telephone or two-way radio on-site and capable of summoning local fire or police departments	☐ Yes ☐ No	
6.	Communication and emergency equipment tested and maintained	☐ Yes ☐ No	
7.	Emergency coordinator's name and phone number posted near phone [SQG only]	☐ Yes ☐ No	
8.	Telephone number of fire department posted near phone [SQG only]	☐ Yes ☐ No	
9.	Location of fire extinguisher and spill control equipment posted near phone [SQG only]	☐ Yes ☐ No	
10.	Employees familiar with waste handling and emergency procedures [SQG only]	☐ Yes ☐ No	
IV. RECORD REVIEW ASSESSMENT PROCEDURES			
D. Manifests			**Comments**
1.	Facility uses manifest system or [SQG only] wastes reclaimed under contractual agreement	☐ Yes ☐ No	
2.	Records maintained for a 3 year period	☐ Yes ☐ No	
3.	Manifest document ID and consecutive shipment numbers	☐ Yes ☐ No	
4.	Generator's name, address and phone number	☐ Yes ☐ No	

Figure C-15 (cont.)
Example RCRA Generator Checklist

D. Manifests (cont.)		Comments
5. All transporters' names, phone numbers, license plate #s, State & EPA ID#s	☐ Yes ☐ No	
6. Designated facility name, address, phone, State & EPA ID#	☐ Yes ☐ No	
7. DOT shipping name, Hazard Class and waste ID#	☐ Yes ☐ No	
8. Containers, quantity and specific gravity designated	☐ Yes ☐ No	
9. Manifest signed and dated	☐ Yes ☐ No	
10. Tests waste or uses knowledge of waste to determine if the waste is restricted from land disposal	☐ Yes ☐ No	
11. Appropriate LDNR notices, certifications sent under Part 268	☐ Yes ☐ No	
12. Manifests returned within 35 days	☐ Yes ☐ No	
13. If "No" for question #12, contacted TSDF and/or transporter [LQG only] and filed exception reports if manifest not received within 45 days (60 days for SQG)	☐ Yes ☐ No	
E. Preparedness and Prevention [LQG only unless noted]		**Comments**
1. Arrangements with local emergency agencies [SQG only]	☐ Yes ☐ No	
2. Emergency coordinator(s) on premise or on call [SQG only]	☐ Yes ☐ No	
3. Personnel are trained to respond to emergencies including the use of alarm systems, emergency equipment and contingency plan	☐ Yes ☐ No	
4. Employees do not work in unsupervised positions until they have completed the training	☐ Yes ☐ No	
5. Training reviewed annually	☐ Yes ☐ No	
6. Program director trained in hazardous waste management procedures	☐ Yes ☐ No	
7. Personnel training plan on-site	☐ Yes ☐ No	

Figure C-15 (cont.)
Example RCRA Generator Checklist

E. Preparedness and Prevention [LQG only unless noted] (cont.)			Comments
8.	Gives job title, job description and name of employee filling each position	☐ Yes ☐ No	
9.	Written description of introductory and continuing training that will be given to each position	☐ Yes ☐ No	
10.	Documentation of training completed by personnel	☐ Yes ☐ No	
11.	Records of current personnel maintained until facility closure, former employee records maintained for at least three years	☐ Yes ☐ No	
F. Contingency Plan [LQG only]			**Comments**
1.	Contingency plan maintained on-site	☐ Yes ☐ No	
2.	Plan submitted to local emergency response agencies	☐ Yes ☐ No	
3.	Emergency coordinator on-site or on call	☐ Yes ☐ No	
4.	Plan describes actions personnel must take in response to fires, explosions or other releases of hazardous wastes	☐ Yes ☐ No	
5.	Describes arrangements with emergency response agencies	☐ Yes ☐ No	
6.	Primary emergency coordinator designated	☐ Yes ☐ No	
7.	Lists names, addresses and phone numbers (home and office) of emergency coordinators	☐ Yes ☐ No	
8.	Evacuation plan, if applicable, designates primary and secondary routes and evacuation signal	☐ Yes ☐ No	
G. Used Oil Storage			**Comments**
1.	Containers in good condition	☐ Yes ☐ No	
2.	Containers storing used oil are not leaking	☐ Yes ☐ No	
3.	Containers/aboveground tanks are labeled or marked clearly "Used Oil"	☐ Yes ☐ No	

Figure C-15 (cont.)
Example RCRA Generator Checklist

G. Used Oil Storage (cont.)		Comments
4. Fill pipes used to transfer used oil into underground storage tanks are labeled or marked clearly "Used Oil"	□ Yes □ No	
5. Containers/tanks which are exposed to rainfall are closed	□ Yes □ No	
6. Cleaned up any spills or leaks of used oil	□ Yes □ No	
H. Off-Site Shipments to Approved Collection Centers		**Comments**
1. Used oil is transported by transporters who have obtained EPA Identification numbers	□ Yes □ No	
2. Transports used oil in a vehicle owned by the generator or owned by an employee of the generator	□ Yes □ No	
3. Transports no more than 55 gallons of used oil at any time	□ Yes □ No	

References:

Cited References:

1. *Revised RCRA Inspection Manual*, OSWER Directive 9938.02b, U.S. Environmental Protection Agency, 1993.

2. *Inspection Record and Checklist* (separate forms for both Large and Small Quantity Generators), Missouri Department of Natural Resources, Form Nos. MO 780-1525 and MO 780-1802, September 1997.

Additional Available References:

3. Wagner, T.P., *The Complete Guide to the Hazardous Waste Regulations*, 2d. ed., 1991.

4. Garrett, T.L. (ed.), *The RCRA Practice Manual*, American Bar Association, 1994.

5. Skillern, F.F., *Environmental Protection Deskbook*, Chapter 5, 2d. ed., 1995.

6. *Wood Preserving Resource Conservation and Recovery Act Compliance Guide*, Chapter 3, U.S. Environmental Protection Agency (EPA-305-B-96-001), June 1996.

7. *Process-Based Self-Assessment Tool for the Organic Chemical Industry*, Appendix D, U.S. Environmental Protection Agency (EPA-305-B-97-002), April 1997.

APPENDIX D: EPCRA Regulatory and Assessment Procedures Overview

Overview

The Emergency Planning and Community Right-to-Know Act (EPCRA), also known as the Superfund Amendments Reauthorization Act (SARA) Title III, provides primarily for dissemination of information on hazardous chemicals used by, released from, or otherwise managed as waste by, a facility. There are four main functional areas under EPCRA, as shown in Figure D-1 below. All of the EPCRA requirements will likely apply to kraft pulp mills based on the size, scope and nature of the facilities. The following sections briefly summarize each area, and the final section highlights screening techniques for evaluating EPCRA compliance.

Figure D-1
EPCRA Functional Areas

Functional Area	Requirements
Emergency Planning	! Designate on-site facility emergency coordinator ! Notify State/local emergency planning officials of facility's status and name of on-site coordinator
Emergency Notification	! Identify hazardous substances and reportable quantity threshold for spills/leaks ! Immediately notify if spill, leak or other release exceeds reportable quantities. Notify National Response Center and State/local emergency officials
MSDS and Inventory Information	! Prepare or have available MSDS for all OSHA hazardous chemicals used on site ! Submit copies of MSDS for hazardous chemicals used in excess of specified thresholds ! Send copies to State/local emergency officials, along with Tier 1/Tier 2 inventory updates annually
Toxic Release Reporting	! Report annually quantities of listed toxic chemicals entering each environmental medium, including land disposals of toxic chemicals and off-site transfers of waste containing toxic chemicals ! Use standard form (Form R or Form A) ! No specified calculation method applies, but fugitive releases are included

Emergency Planning

The emergency planning requirements apply if the facility has certain extremely hazardous substances above threshold quantities specified in the regulations (40 CFR Part 355). The facility must notify the State emergency response agency and local emergency planning commission (40 CFR 355.30). The facility must designate an emergency response coordinator and provide the coordinator's name to the applicable emergency response officials.

Emergency Notification

In the event of a spill, leak, or other release of a reportable quantity for a CERCLA hazardous substance or an EPCRA extremely hazardous substance, the facility generally must provide immediate notification to the State and local emergency agencies (40 CFR 355.40). If the release is of a CERCLA hazardous substance, the facility also must notify the National Response Center (NRC) ((800) 424-8802), pursuant to CERCLA and 40 CFR 302.6. EPA logs notifications to the NRC into EPA's Emergency Response Notification System (ERNS) database. The list of CERCLA hazardous substances is published at 40 CFR 302.4. The list of EPCRA extremely hazardous substances is published at 40 CFR 355 Appendix A. Figure D-2 lists several substances that are associated with kraft pulp mill operations that are included in the lists of chemicals subject to EPCRA and/or CERCLA emergency reporting. The figure also indicates the reportable quantity for each chemical. Figure D-2 is a non-exclusive list -- there likely are additional chemicals that could be released from kraft pulp mill operations that could be subject to EPCRA or CERCLA reporting. Also note that, for several of the compounds listed in Figure D-2, it would be unlikely for mills to have releases that exceed the reportable quantity threshold.

NOTE! Federally permitted releases are exempt from emergency reporting requirements. Check the EPCRA Hotline (1-800-424-9346) for possible updates and clarifications on what constitutes a federally permitted release.

Emergency reporting is not required for certain types of exempted releases. Most important, reporting is not required for federally permitted releases as defined under CERCLA. These include releases in compliance with regulations and permits under various environmental statutes, including the Clean Air Act, Clean Water Act, and Resource Conservation and Recovery Act. See CERCLA section 101(10) for the statutory definition.

In addition, for certain types of "continuous releases," special reporting procedures apply. A continuous release is one that occurs without interruption or abatement, and is stable in quantity or rate, or that is routine, anticipated, intermittent, and incidental to normal operations. In these circumstances, special regulatory notice provisions established under CERCLA apply. Those provisions include an initial telephone and written notice, an update notice after one year, and then notices of changes in the source or composition of a release, in the normal range of the release, or any statistically significant increase in the release. In some circumstances, a facility can use the TRI Form R report (with certain additional information) as the basis for reporting these types of releases under CERCLA (but not for EPCRA). See 40 CFR 302.8 and 355.40 for further detail. Also see the EPA report "*Reporting Requirements for Continuous Releases of Hazardous Substances: A Guide for Facilities on Compliance*" (EPA 540-R-97-047).

Figure D-2
Non-Exclusive List of Chemicals Associated with Kraft Mill Operations for CERCLA/EPCRA Emergency Reporting

Hazardous Substance	CERCLA RQ (in lbs)	EPCRA RQ (in lbs)	Hazardous Substance	CERCLA RQ (in lbs)	EPCRA RQ (in lbs)
Sulfur dioxide	-	500	Formaldehyde	100	100
Nitrogen dioxide	10	10	Hexane	5,000	-
1,4-Dichlorobenzene	100	-	Hydrochloric acid	5,000	-
2,4,5-Trichlorophenol	10	-	Hydrogen sulfide	100	100
2-Butanone (MEK)	5,000	-	Mercury	1	-
Acetaldehyde	1,000	-	Methanol	5,000	-
Acetophenone	5,000	-	Methyl chloroform	1,000	-
Acrolein	1	1	Methyl isobutyl ketone	5,000	-
Arsenic*	1	-	Methyl mercaptan	100	100
Benzene	10	-	Methylene chloride	1,000	-
Cadmium*	10	-	Phenol	1,000	1,000
Carbon tetrachloride	10	-	Propionaldehyde	1,000	-
Chlorine	10	10	Styrene	1,000	-
Chloroform	10	10	Toluene	1,000	-
Chromium*	5,000	-	Xylenes	100	-

* Not applicable if the diameter of the solid metal is ≥ 0.004 inches (100 micrometers)

Hazardous Chemical Reporting

For each hazardous chemical used at the facility and subject to the Material Safety Data Sheet (MSDS) requirement under the Occupational and Safety Health Act, the owner or operator must provide the MSDS to the state/local emergency agencies and the local fire department. In addition, the facility must provide annually a current inventory of those hazardous chemicals. At a minimum, this involves a "Tier 1" report that aggregates the hazardous chemicals by hazard category. At an agency's request, the facility also must submit a "Tier 2" report that identifies specific information on specific chemicals. A facility need not submit MSDS, or Tier 1 or 2 information on a chemical if at any one time the facility had less than 500 pounds of the chemical (if an extremely hazardous substance) or 10,000 pounds of the chemical (for all other hazardous chemicals) (40 CFR 370.20-370.28). Many kraft pulp mills likely will be required to submit Tier 2 reports because the mills are significant, large facilities. Based on a limited review of sample Tier 2 reports submitted by four kraft pulp mills, Figure D-3 provides an example, non-exclusive list of the types of materials that could be listed in a Tier 2 report for a kraft mill. The list is by process area; note that for the papermaking process in particular, mills will have a variety of additional chemicals listed in an actual report based on the types of additives and other materials used at the particular mill. Also note that for the papermaking area in particular, it appears from the example reports reviewed that mills may report the trade name of the chemicals used and not the actual chemical substance.

Toxic Release Inventory (TRI) Reporting

Covered facilities that manufacture, process, or otherwise use listed toxic chemicals above threshold quantities must file TRI reports annually, using "Form R" or "Form A" as developed by EPA (40 CFR Part 372). TRI reports estimate all releases and other waste management quantities, through all media (including air, water, and land disposals), of listed toxic chemicals. Covered facilities also must report the quantity of toxic chemicals in waste transferred offsite. Currently, the TRI list includes over 600 chemicals and chemical categories.

The regulations (40 CFR Part 372) do not require that releases be calculated in any particular manner for TRI reporting purposes, nor does EPCRA establish any monitoring or testing requirements to support TRI reporting. Instead, a facility may rely on existing information and estimates to prepare TRI reports. For the kraft pulp sector, recent audits suggest that mills are using estimation models and techniques developed by the National Council of the Paper Industry for Air and Stream Improvement, Inc. (NCASI) to develop release information for TRI reporting.

Figure D-3
Example List of EPCRA Tier 2 Report Chemicals (by Process Area)

Process Area	Substances	
Kraft Pulping	! Anthraquinone ! Antifreeze ! Black/White Liquor ! Gasoline ! Hydrochloric Acid (HCl) ! Hydrogen Sulfide (H_2S) ! Oil-Based Defoamer ! Paraffinic/Napthalenic Solvent	! Propane, Liquid ! Sodium Hypochlorite ! Sodium Hydrosulfide ! Sodium Hydroxide (NaOH) ! Sulfuric Acid (H_2SO_4) ! Tall Oil ! Tall Oil Sodium Salt ! Turpentine
Chemical Recovery/ Causticizing	! C1102 ! Caustic Soda ! Green/White Liquor ! Fuel Oil (Nos. 2, 4, or 6) ! Hydrogen Sulfide (H_2S) ! Kerosene ! Lime (CaO), Quicklime ! Lime Mud ($CaCO_3$), Lime Slurry	! Muriatic Acid ! Propane, Liquid ! Recycled Oil ! Salt Cake (Na_2SO_4) ! Sodium Hydrosulfide ! Sodium Hydroxide (NaOH) ! Sulfuric Acid (H_2SO_4) ! Sulfur, Liquid
Bleach Plant	! Chlorine Dioxide ! Methanol (CH_3OH) ! Paraffinic/Napthalenic Solvent ! Sodium Chlorate	! Sodium Chloride (NaCl) ! Sodium Hydroxide (NaOH) ! Sulfuric Acid (H_2SO_4)
Wastewater Treatment Plant	! Ammonia, Aqueous ! Antifreeze ! Chlorine (Cl_2) ! Ferric Sulfate ! Lime Slurry	! Paraffinic/Napthalenic Solvent ! Phosphoric Acid ! Sodium hydroxide (NaOH) ! Sulfuric Acid (H_2SO_4)
Power Plant	! Coal ! Chlorine (Cl_2) ! Fuel Oil (Nos. 2, 4, or 6) ! Flyash (coal) ! Hydrogen (H_2) ! Hydrogen Sulfide (H_2S)	! Lubricating Oil ! Morpholine ! Oxygen (O_2) ! Paraffinic/Napthalenic Solvent ! Propane, Liquid (C_4H_{10}) ! Sulfuric Acid (H_2SO_4)
Woodyard and Miscellaneous Processes	! Antifreeze ! Diesel Fuel ! Gasoline ! Grease ! Hydrogen Sulfide (H_2S) ! Kerosene	! LP Gas ! Lubricating Oil ! Methyl Acetylene Propadiene ! Propane (liquid) ! Salt Cake (Na_2SO_4) ! Varsol
Papermaking	! Alum ! Chlorine (Cl_2) ! Custom Sperse (various) ! Diesel Fuel ! Dye (various) ! Foamaster (various) ! Muriatic Acid	! Nalbrite (various) ! Nalco (various) ! Nopcote (various) ! Rosin Size (various) ! Sodium Hypochlorite ! Starch ! Sulfuric Acid (H_2SO_4)

Key Assessment Strategies

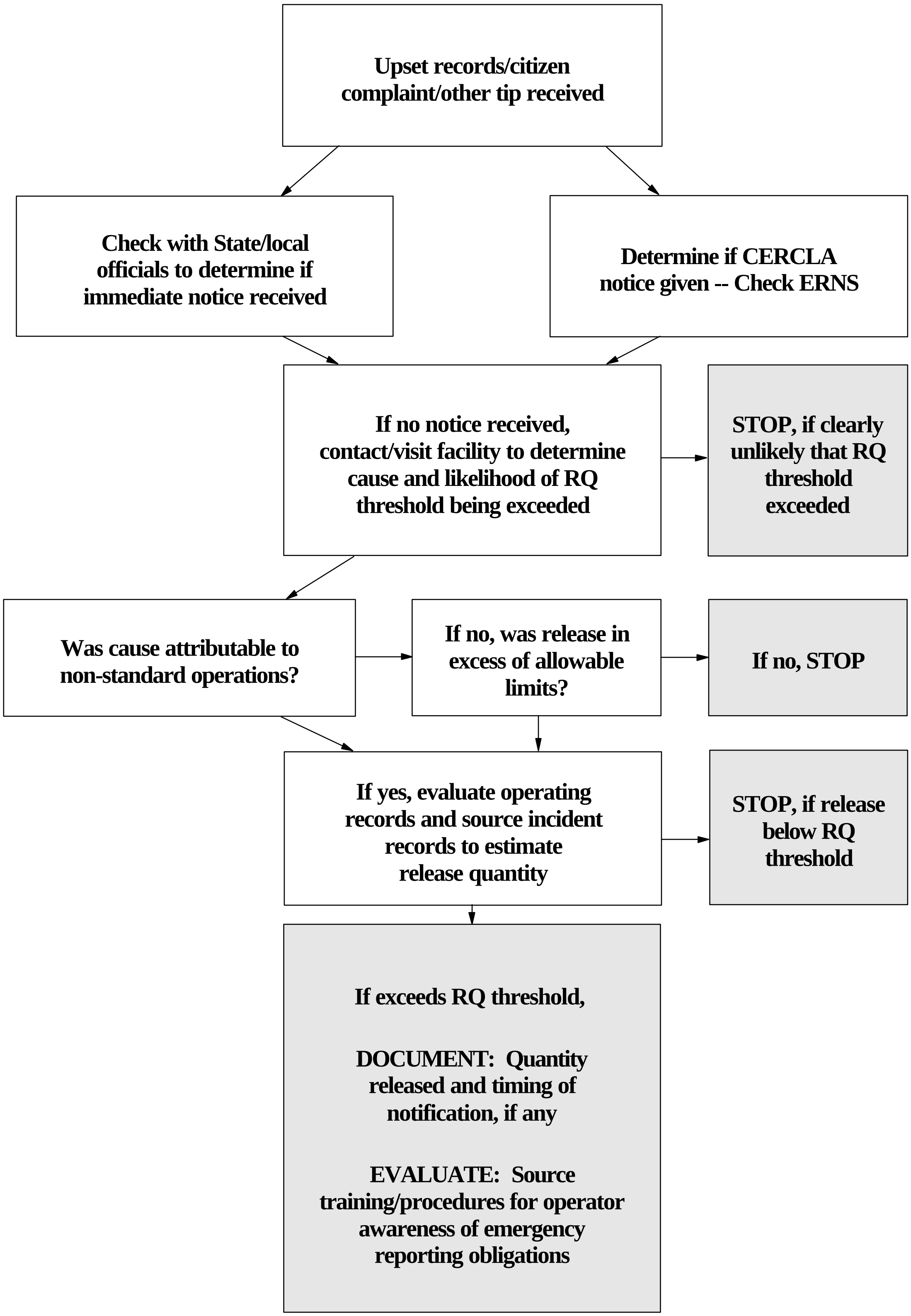
Other than for emergency notification requirements, an EPCRA compliance assessment generally involves a records review. For the facility, an assessment should begin with establishing a complete inventory of all hazardous chemicals used on site and verifying that the appropriate MSDS sheets, as well as current inventory estimates, are available. Next, the assessment should ensure that basic notifications to State and local emergency response agencies are current. Finally, the TRI "Form R" report should be checked. If NCASI or similar estimation techniques are used, the assessment should consider whether any extended process or control device upsets have occurred. If so, the facility should evaluate whether the estimates, although they may be appropriate to use generally, need to be adjusted to address the additional releases resulting from the upset conditions.

An agency inspector can screen for compliance with these same EPCRA requirements by confirming the information with the facility contact during the opening conference or just in advance of the closing conference. For an announced inspection, the inspector should ask the source to have EPCRA-related documentation ready so that this screening check can be performed without interrupting the main focus of the inspection. A screening checklist is included in Appendix E.

A mill or an agency inspector also must verify compliance with emergency notification requirements. As an initial step, mill personnel should review internal training programs and operating procedures to determine whether these elements are adequate to ensure operator awareness and understanding of these requirements. Next, mill personnel should review all plant upset and malfunction records, as well as accidental releases associated with raw material handling, and then cross-check to see if an emergency notification was made. If not, the mill should evaluate the severity of each incident to confirm that the notification requirements were not triggered. In addition, mill personnel should review whether routine releases are federally permitted and in compliance with those permits. An agency air, water or waste inspector can screen for compliance with these requirements by requesting that the source provide the relevant documentation for review (see Appendix E for basic screening checklist questions).

For an agency EPCRA inspector, a more detailed approach, similar to the appropriate approach for mill personnel, can be used to identify potential compliance concerns with emergency notification requirements. The inspector can check general mill upset reports and citizen complaints since the previous inspection, and then cross-check those incidents with notification records identified in EPA's ERNS database, records on file with State/local emergency officials, or records requested from the mill. For episodes of releases in which no notification is provided, further investigation to determine if reportable quantity thresholds were exceeded may be warranted. Figure D-4 provides an overview of the steps and considerations involved in this type of assessment.

Figure D-4
Assessment Considerations for EPCRA/CERCLA Emergency Notifications



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APPENDIX E: Example Assessment Forms

Overview

This Appendix provides a series of example assessment forms for the process areas described in Sections 4 through 9 of this manual. The forms are designed primarily for the agency inspector, as opposed to self-audit assessments. The forms generally cover the same issues discussed in the "inspection considerations" portions of each of the relevant sections. In addition, set out on the next two pages are screening checklists for EPCRA and RCRA that are not process-specific. These screening checklists may be useful for the air or water inspector if asked to screen for compliance with these other media statutes.

The forms are designed generally to evaluate whether a kraft pulp mill is in compliance, although particular items for follow-up investigation are noted where applicable. The forms are not geared toward evaluating applicability or other decisions made during the permitting process. The forms do not include the basic forms already available as part of the underlying media inspection guidance, if applicable (such as the forms available in the *NPDES Compliance Inspection Manual*).

Finally, EPA notes that the forms are intended only as generalized examples. These forms are not intended to replace mill-specific forms that may have been developed by individual inspectors or offices nor to replace other general forms that a particular agency or inspector may use. The forms also do not replace compliance checklists that may be designed for a particular regulation. Instead, the forms provide a synopsis of much of the detail found in Sections 4 through 9 of the manual, and can be used by inspectors to update or refine existing inspection forms that they may use.

Example RCRA Screening Form

(The following provides an example screening form for RCRA issues that are not process-specific; additional process-specific RCRA issues are addressed in the process-based forms where applicable)

RCRA Generator Screening Questions	
Does the facility have an EPA ID No. for Hazardous Waste Generation? If yes, provide ID #	☐ Yes ☐ No ID #:____________________
How are waste determinations made?	Sampling Knowledge Both
What Generator status is claimed?	LQG SQG CESQG
Are records available to document amount of generation by month?	☐ Yes ☐ No
Are manifests available in organized file?	☐ Yes ☐ No
What are the primary wastes generated and what process(es) generate the waste? (Provide Waste Type, Process and EPA ID #)	Type (ID): Type (ID): Type (ID): Type (ID): Type (ID): Type (ID): (*add more rows as necessary*)
Were any of the units that contain or handle wastes in (circle all that apply):	(a) poor condition (d) leaking (b) unmarked (e) cracked (c) opened (f) corroded
Describe any units identified in the preceding question.	
Is there any evidence of current or past releases? If so, please describe.	☐ Yes ☐ No
Notes:	

Example EPCRA Screening Form

(The following provides an example screening form for EPCRA issues that are not process-specific; additional process-specific EPCRA issues are addressed in the process-based forms where applicable)

General EPCRA Screening Questions	
Have all hazardous chemicals been inventoried?	☐ Yes ☐ No
Are Tier 1/Tier 2 inventories current?	☐ Yes ☐ No
Are appropriate MSDS data sheets available?	☐ Yes ☐ No
Has the facility designated an emergency response coordinator?	☐ Yes ☐ No
Has the facility given necessary notifications to State and local emergency response agencies?	☐ Yes ☐ No
Are TRI Form R reports complete and current, including a Form R for all TRI chemicals manufactured, processed or otherwise used over the applicable threshold?	☐ Yes ☐ No
If applicable, do the Form R reports consider significant upsets/malfunctions increasing releases beyond estimates from use of standard models/guidelines?	☐ Yes ☐ No
Does the facility have an established training program and written operating procedures to ensure EPCRA compliance? *[Note: not a regulatory requirement; for screening purposes only]*	☐ Yes ☐ No
Have any releases that are not federally permitted occurred at the facility during the period of review?	☐ Yes ☐ No
If releases have occurred, does the source have documentation that the releases were reported to State and local emergency agencies and to the National Response Center (or that no notice was required) ?	☐ Yes ☐ No

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Pulping Process Area: Example Assessment Form

I. Air Emissions -- Basic Unit Data (include row for each separate equipment system for following categories of emissions units, as applicable)

Unit ID	LVHC or HVLC	Applicable Regs.	Primary Controls	Backup Controls
Digester(s)				
MEE(s)				
Washer(s)				
Knotter(s)				
Screen(s)				
Decker(s)				
Oxygen Delignification				
Condensates				
Other controlled points				

II. Air Inspection

A. General: (1) Units properly identified in permit? Yes No N/A

(2) Operating rates w/i Permit Limits/Normal Op.? Yes No N/A

(3) Identify any inoperative units: ___________________________________

(4) Other general notes/concerns: ___________________________________

B. Uncontrolled Venting:

(1) Evaluate records (either through records required by Cluster Rules or through mill's DCS, if available) to determine extent of uncontrolled venting over last reporting period.
Is uncontrolled venting:

- ! Within permit allowable rates? Yes No
- ! $\leq$ 1% of operating time? Yes No

(2) If uncontrolled venting exceeds 1% of operating time, consider follow up investigation to determine cause(s) of problem and any corrective actions taken by source. Findings include: ____

____

C. Enclosure/Closed-vent System:

(1) Monitoring/inspection plan available? Yes No
(2) Logs properly filled out? Yes No
(3) Identify any problems: ____

____

(4) Identify results of any portable leak checks/other inspections for these requirements conducted while on-site: ____

____

D. Incinerator Evaluation (if applicable):

(1) Monitored Parameters (as applicable):

Parameters	Actual Values	Allowable/Baseline Values
! Temperature:	________	________
! TRS CEMS:	________	________
! HAP CMS:	________	________

-- Are all monitors in proper working order, with documentation of all required QA/QC? Yes No
-- Identify problems: ____

(2) Identify any follow-up checks conducted: ____

____

E. Condensates Evaluation:

(1) If recycling compliance option used, identify any problems noted through records review and/or visual observations: ________________________

(2) If condensates segregation option is used, do monitoring records demonstrate that segregation requirements are met? Yes No

(3) Closed Collection/Closed-vent Systems:

! Monitoring/inspection plan available? Yes No
! Logs properly filled out? Yes No
! Identify any problems: ____

- ! Identify results of any portable leak checks/other inspections for these requirements conducted while on-site: ____

(4) Steam Stripper (if applicable):

- ! SFR: ____________ (actual) ___________ (allowable/baseline)
- ! Methanol CMS: ____________ (actual) ___________ (allowable/baseline)

- ! Are all monitors in proper working order, with documentation of all required QA/QC? Yes No

  -- Identify problems: ____

- ! Identify any follow-up checks conducted: ___________________________________
  ____

(5) WWTP Biological Treatment System (if applicable):

- ! Have all required percent reduction efficiency tests been performed? Yes No
- ! Have all required tests demonstrated compliance?: Yes No
- ! Results of most recent test: ______________
- ! Since last inspection, have any tests been triggered by parameter value excursions? Yes No
- ! If so:

  -- Was test passed? Yes No
  -- Did mill take all appropriate corrective actions within required timeframe? Yes No

- ! Are all monitors in proper working order, with documentation of all required QA/QC? Yes No

  -- Identify problems: ____

- ! Are discharge points below liquid surface? Yes No
- ! Identify any follow-up checks conducted or problems noted: ____
  ____

(6) **Note:** If biological treatment system other than WWTP system is used, evaluation will be based on site-specific parameters; identify the parameters and complete the following (add lines as necessary for each parameter):

- Parameter #1: _____________ (actual) ___________ (allowable/baseline)
- Parameter #2: _____________ (actual) ___________ (allowable/baseline)

- Are all monitors in proper working order, with documentation of all required QA/QC? Yes No

  -- Identify problems: ____

- Identify any follow-up checks conducted: ___________________________________

III. Water Inspection -- See BMP checklist on following pages

IV. RCRA

(1) Are surface impoundments used to manage spent black liquor? Yes No

- If yes, what liner material is used, if any? _____________________________

(2) Are there indications of spills/leaks that affect the ground (such as discoloration, puddling, dead vegetation, or liquid channeling? Yes No

- If yes to either question, consider forwarding to RCRA inspector for follow-up regarding leaks, and for a determination of whether liquor from impoundments is sent to wastewater treatment instead of being reused in process (which could affect treatment of material as a RCRA solid waste)

(3) Are hazardous wastes generated in this area and/or are satellite accumulation sites located in this area? Yes No Not Checked

- If yes, consider completing RCRA screening checklist at beginning of this Appendix

SPENT PULPING LIQUOR, TURPENTINE & SOAP BMP PLAN CHECKLIST
Evaluation of the BMP Plan

- ☐ Engineering review of pulping and chemical recovery systems included in Plan:
  - ☐ Process equipment
  - ☐ Storage tanks
  - ☐ Pipelines and pumping systems
  - ☐ Loading and unloading facilities
  - ☐ Other equipment in spent pulping liquor, soap, and turpentine service (note below)
- ☐ Selection of monitoring parameter:
  - ☐ Appropriate parameter selected
  - ☐ Appropriate sampling location
- ☐ Required BMP Elements included in Plan:
  - ☐ Return of diverted or spilled liquor to the process to the maximum extent practicable as determined by the mill
  - ☐ Establishment of preventive maintenance programs for equipment in spent pulping liquor service
  - ☐ Continuous, automated monitoring systems (i.e., alarms, conductivity monitors, or pH meters) on storage tanks, in process areas, in process sewers, in process wastewater, and in wastewater treatment plant to detect leaks, spills, and intentional diversions
  - ☐ Annual training for personnel involved with operating, maintaining, or supervising operation of equipment in spent pulping liquor, turpentine, or soap service
  - ☐ Preparation of reports evaluating spill events not contained in the immediate process area
  - ☐ Establishment of a program to review any planned facility modifications and construction activities in the pulping and chemical recovery facilities
  - ☐ Installation of secondary containment for spent pulping liquor bulk storage tanks or an annual tank integrity testing program coupled with diversion structures
  - ☐ Installation of secondary containment for turpentine bulk storage tanks
  - ☐ Installation of curbing or diking systems for turpentine and soap processing areas
  - ☐ Wastewater treatment influent monitoring to track BMP performance and effectiveness and to detect trends in spent liquor losses (EPA has recommended that mills monitor for COD, but other parameters may be used)
- ☐ Plan updated as elements of program are implemented
- ☐ Action levels updated
  - ☐ Lower action level
  - ☐ Upper action level

Notes/Concerns:

SPENT PULPING LIQUOR, TURPENTINE & SOAP BMP PLAN CHECKLIST (cont.)	
BMP Plan Implementation	
A. Training	
Yes No N/A	1. Has the facility held annual training for personnel involved with operating, maintaining, or supervising operation of equipment in spent pulping liquor, turpentine, or soap service?
Yes No N/A	2. Is the facility achieving the training goals outlined in the BMP Plan?
Yes No N/A	3. Are records of training activities maintained for three years?
B. Repair	
Yes No N/A	1. Has the facility recorded repairs of equipment in spent pulping liquor, soap and turpentine service?
Yes No N/A	2. Has the facility implemented the control measures outlined in the BMP Plan?
Yes No N/A	3. Has the facility implemented changes to equipment to prevent reoccurrence of unintentional spent pulping liquor spills?
Yes No N/A	4. Are records of repairs maintained for three years?
C. Spills	
Yes No N/A	1. Has the facility prepared reports on each spill or intentional diversion not contained in the immediate process area?
	2. Do the reports include:
Yes No N/A	equipment involved,
Yes No N/A	circumstances leading to the incident,
Yes No N/A	effectiveness of the corrective actions taken to contain or recover the spill or intentional diversion,
Yes No N/A	plans to develop changes to equipment and operating and maintenance practices as necessary to prevent reoccurrence?
Yes No N/A	3. Has the inspector reviewed the status of planned changes with facility staff?

SPENT PULPING LIQUOR, TURPENTINE & SOAP BMP PLAN CHECKLIST (cont.)	
BMP Plan Implementation (cont.)	
D. Monitoring Systems	
Yes No N/A	1. Have storage tank alarms been installed?
Yes No N/A	2. Is the location of storage tank alarm signals (audio or visual) appropriate?
Yes No N/A	3. Do the storage tank alarm signals provide sufficient notice to allow operator response?
Yes No N/A	4. Have conductivity monitors and/or pH meters been installed in the process areas, process sewers and wastewater treatment plants?
Yes No N/A	5. Are the conductivity monitors and/or pH meters in appropriate locations?
Yes No N/A	6. Do the conductivity monitors and/or pH meters provide sufficient signal for operator response?
E. Containment Structures and Tank Integrity Testing	
Yes No N/A	1. Have curbing or diking systems for turpentine and soap processing areas been installed according to the BMP Plan?
Yes No N/A	2. Have secondary containment structures for turpentine bulk storage tanks been installed according to the BMP Plan?
Yes No N/A	3. Has the facility opted to install secondary containment structures for spent pulping liquor bulk storage tanks?
Yes No N/A	4. Have secondary containment structures for spent pulping liquor bulk storage tanks been installed according to the BMP Plan?
Yes No N/A	5. Has the facility opted to implement tank integrity testing for spent pulping liquor bulk storage tanks?
Yes No N/A	6. Is the facility using diversion structures?
Yes No N/A	7. Has the inspector reviewed the procedures used to perform tank integrity tests?
Yes No N/A	8. Are tank integrity tests conducted annually?
Yes No N/A	9. Has the inspector reviewed the results of tank integrity testing?
Yes No N/A	10. Does the permit specify minimum requirements for tank integrity testing programs?
Yes No N/A	11. Do the records of the tank integrity testing program show that the facility meets applicable permit requirements for such programs?
F. Pulping and Chemical Recovery Equipment	
Yes No N/A	1. Do records show that construction and modification activities are evaluated to consider prevention of spills and leaks during changes to pulping and chemical recovery areas?

SPENT PULPING LIQUOR, TURPENTINE & SOAP BMP PLAN CHECKLIST (cont.)	
BMP Plan Implementation (cont.)	
G. Influent Monitoring	
Yes No N/A	1. Has inspector reviewed periodic monitoring reports?
Yes No N/A	2. Do the periodic monitoring reports reveal trends which should be addressed? (Note below)
Yes No N/A	3. Has the inspector discussed trends in the monitoring data with facility staff?
Yes No N/A	4. Were lower action levels exceeded?
Yes No N/A	5. Were investigations of such exceedances conducted according to the BMP Plan?
Yes No N/A	6. Were upper action levels exceeded?
Yes No N/A	7. Were corrective actions implemented according to the BMP Plan?
Yes No N/A	8. Has the inspector discussed exceedances with facility staff?
Yes No N/A	9. Has the inspector discussed pollution prevention measures that may be implemented in response to exceedances?
Yes No N/A	10. Has the facility selected an appropriate monitoring parameter?
Yes No N/A	11. Do the sampling procedures meet applicable permit requirements?
Yes No N/A	12. Are the sampling points in appropriate locations?
Yes No N/A	13. Has the inspector collected a sample to verify the accuracy of the sampling program?
H. Notes/Concerns	

V. EPCRA

Note: Includes only process-specific EPCRA screening for emergency reporting; see general screening checklist at beginning of Appendix E.

(1) Does the facility have TRS limits for all affected emission points -- LVHC and HVLC? Yes No

(2) If yes, were there excess emission periods that were not in compliance with permit? Yes No

- ! If yes, consider forwarding to EPCRA inspector for further evaluation to determine if RQ threshold of 100 lb/24-hour period was exceeded for H_2S or methyl mercaptan

(3) If no, continuing release reporting may apply for unregulated points. Has source filed required report or documented that reporting does not apply? Yes No

(4) Prior to compliance dates for Cluster Rules, are all emission points subject to HAP emission limits? Yes No

(5) If no, continuing release reporting may apply for unregulated points. Has source filed required report or documented that reporting does not apply? Yes No

(6) Were there HAP excess emissions not in compliance with permit during reviewed time period? Yes No

- ! If yes, consider forwarding to EPCRA inspector for further evaluation of whether emissions exceeded RQ thresholds for various chemicals in HAP emissions

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Chemical Recovery Operations: Example Assessment Form

I. Air Inspection

A. General: (1) Units properly identified in permit? Yes No N/A

(2) Production Rate: ____________

(3) w/i Permit Limits/Normal Op.? Yes No N/A

(4) Identify any inoperative units: __________________________________

(5) Other general notes/concerns: __________________________________

Emissions Units	TRS Limits	MACT Limits	PM Limits	Other Limits	Control(s)
[add rows as appropriate]					

B. Recovery Boiler Operations

- Point ID: __________
- Used for NCG control?: Yes No Backup
- Type: DCE NDCE
- Subject to NSPS? Yes No
- Process Data: Black Liquor Feed Rate: __________ Steaming Rate: __________

(1) Any periods of ESP compartment downtime since last inspection? Yes No

- If so, was process adjusted to accommodate reduced ESP capacity? Yes No (attach documentation if requested)

(2) CEMS Data: TRS: _______ (Actual) ________ (Allowable)
O_2: _________ (Actual) ________ (Allowable)

- Are all monitors in proper working order, with documentation of all required QA/QC? Yes No

-- Identify problems: ______________________________

! Indicate if DCS used to obtain trend/recent data (attach any print-outs): _________

(3) VEO Results:

! Opacity levels (attach VEO form): Compliance? Yes No
! Increase (>5%) in baseline opacity?: Yes No

-- If Yes, conduct follow-up

! Excessive spikes/puffing?: Yes No

-- If Yes, check rapper operation

(4) Basic ESP Data (repeat chart for each ESP chamber):

T-R Set #	**Primary Volts**		**Primary Amps**		**Secondary KVolts**		**Secondary Milliamps**		**Sparks/Minute**	
	Actual	**Base**	**Actual**	**Base**	**Actual**	**Base**	**Actual**	**Base**	**Actual**	**Base**
1										
2										
3										
4										
5										
6										

(5) Follow-up ESP Data (if necessary):

! Apparent Rapper Operation: ____
! Component Failure Records Checks: _____________________________________
! Inlet/Outlet temperature drop: ___________ (Actual) ___________ (Baseline)
! Audible Indications of Air Infiltration: Yes No
! Proper hopper discharge operations: Yes No

-- Identify problems: ____

C. Smelt Dissolving Tank: Point ID: ____ Subject to NSPS? Yes No

(1) Scrubber Data

! Fan Vibration: Can you hear sounds of excessive vibration? Yes No
If so, stop inspection and inform site personnel of safety concern.

Parameters	Actual Values	Baseline Values
! Pressure Drop:	________ in. H_2O	________ in. H_2O
! Scrubber Liquid Supply Pressure:	________	________
! Pump Discharge Pressure:	________	________
! Pump Motor Current:	________	________

! Can you hear signs of pump cavitation? Yes No
! Adequate nozzle maintenance procedures/activities, if applicable? Yes No
! Physical indications of poor scrubber operation
(circle as applicable)?

-- Shell/Ductwork Corrosion -- Mud lip at stack discharge
-- Other (Identify): ______________________________

(2) If suspect TRS problem, indicate sulfur content of inlet water/scrubbing liquid: ______
(3) Other checks (Identify): ______________________________

D. Lime Kiln Operations: ! Point ID:________ ! NSPS? Yes No

(1) Process Data:

! Kiln Production Rate: ________________ ! Lime Mud Feed Rate: ___
! Fuel Firing Rate: ____________________ ! Kiln Exit Temp: ________
! Kiln Rotation Rate: __________________

(2) Used for NCG controls: HVLC LVHC Neither Backup Only

(3) VEO Check:

! Levels in compliance (attach form)? Yes No
! Presence of Rainout? Yes No
! If condensing plume does not permit RM 9,
indicate general visible conditions: High Average Low

(4) CEMS Data:

- Opacity: ___________ (Actual) ________________ (Allowable)
- TRS: ______________ (Actual) ________________ (Allowable)
- O_2: ________________ (Actual) ________________ (Allowable)

- Monitoring QA: OK Problems (Identify): ___________________________
  ____
- Indicate if DCS used to obtain trend/recent data (attach any print-outs): _________

(5) Kiln Operating Data:

- Any kiln downtime since last inspection? Yes No
- If so, is there documentation of TRS backup controls being used during those periods (if applicable): Yes No
- Were there periods of plant production increases since last inspection? Yes No
- If so, consider checking opacity CEMS data and pressure drop data (for scrubber-controlled kilns) to determine if controls properly operated during such periods.

(6) Scrubber Data (Note, if ESP used, see above under recovery boiler):

- Can you hear sounds of excessive fan vibration? Yes No

  -- If so, stop inspection and inform site personnel of safety concern.

Parameters	Actual Values	Baseline Values
! Pressure Drop:	_________ in. H_2O	_________ in. H_2O
! Scrubber Liquid Supply Pressure:	_________	_________
! Pump Discharge Pressure:	_________	_________
! Pump Motor Current:	_________	_________

- Can you hear signs of pump cavitation? Yes No
- Adequate nozzle maintenance procedures/activities, if applicable? Yes No
- Physical indications of poor scrubber operation (circle as applicable)?

  -- Shell/Ductwork Corrosion -- Mud lip at stack discharge
  -- Other (Identify): ____

(7) Identify any concerns for the lime kiln: ____
____

E. Lime Mud Washers: Mud Feed Rate: __________ Sodium Content: ______

(1) Any checks on capture/control? Yes No

- Hood Static Pressure: ___________________________
- Pressure Drop: ______________________________
- Liquid Flow Rate: ___________________________

(2) Results of VE checks: ____________________ (attach VEO form, if applicable)

F. Other Process Equipment (Slakers and Storage/Handling Equipment)

(1) Controls operating? Yes No
(2) Any VE concerns? Yes No
(3) Identify any other concerns/checks conducted: ________________________________

____

G. Asbestos D&R

(1) Indications of recent activities likely to disturb asbestos? Yes No
(2) If yes, does the source have appropriate D&R notice/records, or documentation to support requirements applicable? Yes No

II. Other Inspection Items

A. Water

(1) Any lime mud slurries sewered during upsets/maintenance periods? Yes No

- If yes, air inspector should forward to NPDES inspector for follow-up

(2) Are there outdoor storage and handling areas? Yes No

- If so, are they addressed in the mill's SWPP Plan? Yes No

[**Note:** Use Pulping Process Area Example Assessment Form for assessments of black liquor, soap, and turpentine management involving applicable units that may be located in chemical recovery area.]

B. RCRA

(1) Does mill have documentation that pH of liquid green liquor dregs, slaker grits and lime mud sent to landfill is <12.5? Yes No
(2) Are dregs, grits and lime mud dewatered before disposal? Yes No
(3) Does the facility have paint filter test results to document that these are dewatered, not aqueous, wastes? Yes No
(4) Are green liquor dregs, slaker grits and/or lime mud stored in a surface impoundment? Yes No

! If yes, identify the liner material (if any):________________

(5) Does the mill collect, treat or manage elsewhere in the mill any stormwater or groundwater from the unit in which the dregs, grits or lime mud is stored (if so, identify location)? Yes No

! Location (if any):______________________

(6) Are hazardous wastes generated in this area and/or are satellite accumulation sites located in this area? Yes No Not Checked

! If yes, consider completing RCRA screening checklist at beginning of this Appendix

C. EPCRA

Note: Includes only process-specific EPCRA screening for emergency reporting; see general screening checklist at beginning of Appendix E.

(1) Does the facility have SO_2 and NO_x limits for both the recovery boiler and lime kiln? Yes No

(2) If yes, were there excess emission periods that were not in compliance with permit? Yes No

! If yes, consider further evaluation to determine if RQ threshold(s) exceeded

(3) If no, continuing release reporting may apply. Has source either filed required report or documented that reporting does not apply? Yes No

(4) Were there TRS excess emissions not in compliance with permit during reviewed time period? Yes No

! If yes, consider further evaluation of whether TRS compounds exceed RQ of 100 lb/24-hours (for H_2S or methyl mercaptan)

Bleach Plant Operations: Example Assessment Form

I. Basic Unit Data

Bleach Line ID	Bleaching Sequence

C = Chlorine D = Chlorine Dioxide E = Sodium Hydroxide (extraction)
H = Hypochlorite P = Peroxide Z = Ozone

II. Air Inspection

A. General

(1) Units properly identified in permit? Yes No

(2) Production Rate: _____________

(3) w/i Permit Limits/Normal Op.? Yes No

(4) Identify any inoperative units: ____

(5) Other general notes/concerns: ____

B. Bleaching System Control Systems

(1) Bleaching System ID: _______________

Scrubber Parameters: Actual Allowable

! pH (or Oxidation Reduction Potential):
! Gas Inlet Flow Rate:
! Scrubber Liquid Flow Rate:
! Chlorine Outlet CEMS:

(2) Monitoring QA acceptable? Yes No

! Identify Problems: ____
____

(3) Enclosures/Closed Vent System

- ! Monitoring/inspection plan available? Yes No
- ! Logs properly filled out? Yes No
- ! Identify any problems: ______________________________
- ! Identify results of any portable leak checks/other inspections for these requirements conducted while on-site: ______________________________

II. Water Inspection

A. DMR Follow-up

(1) Did the DMRs reviewed prior to the inspection indicate violations or increasing pollutant levels for bleach plant wastewater? Yes No
(2) If yes, review causes with mill operators and identify potential causes/corrective actions taken: ______________________________

B. Compliance Sampling Procedures

(1) Indications of increased flow rate during sampling period? Yes No
(2) For mills that still use chlorine and/or hypochlorite, were samples taken during periods when these materials were in use: Yes No
(3) Are kappa factors within normal ranges? Yes No
(4) Are temperature and pH readings across bleaching stages within normal ranges? Yes No

C. Permit Accuracy

(1) Were permit mass-based limits (AOX and chloroform) based on production levels consistent with normal operation levels? Yes No

- ! If no, refer issue to NPDES permit writer

D. Facility Inspection

(1) Do bleaching towers/extraction stages show signs of corrosion? Yes No
(2) Any leaking from bleach plant washers or saveals? Yes No
(3) Is there excessive entrained air in sewer lines? Yes No
(4) Is there adequate documentation of sampling procedures? Yes No
(5) Are monitoring locations proper? Yes No
(6) Is the bleach plant layout consistent with schematic used to locate monitors and develop permit limits? Yes No

E. Flow Monitoring

(1) Monitoring locations appropriate? Yes No
(2) Monitors functioning properly? Yes No
(3) Monitor calibration frequency:_________ Date of last test:________

! **Note:** Also complete relevant portions of standard *NPDES Compliance Inspection Manual* checklist.

F. Sampling Evaluation

(1) Appropriate collection methods used? Yes No
(2) Sampling handling procedures meet 40 CFR 136 requirements? Yes No
(3) Laboratory/QA: Part of overall WWTP assessment -- see Section 7

IV. RCRA

(1) Has the facility analyzed chloroform levels discharged to the WWTP, POTW, or other wastewater impoundment? Yes No

! If yes, indicate results:___________________

(2) Are hazardous wastes generated in this area and/or are satellite accumulation sites located in this area? Yes No Not Checked

! If yes, consider completing RCRA screening checklist at beginning of this Appendix

V. EPCRA

(1) Does the facility have chorine and chloroform emission limits (such as Part 63 MACT standards) for all emission points for these pollutants at the bleach plant? Yes No

(2) If yes, were there periods of excess emissions that were not in compliance with permit? Yes No

! If yes, consider further evaluation to determine if RQ threshold (10 lb/24-hour period for both substances) was exceeded.
! If no, continuing release reporting under EPCRA/EPCRA may apply. Has source either filed required report or documented that reporting does not apply? Yes No

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Wastewater Treatment Plant Operations: Example Assessment Form

I. Water Inspection

(1) Complete and fill out NPDES Water Compliance Inspection Report (Form 3560-3)
(2) Consider elements in the appropriate checklists in the *NPDES Compliance Inspection Manual* in developing findings for report, as applicable to scope of inspection
(3) Consider the following additional issues:

NPDES COMPLIANCE AND ASSESSMENT CHECKLIST	
A. PERMIT VERIFICATION	
Yes No N/A	1. Permit includes appropriate limits for non-continuous discharger (if applicable).
Yes No N/A	2. Does facility co-treat municipal wastewater? If yes, verify that appropriate additional monitoring records and reports are complete and document compliance (e.g. for total/fecal coliform).
Yes No N/A	3. Do foam restrictions apply? If yes, review applicable records to verify compliance.
B. RECORDKEEPING AND REPORTING EVALUATION	
Yes No N/A	1. BMP monitoring records for black liquor, soap and turpentine management (such as COD/TOC sampling or conductivity/color continuous monitoring) are adequate.
Yes No N/A	2. If monitor records indicate BMP action levels exceeded, do records document appropriate corrective action taken?
Yes No N/A	3. Do WWTP operator records indicate liquor, soap, turpentine spills that are nor recorded under BMP records?
Yes No N/A	4. Did mill prepare report of all liquor, soap or turpentine spills/intentional diversions not contained in immediate process area?
C. OPERATION AND MAINTENANCE EVALUATION	
Yes No N/A	1. Facility has procedures for notifying WWTP personnel of highly contaminated wastewater from pulping/chemical recovery area.
Yes No N/A	2. Are all monitors required by the liquor, soap and turpentine BMPs in proper operating condition? Also, indicate monitor calibration frequency/unusual results (if any):
D. SAMPLING EVALUATION	
Yes No N/A	1. Mill followed method-specified sampling procedures (see permit and Figures 7-7 and 7-8 in Section 7 of this manual).

(4) Stormwater Issues:

- Does SWPP Plan document how WWTP runon/runoff is addressed? Yes No
- Do quarterly visual inspection records indicate any concerns? Yes No
- If yes, do records document appropriate corrective action? Yes No
- Note any concerns or issues with implementation of SWPP Plan BMPs:

II. Air

(1) If biological treatment system at WWTP used to treat condensates, use procedures in Pulping Process Example Assessment Form for evaluating compliance with Cluster Rules requirements.

(2) Water inspector: Is discharge of hardpiping of pulping condensates occurring below liquid surface in WWTP? Yes No

- If no, forward to air inspector for follow up

III. RCRA

(1) Is chloroform discharged from the WWTP? Yes No
(2) If yes, what is the pH of the chloroform discharge?__________
(3) Are hazardous wastes generated in this area and/or are satellite accumulation sites located in this area? Yes No Not Checked

- If yes, consider completing RCRA screening checklist at beginning of this Appendix

IV. EPCRA

(1) Check air emission estimates in the mill's Form R report for wastewater treatment emission points. For chemicals subject to EPCRA/CERCLA emergency reporting, do the emission estimates for normal operations appear to exceed applicable RQ thresholds for the chemicals released to the air (such as 10 lb/24-hour period for chlorine and chloroform)? Yes No

- ! If yes, continuing release reporting under EPCRA/CERCLA may apply unless the mill has emission limits for these compounds from these emission points. Has source either filed required report or documented that reporting does not apply? Yes No

(2) Were there treatment plant upsets during the period reviewed or other indications that discharges exceeded permit limits? Yes No

- ! If yes, does the plant have records of emergency reports under EPCRA or CERCLA for periods in which the upsets/permit exceedances occurred? Yes No

- ! If no, forward to EPCRA inspector for follow up

(3) Do BMP spill record reports indicate potential releases of EPCRA/CERCLA hazardous substances? Yes No

- ! If yes, consider forwarding to EPCRA inspector for follow up on emergency reporting compliance

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Power Boiler Operations: Example Assessment Form

I. Boiler Data

Unit ID	MMBTU/HR	Fuel(s)	Applicable Regs.	Control(s)

II. Air Inspection

A. General: (1) Units properly identified in permit? Yes No N/A

(2) Operating rates w/i Permit Limits/Normal Op.? Yes No N/A

(3) Identify any inoperative units: ________________________________

(4) Other general notes/concerns: ________________________________

B. VEO Results (attach applicable VEO forms): Compliance? Yes No N/A

C. Boiler O&M Practices

(1) Fuel sulfur content:____________ (actual) __________ (allowable)

(2) Fuel type within permit limits? Yes No

(3) Operating hours within any applicable limits? Yes No

(4) Identify any follow-up checks or concerns:____________________________________

D. CEMS Data

Unit ID	SO2	NOx	Opacity	TRS

! Identify any CEMS operational concerns:____

E. Control System Data (complete for each applicable system used)

ESP Controls (if used)

(1) Electrical Parameter Data (repeat chart for each ESP chamber):

T-R Set #	Primary Volts		Primary Amps		Secondary KVolts		Secondary Milliamps		Sparks/Minute	
	Actual	Base	Actual	Base	Actual	Base	Actual	Base	Actual	Base
1										
2										
3										
4										
5										
6										

(2) Follow up ESP Data:

- Apparent Rapper Operation: ______________________________________
- Component Failure Records Checks: ________________________________
- Inlet/Outlet temperature drop: ___________ (Actual) _________ (Baseline) __
- Audible Indications of Air Infiltration: Yes No
- Proper hopper discharge operations: Yes No
  -- Identify problems: ____

Scrubber (if used)

(1) Can you hear sounds of excessive fan vibration? Yes No

- If yes, stop inspection and inform site personnel of safety concern.

(2)

Parameters	Actual Values	Baseline Values
Pressure Drop:	________	________
Scrubber Liquid Supply Pressure:	________	________
Pump Discharge Pressure:	________	________
Pump Motor Current:	________	________

(3) Can you hear signs of pump cavitation? Yes No

(4) If nozzles used, does source have maintenance log? Yes No

- Does it appear that nozzle maintenance is being performed consistent with source's standard procedures and that no unusual increases in maintenance needs are occurring? Yes No

(5) Visible Compliance Indicators:

- Shell/Ductwork Corrosion? Yes No

  -- If so, consider liquor pH follow-up: discuss with source)

- Mud lip at stack discharge point? Yes No

  -- If so, indication of reentrainment problems

<u>Fabric Filter (if used)</u>: Pulse Jet Reverse Air
Shaker Other: ____________________

(1) <u>Parameters</u> <u>Actual Values</u> <u>Baseline Values</u>

Parameters	Actual Values	Baseline Values
! Pressure Drop:	________	________
! Inlet Temperature:	________	________
! Outlet Temperature:	________	________
! Compresses Air Pressure:	________	________

(2) Audible/visible checks of cleaning system: Identify any concerns: ____________________
____

(3) Visible/audible checks for air infiltration, corrosion, hopper discharge. Identify any concerns: ____
____

(4) Identify any follow-up activities: ____
____

<u>Multicyclones (if used):</u>

(1) Pressure drop within normal range? Yes No
(2) Hopper discharge practices acceptable? Yes No
(3) Gas flow rates near nominal design rates? Yes No
(4) Identify any concerns: ____

F. Asbestos D&R

(1) Indications of recent activities likely to disturb asbestos? Yes No
(2) If yes, does the source have appropriate D&R notice/records, or documentation to support requirements applicable? Yes No

III. Water Inspection

(1) Oil-fired Boilers

- ! Is SPCC plan required? Yes No
- ! If yes, is the SPCC plan available for inspection? Yes No
- ! Has the facility recorded any recent spills, leaks, or similar events? Yes No
- ! If yes, forward to water inspector for follow up
- ! Observe containment curbs/other measures for tank storage; are there any obvious problems (applicable to SPCC and storm water compliance)? Yes No
- ! Identify any concerns/comments: ______________________________

____

(2) Storm Water Issues

- ! Is the SWPP plan available for inspection? Yes No
- ! Does the SWPP plan include following BMPs for power boiler operations, as applicable (circle all that apply)? [See Section 9 for general SWPP plan checklist]

  -- Fugitive dust control, especially for coal handling
  -- Delivery/residue hauling vehicles
  -- Fuel oil/chemical unloading operations
  -- Storage tanks and facilities
  -- Ash loading
  -- Other spills and leaks

- ! Does the mill have records of any required monitoring? Yes No
- ! For coal-fired boilers, observe coal pile runon/runoff control procedures and note any obvious problems or concerns: ______________________________

____

IV. RCRA

(1) Does the facility burn any hazardous waste, used oil, or hazardous waste liquids in the power boilers? Yes No

- ! If yes, identify material burned:______________________________

(2) Are hazardous wastes generated in this area and/or are satellite accumulation sites located in this area? Yes No Not Checked

- ! If yes, consider completing RCRA screening checklist at beginning of this Appendix

V. EPCRA Inspection

Note: Includes only process-specific EPCRA screening for emergency reporting; see general screening checklist at beginning of Appendix E.

(1) Does the facility have SO_2 and NO_x limits for each power boiler? Yes No

(2) If yes, were there excess emission periods that were not in compliance with permit? Yes No

- ! If yes, consider further evaluation to determine if RQ threshold(s) exceeded)

(3) If no, continuing release reporting may apply. Has source either filed required report or documented that reporting does not apply? Yes No

(4) If used for NCG control, were there TRS excess emissions not in compliance with permit during reviewed time period? Yes No

- ! If yes, consider further evaluation of whether TRS compounds exceed RQ of 100 lb/24-hours (for H_2S or methyl mercaptan)

Woodyard, Papermaking and Other Operations: Example Assessment Form

I. Air Inspection

(1) Woodyard Operations:

- ! Are there any fugitive dust problems observed? Yes No
- ! If permit requirements apply for fugitive dust control, are all required control methods in operation? Yes No
- ! If water spray system used, is spray pattern appropriate? Yes No
- ! Water pressure (if applicable): ______ (observed) _______________ (baseline)
- ! Water flow rate (if applicable): ______ (observed) _______________ (baseline)

(2) Other Operations:

- ! Does the mill have industrial process refrigeration subject to section 608 (stratospheric ozone protection) requirements? Yes No
- ! If yes, complete checklist on next page.

II. Water Inspection

(1) Does the mill use wet wood handling operations? Yes No

- ! If yes, does the permit include allowances for discharges from these operations? Yes No

- ! If no, then evaluate further and forward to permit writer for follow up

(3) Identify any storm water permit concerns (use the SWPP Plan Checklist on following pages as a tool to evaluate content and implementation of plan): ____

____

____

General Section 608 Screening Questions	
(1) Does the facility have industrial process refrigeration units with CFC and/or HCFC charges of 50 pounds or greater?	☐ Yes ☐ No
(2) Does the facility service, maintain, or repair this refrigeration equipment with company employees? If no, go to question number 4.	☐ Yes ☐ No
(3) Do all service technicians have EPA approved technician certification? **NOTE**: Approved 608 technician certifications contain the following language, *"[Name of person] has been certified as a [Type I, Type II, Type III and/or Universal, as appropriate] technician as required by 40 CFR part 82, subpart F."*	☐ Yes ☐ No
(4) Does the facility keep all maintenance records on all 50+ pound units?	☐ Yes ☐ No
(5) Does that facility calculate the leak rate on all 50+ pound units? **NOTE**: The leak rate that triggers mandatory repairs is 35% in a 12 month period.	☐ Yes ☐ No
(6) Are leaks above the allowable leak rate repaired within 30 days, or 120 days if an industrial process shut down is required?	☐ Yes ☐ No
(7) If leak repairs have been conducted, was an initial verification test conducted before refrigerant was recharged into the system?	☐ Yes ☐ No
(8) If leak repairs have been conducted, was a follow-up verification test conducted within 30 days of the successful initial verification test?	☐ Yes ☐ No
(9) If no repairs were conducted or repairs failed, was a retrofit or retirement plan prepared and available for review?	☐ Yes ☐ No
(10) Does the company own refrigerant recovery equipment?	☐ Yes ☐ No
(11) Has the company submitted to EPA a recovery equipment certification form? **NOTE**: Ask to see a file copy.	☐ Yes ☐ No

Copies:

! If any technicians are not EPA certified for 608, make a copy of at least 1 record that shows the technician performing work involving the refrigerant.

! If any no answer in questions 4, 6, 7, 8 <u>and</u> it is a reasonable amount, make a copy of available maintenance records for each 50+ pound unit receiving a no answer.

! Make a copy of any retrofit or retirement plan.

Notes:

SWPP PLAN -- REVIEW OF PLAN ELEMENTS
1. Pollution Prevention Team ☐ Identify specific individuals ☐ Outline their responsibilities

2. Description of potential pollutant resources, including:
☐ Site map indicating:
  ☐ Drainage areas
  ☐ Drainage patterns/outfalls
  ☐ Structural and non-structural controls
  ☐ Surface waters
  ☐ Significant materials exposed to precipitation
  ☐ The location of leaks or spills that have occurred in the last 3 years
  ☐ Location of industrial activities exposed to precipitation including:
    ☐ Fueling stations
    ☐ Vehicle/equipment maintenance or cleaning areas
    ☐ Loading/unloading areas
    ☐ Waste treatment, storage, or disposal areas
    ☐ Liquid storage tanks
    ☐ Processing areas
    ☐ Storage areas
  ☐ A list of pollutants likely to be present in the discharges
  ☐ Description of significant materials handled, treated, stored, or disposed of such that exposure to storm water occurred in the last 3 years
    ☐ Description of the method and location of storage or disposal
    ☐ Description of all material management practices
    ☐ Description and location of existing structural and non-structural controls
  ☐ List of significant spills and leaks that occurred in the 3 years prior to the effective date of the permit
  ☐ Summary of existing storm water sampling data
  ☐ Description of areas with a high potential for significant soil erosion
  ☐ A narrative summarizing potential pollutant sources

3. A description of appropriate measure and controls, including: ☐ Good housekeeping procedures ☐ Preventive maintenance procedures ☐ Spill prevention and response procedures ☐ Inspection procedures ☐ Employee training program ☐ Recordkeeping and internal reporting procedures ☐ Non-storm water discharge certification or failure to certify non-storm water discharge certification   ☐ Identify authorized non-storm water discharges and appropriate controls ☐ Erosion and sediment controls for areas with a high erosion potential ☐ A narrative consideration of traditional storm water management practices ☐ Plan for implementation and maintenance of traditional measures found to be reasonable and appropriate

SWPP PLAN -- REVIEW OF PLAN ELEMENTS (cont.)
4. ☐ Annual site compliance evaluation reports (prepared after the inspection is performed) including: ☐ A summary of the scope of the inspection ☐ Personnel making the inspection ☐ Major observations ☐ Actions taken to revise the Pollution Prevention Plan ☐ Certification of compliance or a list of incidents of non-compliance
5. ☐ If discharging to a large or medium municipal separate storm sewer, compliance with applicable requirements in the municipal storm water management program
6. ☐ Consistency of the storm water pollution prevention plan with other plans
7. Additional requirements for facilities subject to Emergency Planning and Community Right to Know Act (EPCRA) Section 313 requirements ☐ A description of the measures used in areas where Section 313 water priority chemicals are stored, processed, or otherwise handled to: -Minimize the potential contact or storm water run-on with the chemicals -Prevent exposure of the chemicals to storm water and wind ☐ A discussion of the measures taken to minimize the discharge of Section 313 water priority chemicals from the following areas: ☐ Liquid storage areas ☐ Non-liquid storage areas ☐ Truck and railcar loading areas ☐ Transfer, processing, or handling areas ☐ Other areas ☐ Preventive maintenance and housekeeping ☐ Facility security ☐ Training ☐ Professional Engineer (PE) certification every 3 years
8. ☐ Assurance that any salt storage piles onsite are covered or enclosed
Notes/Comments on SWPP Plan Review:

SWPP PLAN -- REVIEW OF BMP IMPLEMENTATION	
A. FUELING	
Yes No N/A	1. Has spill and overflow prevention equipment been installed?
Yes No N/A	2. Are vehicle fuel tanks often "topped off"?
Yes No N/A	3. Have steps been taken to protect fueling areas from rain?
Yes No N/A	4. Is runon to the fueling area minimized?
Yes No N/A	5. Are oil/water separators or oil and grease traps installed in storm drains in the fueling area?
Yes No N/A	6. Is the fueling area cleaned by hosing or washing?
Yes No N/A	7. Do you control petroleum spills?
Yes No N/A	8. Are employees aware of ways to reduce contamination of storm water at fueling stations?
	9. Where does the water drain from the fueling area?
B. MAINTAINING VEHICLES AND EQUIPMENT	
Yes No N/A	1. Are parts cleaned at the facility?
Yes No N/A	2. Has the facility looked into using nontoxic or less toxic cleaners or solvents?
Yes No N/A	3. Are work areas and spills washed or hosed down with water?
Yes No N/A	4. Are spills or materials washed or poured down the drain?
Yes No N/A	5. Are oil filters completely drained before recycling or disposal?
Yes No N/A	6. Are incoming vehicles and equipment checked for leaking oil and fluids?
Yes No N/A	7. Are wrecked vehicles or damaged equipment stored onsite?
Yes No N/A	8. Does the facility recycle any of the automotive fluids or parts?
Yes No N/A	9. Can the facility reduce the number of different solvents used?
Yes No N/A	10. Are wastes separated?
Yes No N/A	11. Does the facility use recycled products?
C. PAINTING VEHICLES AND EQUIPMENT	
Yes No N/A	1. Is care taken to prevent paint wastes from contaminating storm water runoff?
Yes No N/A	2. Are wastes from sanding contained?
Yes No N/A	3. Are parts inspected before painting?
Yes No N/A	4. Is the facility using painting equipment that creates little waste?

SWPP PLAN -- REVIEW OF BMP IMPLEMENTATION (cont.)				
C. PAINTING VEHICLES AND EQUIPMENT (cont.)				
Yes	No	N/A	5.	Are employees trained to use spray equipment correctly?
Yes	No	N/A	6.	Does the facility recycle paint, paint thinner, or solvents?
Yes	No	N/A	7.	Are wastes separated?
Yes	No	N/A	8.	Can the facility reduce the number of solvents used?
Yes	No	N/A	9.	Does the facility use recycled products?
D. WASHING VEHICLES AND EQUIPMENT				
Yes	No	N/A	1.	Has the facility considered using phosphate-free biodegradable detergents?
Yes	No	N/A	2.	Are vehicles, equipment, or parts washed over the open ground?
E. LOADING AND UNLOADING MATERIALS				
Yes	No	N/A	1.	Are tank trucks and material delivery vehicles located where spills or leaks can be contained?
Yes	No	N/A	2.	Is loading/unloading equipment checked regularly for leaks?
Yes	No	N/A	3.	Are loading/unloading docks or areas covered to prevent exposure to rainfall?
Yes	No	N/A	4.	Are loading/unloading areas designed to prevent storm water runon?
Yes	No	N/A	5.	Is piping system routinely checked for leaks?
F. LIQUID STORAGE IN ABOVE-GROUND TANKS				
Yes	No	N/A	1.	Do storage tanks contain liquid hazardous materials, hazardous wastes, or oil?
Yes	No	N/A	2.	Are operators trained in correct operating procedures and safety activities?
Yes	No	N/A	3.	Does the facility have safeguards against accidental discharge?
Yes	No	N/A	4.	Are tank systems inspected, and is tank integrity tested regularly?
Yes	No	N/A	5.	Are tanks bermed or surrounded by a secondary containment system?
G. INDUSTRIAL WASTE MANAGEMENT AND OUTSIDE MANUFACTURING				
Yes	No	N/A	1.	Has the facility looked for ways to reduce waste at the facility?
Yes	No	N/A	2.	Has the facility considered waste reduction BMPs?
Yes	No	N/A	3.	Are industrial waste management and outside manufacturing areas checked often for spills and leaks?
Yes	No	N/A	4.	Are industrial waste management areas or manufacturing activities covered, enclosed, or bermed?

SWPP PLAN -- REVIEW OF BMP IMPLEMENTATION (cont.)	
G. INDUSTRIAL WASTE MANAGEMENT AND OUTSIDE MANUFACTURING (cont.)	
Yes No N/A	5. Are vehicles used to transport wastes to the land disposal or treatment site equipped with anti-spill equipment?
Yes No N/A	6. Does the facility use loading systems that minimize spills and fugitive losses such as dust or mists?
Yes No N/A	7. Are sediments or wastes prevented from being tracked offsite?
Yes No N/A	8. Is storm water runoff minimized from the land disposal site?
H. OUTSIDE STORAGE OF RAW MATERIALS, BY-PRODUCTS, OR FINISHED PRODUCTS	
Yes No N/A	1. Are materials protected from rainfall, runon, and runoff?

III. RCRA

(1) Solid Waste Landfills:

! Does the mill maintain records of all waste streams landfilled on-site? Yes No
! For each waste stream, do the records document how the mill characterized the waste and made a determination that the waste is not hazardous? Yes No
! Were any free liquids observed in the landfill? Yes No
! Are all training, inspection and other recordkeeping requirements specified by permit up-to-date and available for inspection? Yes No
! To the extent required, review available monitoring data. Within specified permit limits? Yes No

-- Identify evidence of any problems: ____

____

! Is leachate handling in accordance with solid waste permit? Yes No
! If leachate sent to WWTP or storm water outfall, does NPDES permit allow for this practice? Yes No
! Identify any other concerns, such as obvious O&M problems, signs of spills or improper unloading practices: ________________________________

____

(2) Are hazardous wastes generated in this area and/or are satellite accumulation sites located in this area? Yes No Not Checked

! If yes, consider completing RCRA screening checklist at beginning of this Appendix

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SECTION 6: ASSESSMENT MODULE FOR BLEACHING PROCESS OPERATIONS

6.1 Introduction

This section provides the necessary information for conducting a compliance assessment of the bleaching process at a kraft pulp mill. This section first describes the bleaching process. The section then outlines the regulatory requirements and available inspection procedures for pulp bleaching activities. In addition, Appendix E contains an example assessment form that combines the various elements discussed in this section.

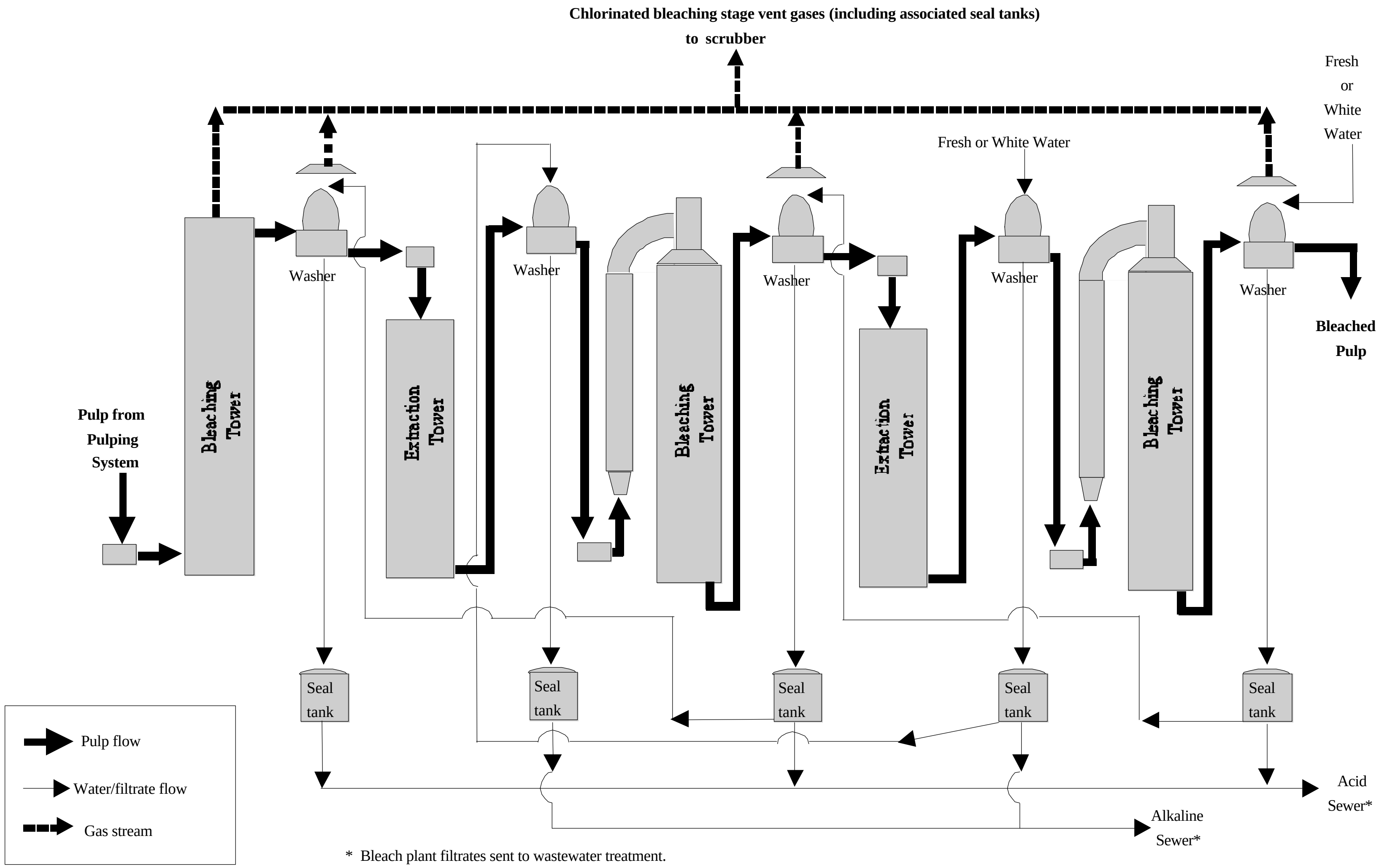
CONTENTS

6.2 Overview of Process and Discharges

6.2.1 Description of the Process

At some mills, the pulp produced by the kraft process is whitened and brightened in a series of chemical bleaching operations that are together called a *bleaching line*. All the bleaching lines at a mill, and all the equipment associated with those bleaching lines, are defined in the Cluster Rules MACT standards as the *bleaching system*. Similarly, the Cluster Rules wastewater regulations define the bleach plant as "all process equipment used for bleaching ..." and limit the discharge of pollutants in the bleach plant effluent. Figure 6-1 depicts the major equipment found in a typical five stage bleaching line. A brief description of these equipment systems and their function follows.

Figure 6-1
Diagram of Example Bleaching System



The bleaching process. A bleaching line typically consists of a sequence of three to six bleaching stages. The number of stages varies depending on the furnish (softwood or hardwood) and on the brightness requirements of the pulp and the specific design of the mill. A typical bleaching line has 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 necessary 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.

NOTE! *Bleaching line* means a group of stages arranged in series; pulp flows from one stage to the next. *Bleaching system* refers to all of the bleaching lines and all of the process equipment associated with those bleaching lines.

For mills that use oxygen delignification (or "oxygen pre-bleaching"), the mills may consider this equipment as the first bleaching stage. However, oxygen delignification is defined by the MACT standards as a pulping area HVLC source and is discussed in Section 4.2.1. Oxygen delignification is also explicitly excluded from the effluent guidelines definition of "bleach plant," given in 40 CFR 430.01.

Chemical and steam 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. Mixing can be accomplished with the use of enclosed rotary high-shear mixers or static in-the-pipe mixers. Significant HAP emissions are not anticipated from mixers, because they are typically enclosed.

Retention towers. The bleaching reactions occur primarily in a bleaching or retention tower. To effectively manage the bleaching chemical reaction, it is necessary to maintain a certain temperature, retention time, consistency, pressure, and pH for each bleach stage. Conditions vary with the bleaching chemical used. Bleaching stages that use chlorine and/or chlorine dioxide are performed at acid (low) pH, while extraction and peroxide bleaching are performed at alkaline (high) pH.

There are two primary types of retention tower: 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, however, chlorinated bleach stages use an upflow tower design or a modification thereof.

Washers. To minimize chemical usage and equipment corrosion, it is important to remove as much bleaching chemical as possible from the pulp prior to entering the next bleaching stage. Bleached pulp washing is performed in the same type of equipment used to wash brown stock pulp, and typically consists of a rotary drum washer with an associated seal tank. The washer consists of a hollow, mesh-covered cylinder through which a vacuum is pulled. The vacuum is typically produced by a sealed drop leg on the discharge line. In some cases, the vacuum may be created by vacuum pumps. Section 4.2.1 contains additional discussion of brown stock washers.

Seal tank. The seal tank holds washer filtrate and serves to keep the drop leg (barometric leg) submerged, maintaining vacuum on the washer. Washer filtrate is typically reused as wash water counter currently to the flow of the pulp. In other words, fresh water is used in the final bleaching stages. Then filtrates from chlorinated bleaching stages are reused in preceding chlorinated bleaching stages, and filtrates from non-chlorinated stages are used on preceding non-chlorinated stages. Filtrates in the first two seal tanks at the first chlorinated and non-chlorinated stages of a bleaching line are typically sewered. Consequently, there is an “acid sewer” from the first chlorinated filtrate tank and an “alkaline sewer” from the first non-chlorinated filtrate tank.

Vacuum pump. A vacuum pump may be used to pull the vacuum on a rotary vacuum washer. Vacuum pumps are not expected to be widely in use at bleaching systems since the majority of the mills utilize the barometric leg method of pulling a vacuum on the washer.

NOTE! The Cluster Rules wastewater regulations define *bleach plant effluent* as the total discharge of process wastewaters from the bleach plant bleaching system. This would include separate acid and alkaline filtrates or combined filtrates.

Bleaching chemicals. Many oxidants are used as bleaching agents, but chlorinated chemicals are the most common. Bleaching with chlorinated chemicals (chlorine gas, sodium hypochlorite, and chlorine dioxide) is common because they are powerful and inexpensive. Use of these compounds generates chlorinated HAP emissions from bleaching system vents and chlorinated pollutants in bleach plant effluents. In addition to chlorinated chemicals, some oxygen bleaching agents are commonly used, including oxygen, peroxide, and ozone. Oxygen and peroxide are frequently mixed with the pulp just prior to an extraction stage.

Stages in a bleaching line typically are named after the bleaching chemical used or the operation performed. For example, a bleaching stage using chlorine or chlorine dioxide may be called a C-stage or D-stage, respectively. An extraction stage would be called an E-stage. Figure 6-2 lists the chemicals and the bleaching stage abbreviations that are commonly used by the industry. Figure 6-2 also lists some examples of bleach plant sequences used by kraft mills.

Figure 6-2
Bleaching Stage Abbreviations and Bleaching Sequences[1]

Bleaching Stage	Name	Formula
C	Chlorine	Cl_2
D	Chlorine Dioxide	ClO_2
E	Sodium Hydroxide (extraction)	NaOH
H	Hypochlorite	NaOCl
P	Peroxide	H_2O_2
Z	Ozone	O_3
Bleaching Sequence	**Comment**	
CEH	Classical sequence for production of semi-bleached pulp	
C/DE$_O$DED	Classical market kraft pulp sequence of the 1980s	
DE$_{OP}$DED	Classical ECF (elemental chlorine-free) sequence for market kraft pulp, sometimes preceded by oxygen delignification	
ZE$_O$D	First sequence using ozone for commercial production of kraft pulp in North America (preceded by oxygen delignification)	

6.2.2 Air Pollutant Emissions

Emissions of HAPs from the bleaching process equipment systems are strongly influenced by the bleaching chemicals used. The primary pollutants generated from the bleaching system are chlorine, chloroform, and other chlorinated HAPs. These pollutants are generated in and emitted from stages that use chlorine or chlorinated bleaching chemicals. Hypochlorite use results in the largest emissions of HAP, particularly chloroform. Elimination of hypochlorite as a bleaching chemical significantly reduces chloroform emissions. For bleaching lines that do not use hypochlorite, the degree of substitution of chlorine dioxide for chlorine also affects chloroform and overall HAP emissions. The use of oxygen delignification also may act to decrease chloroform emissions. Although highly variable depending on the process used at a particular mill, typical emission rates for chloroform and total HAPs are shown in Figure 6-3. Uncontrolled chlorine emissions from the bleach plant can average approximately 0.70 lb/ADTP, and chlorine dioxide emissions can average approximately 0.50 lb/ADTP. Scrubbers can achieve up to 99 percent reduction efficiency for these pollutants.[2]

Figure 6-3
Typical Air Emissions from the Bleaching System at a 1000 Ton Per Day Kraft Mill*

Pulping System Components	Typical Emissions (Tons/yr)		
	Methanol	Total HAP	Chloroform
Bleach Plant with Hypochlorite	39	121	68
Bleach Plant with no Hypochlorite and Chlorine Dioxide Substitution <65%	39	72	23
Bleach Plant with no Hypochlorite and Chlorine Dioxide Substitution ≥ 65%	39	49	2

* Values are based on typical emission factors contained in the 1997 EPA Chemical Pulping Emission Factor Document,[3] with an assumption that the mill operates 350 days/year.

6.2.3 Water Pollutant Discharges

Because chlorine-containing compounds are the predominant bleaching agents used at kraft pulp mills, and because of the toxicity and persistence of chlorinated compounds, EPA regulates the discharge of chlorinated pollutants generated during pulp bleaching. Chlorinated pollutants regulated in the Cluster Rules, described in Section 7.2.3, include:

- AOX
- Chloroform
- 2,3,7,8-TCDD (Dioxin)
- 2,3,7,8-TCDF (Furan)
- 12 chlorinated phenolic compounds:
  - Trichlrosyringol
  - 3,4,5-Trichlorocatechol
  - 3,4,6-Trichlorocatechol
  - 3,4,5-Trichloroguaiacol
  - 3,4,6-Trichloroguaiacol
  - 4,5,6-Trichloroguaiacol
  - 2,4,5-Trichlorophenol
  - 2,4,6-Trichlorophenol
  - Tetrachlorocatechol
  - Tetrachloroguaiacol
  - 2,3,4,6-Tetrachlorophenol
  - Pentachlorophenol

6.2.4 Solid/Hazardous Waste Discharges

The solid waste discharges associated with the bleaching system are minimal. Most of the discharges are liquid wastes that are part of the NPDES-regulated wastewater sent to the treatment plant prior to discharge.

6.2.5 EPCRA Chemicals and Reportable Releases

Facilities will have to provide information on chemicals used in the bleach plant to meet EPCRA's emergency preparedness requirements. Appendix D contains a process-based list of the types of hazardous chemicals typically included in an EPCRA inventory for a kraft pulp mill.

On-site air, water, and land releases, including land disposals, of toxic chemicals from the bleach plant and off-site transfers of waste containing these toxic chemicals may have to be accounted for in TRI Form R reports. For TRI purposes, the bleach plant wastewaters will affect the quantity of releases for both water discharges and solid waste discharges (i.e., the amount of certain TRI chemicals estimated to remain in wastewater treatment plant sludges). For toxic chemicals in waste streams, the mill also must report in Form R the waste treatment or disposal method employed and an estimate of treatment efficiency.

In addition, EPCRA/CERCLA emergency release reporting could apply for off-site releases that are not federally permitted and exceed certain reportable quantities. Releases directly from the bleach plant most likely would involve air emissions chlorine or chloroform that exceed the applicable reportable quantity (10 pounds per 24-hour period for each of these chemicals) and are not federally permitted. Releases potentially could occur as a result of spills resulting from material storage and handling activities.

6.3 Air Regulations and Inspection Techniques

The air emissions from the bleaching system are subject to the new Cluster Rules requirements, as well as any applicable State regulations. The NSPS do not apply to bleaching systems.

Key Air Regulatory Considerations

- **Regulatory concerns are primarily Cluster Rules-related -- non-HAP requirements do not apply**
- **Control of emissions generally through gas scrubbers**
- **Voluntary Advanced Technology Incentives Program can be used to extend compliance deadline**
- **Oxygen delignification system considered part of pulping (HVLC) system for MACT purposes -- see Section 4.4**

6.3.1 Emission Points

The primary emission points from the bleaching process are the bleaching towers, washers, and seal tanks. If steam and chemical mixers are vented to the atmosphere, the mixers would also emit HAPs. The emissions regulated by the MACT standard are chlorinated HAPs and chloroform.

The emission points of concern are those from bleaching stages where chlorine or other chlorinated compounds are applied. The washer systems remove the chlorinated bleaching chemicals from the pulp slurry at the end of the stage and prior to the application of the chemicals in the next bleaching stage. Therefore, there is not a significant carry over of chlorinated HAPs and associated emissions to bleaching stages in which non-chlorinated chemicals are used.

6.3.2 Applicable Regulations

Air emission regulations for criteria pollutants, such as NSPS Subpart BB, do not cover the bleach plant equipment systems at kraft pulp mills. However, the Cluster Rules MACT standards apply. In addition, state HAP requirements may also apply.

6.3.2.1 State HAP Standards

At least one state -- Maine -- has established specific emission limits for chlorine and chlorine dioxide emissions from bleach plant operations (see Figure 6-4 for a summary of the Maine requirements -- Chapter 122 of the Maine Administrative Code). In addition, some states may impose limits on these operations under other applicable authority. Based on a review of sample permits from a few states, both Wisconsin and Georgia appear to impose requirements on bleach plant operations. Wisconsin has established chlorine emission limits for both new or modified sources, and existing sources under its state air toxic regulations (See NR 445, Wis. Adm. Code). No monitoring requirements were established in the sample permit reviewed. Similarly, Georgia appears to impose similar requirements on the basis of a State air toxics program. In addition, the Georgia permit reviewed also contained scrubber control device parameter monitoring requirements.

Figure 6-4
Summary of Maine Bleach Plant Regulations

Emission Limits	Monitoring Provisions	Testing Provisions
! 3.0 lb/hr for Chlorine ! 3.0 lb/hr for Chlorine Dioxide ! Limits apply to combined bleach plant operations	! Total chlorine CEMS, but only after determination that equipment is available and reliable for determining compliance ! Scrubber recycle flow, Oxidation Reduction Potential (ORP), scrubber pressure drop, pH meters, and potentially other scrubber parameters ! Recycle flow, ORP, scrubber pressure drop, and pH must be recorded once per shift	! Annual testing required ! Use NCASI methods (Technical Bulletins #520 and #548, 4/87 and 6/88) or other approved method

6.3.2.2 Cluster Rules Standards

NOTE! MACT summary based on 4/15/98 Final Rule and subsequent regulatory notices published through 4/30/99. Check website for possible updates to this section for any subsequent regulatory notices.

Basic emission limits. At kraft mills, the MACT requirements apply only to bleaching lines that use chlorinated compounds, and only to the bleaching stages in which chlorinated compounds are introduced. The equipment covered is the bleaching tower, washer, and seal tank. Steam and chemical mixers are also covered if they vent to the atmosphere as well as any vacuum pumps. Extraction stages are not covered.

The rule has two emission limits, one for chloroform and one for chlorinated HAPs (excluding chloroform). Figure 6-5 presents the control options for the bleaching system emission limits. Each bleaching system must comply with both the chloroform and chlorinated HAP limits (chlorinated HAPs may be measured as chlorine). The rule has two limits because the technology used to control chlorinated HAPs will not control chloroform.

Figure 6-5
Control Options for Bleaching System Emission Limits

Bleaching System Emission Limit	Control Option
Chloroform	Comply with the revised effluent limitations guidelines and standards
	Use no chlorine or hypochlorite in any bleaching stage
Chlorinated HAP	Reduce total chlorinated HAP mass in the vent stream by 99 percent or more (measured as chlorine) using a control device
	Reduce the total chlorinated HAP emission concentration (excluding chloroform) to 10 ppmv or less exiting a treatment/control device
	Reduce the total chlorinated HAP mass emission rate to 0.001 kg total HAP (excluding chloroform) per Mg ODP

Chloroform emission limit. Process modifications are required to meet the chloroform limit since chloroform is not removed in the bleach plant gas scrubber. A mill can comply with the MACT requirements of eliminating chlorine and hypochlorite use or meet the limits set forth in the NPDES effluent limitations guidelines. However, if the compliance dates for the effluent limitations guidelines (which are based on the NPDES permit renewal cycle for each facility) are different than those for the MACT standards, the MACT compliance dates must still be met.

NOTE! The enclosures and closed-vent system must meet the same requirements as described in Section 4.3.2.2 for the pulping process.

Chlorinated HAP emission limit. As outlined in Figure 6-5, the MACT standards provide three optional emission limit formats (i.e., a limit based on percent reduction, pollutant concentration, or mass emissions per product). However, for each of these three options, the chlorinated HAP emission limit is based on the use of a gas scrubber; and, although not explicitly required, nearly all mills are expected to use or modify existing gas scrubbers to meet the emission limit. Some mills may be able to meet the concentration or mass emission limits through process modifications (i.e., 100% chlorine dioxide substitution). In addition to the ultimate control device, the Cluster Rules require -- for each bleaching stage in which chlorinated compounds are introduced -- that emission points be enclosed and vented to a closed-vent system which is routed to the control device. The enclosures and closed-vent system requirements are the same as for pulping process area emission points (see Section 4.3.2.2).

General exceptions and alternative standards. Under the Effluent Limitations Guidelines (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 bleaching system requirements for kraft mills in exchange for achieving greater HAP reductions than the regulatory baseline. Mills that elect to enter this program receive a 3-year extension for complying with MACT bleaching standards (i.e., they must comply by April 15, 2004). As part of the extension, mills must submit a control strategy report every two years under 40 CFR 63.455(b) until compliance is achieved. The report must contain milestones and status reports for achieving compliance. In addition, the mill must meet either one of the following two conditions:

! No increase in the application rates of chlorine and/or hypochlorite (in kg per Mg ODP) in the bleaching system beyond current levels. The current application rate is defined as the average daily rates used over the three months prior to June 15, 1998. The application rate limitation is provided to prevent a bleaching system from “backsliding” (i.e., increasing emissions during the extended compliance period). **Or,**

! By no later than April 16, 2001, comply with enforceable effluent limitation guidelines for 2,3,7,8 TCDD and for AOX that are at least as stringent as the baseline BAT levels set out in the Cluster Rules effluent guidelines (40 CFR 430.24(a)(1)).

Any bleaching line that is modified to not use chlorine or any chlorinated HAP is exempt from all MACT requirements.

Back-up control requirements. There are no explicit back-up control MACT requirements for the bleaching system emission limits and the rule provides no allowances for excess emissions. Therefore, the only excused excess emission periods would be those periods that are specifically designated in the startup, shutdown, or malfunction plan approved under 40 CFR 63.6(e)(3).

Monitoring, reporting, and recordkeeping (MRR). The MACT establishes MRR requirements to assure continuous compliance with the emission limits. In order to meet the chlorinated HAP emission limit, the majority of the mills will use gas scrubbers. The MACT requires that mills use a continuous monitoring system (CMS) to demonstrate compliance. Figure 6-6 summarizes the MACT MRR requirements for each control option. The specific parameter excursion levels used to determine ongoing compliance are determined during the initial performance test. If a mill uses a control device other than a gas scrubber, the mill must submit for approval proposed parameters to be monitored and the applicable excursion level for each proposed parameter. The mill may submit proposed revised excursion levels (or, if applicable, monitored parameters) on the basis of subsequent performance testing results.

Figure 6-6
MACT Monitoring, Reporting, and Recordkeeping Requirements for Bleaching Systems Chlorinated HAP Emission Limit

Control Option	Continuous Monitoring	Reporting	Recordkeeping
Gas scrubber used to meet: ! 99% chlorinated HAP reduction, or ! Mass emission rate of 0.001 kg chlorinate HAP per Mg ODP	! pH or oxidation-reduction potential of the effluent ! Vent gas inlet flow rate ! Scrubber liquid influent rate	Standard Part 63 reporting (i.e., quarterly EER and CMS performance report, except, if no excess emissions, then semiannual performance report with statement that no excess emissions occurred)	Standard Part 63 recordkeeping for monitored operating parameters (i.e., both monitor performance data and measured data averages)
Gas scrubber used to meet: ! 10 ppmv chlorinated HAP outlet concentration	! Same scrubber parameters as above, or ! Chlorine outlet concentration	Standard Part 63 reporting (i.e., quarterly EER and CMS performance report, except, if no excess emissions, then semiannual performance report with statement that no excess emissions occurred)	Standard Part 63 recordkeeping for monitored operating parameters (i.e., both monitor performance data and measured data averages)
Compliance with emission limits with a control device other than gas scrubber	Determine appropriate monitoring parameters during initial performance test	(Same as using a gas scrubber to comply with the emission limits)	(Same as using a gas scrubber to comply with the emission limits)
Process modification to meet mass or concentration emission limits	Determine appropriate monitoring parameters during initial performance test	(Same as using a gas scrubber to comply with the emission limits)	(Same as using a gas scrubber to comply with the emission limits)

As noted above in this section, the mill must also meet the enclosures and closed-vent system requirements for capturing and transporting the bleach vent gases to the scrubber or other control device. These requirements include independent MRR requirements, as summarized in Figure 6-7.

Figure 6-7
Enclosures and Closed-vent System MACT Monitoring and Recordkeeping Requirements

Control Option	Monitoring	Reporting	Recordkeeping
Enclosures and Closed-vent System requirements apply to all control options (See Figure 6-5)	! *Every 30 days*: Visual inspection of all bypass line valves or closure mechanisms ! *Initially and Annually*: Demonstrate no detectable leaks at positive pressure components. Demonstrate negative pressure at enclosure openings	! None required for 30-day visual inspections ! Initial and annual leak checks/negative pressure demonstrations are subject to general Part 63 performance test reporting requirements	! Prepare and maintain a site specific inspection plan ! Visual check records must be kept because relevant to documenting compliance (§ 63.10(b)(2)(vii)) ! Performance test records must be maintained (§ 63.10(b)(2)(viii))

The MRR requirements (see Figure 6-8) for the chloroform emission limit are limited because the mill will use process modifications rather than add-on control technology to comply.

Figure 6-8
MACT Monitoring, Reporting, and Recordkeeping Requirements for Bleaching Systems Chloroform Emission Limit

Control Option	Continuous Monitoring	Reporting	Recordkeeping
Eliminate use of hypochlorite or chlorine	None	Initial (one-time) compliance report only	General Part 63 requirements for initial compliance reports
Comply with effluent limitation guidelines (by MACT compliance date)	As required in NPDES permit (minimum weekly monitoring of bleach plant effluent)	As required in NPDES permit (minimum annual submission of discharge monitoring report)	Standard NPDES permit recordkeeping (3 years for all monitoring records)

Finally, Figure 6-9 summarizes the MRR requirements for mills that receive the 3-year compliance date extension. These requirements apply from June 1998 until the mill demonstrates compliance with all applicable bleaching system emission limits.

Figure 6-9
MACT Monitoring, Reporting, and Recordkeeping Requirements for Mills in the Voluntary Advanced Technology Incentives Program

Control Option	Continuous Monitoring	Reporting	Recordkeeping
Compliance date extension for Advanced Technology Incentives systems (no increase in chlorine or hypochlorite use)	Chlorine and hypochlorite application rates in kg/Mg ODP	! Daily application rates of chlorine and hypochlorite every 6 months; and ! Submit the initial control strategy report and update the control strategy report every 2 years	Daily application rates of chlorine and hypochlorite

6.3.3 Air Inspection Techniques

Because of the significant air emission sources outside of the bleach plant area (including the lime kiln, recovery boiler and power boilers) and the lack of applicable requirements, the bleaching systems in the past often have not been a high priority for committing on-site inspection resources. However, the bleach plant air emissions will require increased attention from inspectors to assure compliance with Cluster Rules requirements. For initial compliance, the appropriate steps to follow for coming into compliance with the Cluster Rules are outlined extensively in the document *Pulp and Paper NESHAP: A Plain English Description,*[4] including a discussion of applicability and timing issues, as well as initial compliance checklists. This document, therefore, focuses on on-site inspections that will be conducted after initial compliance has been demonstrated and the appropriate permit conditions have been included to address the Cluster Rules.

6.3.3.1 Pre-inspection Steps

As discussed in Chapter 3, there are a number of steps that should be taken routinely prior to conducting an actual on-site inspection, including file (especially permit) reviews. As part of conducting the file review and planning the on-site inspection, the inspector should consider at least the following items:

Process diagrams. Obtain a simplified diagram of the bleaching system(s) and note what control(s) are employed. This type of diagram may be available in the Part 70 operating permits file if submitted with the application.

Evaluation of periodic monitoring reports. If a scrubber is used for HAP control, scrubber parameter (or, in some cases, outlet chlorine concentration) data will be recorded and submitted in a semiannual (or quarterly) excess emission report (EER) of excursions from required parameter levels -- these levels should be specified in the mill's operating permit. The inspector should review any reports submitted since the last inspection in order to prioritize the need for follow-up while on site. Note that under the Cluster Rules, there is no allowance for excess emission periods, although the MACT general provisions do allow for excess emissions that occur as a result of startup, shutdown or malfunction. The inspector will have to review on-site records to evaluate any claims of allowable excursions. This evaluation must also consider whether the claimed excursions are consistent with the startup, shutdown and malfunction plan required under 40 CFR 63.8.

Evaluation of episodic malfunction reports. The inspector should review malfunction/upset reports since the last inspection, if available. If the reports identify corrective actions to be taken by the source, note the need to verify during the on-site inspection that the corrective steps were actually taken and that they resolved the problem.

Also, the inspector can compare claims of malfunction periods on EERs with the duration and timing of malfunction periods indicated on malfunction reports. If a malfunction report is required for all or some specified subset(s) of malfunctions, note any discrepancies between the malfunction reports submitted and the claimed excess emissions in an EER. Significant discrepancies signify either errors in the EER or malfunction reporting that should be addressed with the facility either as part of the inspection or by agency compliance staff responsible for processing periodic and episodic reports.

6.3.3.2 On-site Inspection Steps

The appropriate on-site inspection steps must be tailored to the objectives of the inspection and the priority given to the bleaching area in a particular inspection. The possible steps for a routine Level 2 inspection include:

Permit verification. One objective of a standard Level 2 air inspection will be to verify that the permit includes all the appropriate equipment. As noted above, the *Plain English Description* document [4] contains a detailed discussion of the applicability of the Cluster Rules requirements. Prior to the inspection, review the permit to determine what conditions apply to the bleaching process. Depending on the nature of the specific permit conditions, the inspector then should evaluate a number of potential issues to verify that bleaching operations remain consistent with permit requirements, including:

- Are all emissions units properly identified in the permit?
- Have any modifications (including production increases that required a physical or operational change) occurred that could trigger NSR? Note that bleach plant modifications, even if they do not constitute a major modification that triggers PSD or major NSR review, could debottleneck production in other areas of the mill that result in significant emission increases from other processes.
- Are HAP control methods properly identified?

- Compare the basic process/design information with conditions in the permit to verify the accuracy of the information in the permit and to support subsequent assessment activities.

Evaluation of proper operation of control equipment. A Level 2 inspection will focus on assuring that the control equipment is being properly operated and maintained so that the facility continues to achieve compliance with the applicable emission limits. Although the proper steps for this phase of the inspection will depend on the control measures used for HAP control, all mills will have to comply with the enclosures and closed-vent system requirements and nearly all mills are expected to use gas scrubbers to reduce emissions.

Enclosures and closed-vent system. As part of the Cluster Rules, facilities will have to enclose bleach plant emission points and convey the gases through a closed-vent system if a control device is used. The Cluster Rules require the facility to develop a self-inspection plan, including a series of periodic checks, to assure that this system continues to operate properly. The inspector should review the records of these activities to assure that the required checks are occurring and that the source has taken any corrective action steps necessary to remain in compliance. If a problem is detected or suspected, the inspector may want to consider conducting the types of checks that the facility is supposed to undertake as part of its self-inspection program.

Checks of Enclosures/Closed-vent Systems for Suspected Problems with Facility Self-Inspections

- **Visual inspections (ductwork, piping, valves, etc.)**
- **Leak checks using Method 21 analyzer (positive pressure components)**
- **Pressure checks using portable pressure gauge, etc. (negative pressure enclosure/hood openings)**

Scrubber systems. Most mills will use scrubbers to control chlorinated HAP emissions from bleaching systems. The Cluster Rules provide for a set of scrubber parameters (or the use of an outlet chlorine CMS) that are used to determine direct ongoing compliance with the applicable emission limits. The on-site inspection should confirm that:

- The required monitors are in good working order. Interview plant personnel to determine what type of routine maintenance and quality assurance is conducted as part of the mill's monitoring program.
- The monitored readings at the time of the inspection are within permit limits. To the extent that the monitoring data are handled and stored by a distributed control system (DCS), the inspector can evaluate recent historical data and data trends for direct compliance, as well as shifts in emissions that indicate a loss of control

efficiency that could lead to future compliance problems if corrective measures are not taken.

If the initial review of scrubber performance data indicates potential problems, then the inspector may want to consider conducting follow-up checks of the system. See the discussion of scrubber follow-up assessment steps in Section 5.3.3.2.

6.4 Water Regulations and Inspection Techniques

Kraft mills that manufacture bleached papergrade pulp are subject to 40 CFR Part 430 (Subpart B). EPA did not promulgate revised regulations for mills that manufacture dissolving grade kraft pulp (Subpart A) in 1998, but expects to do so in the future. Also, note that the Subpart B requirements apply to soda mills, of which there are only a limited number of U.S. facilities.

Key Water Considerations

- **Cluster Rules impose new requirements applicable to bleach plant effluent prior to entering WWTP**
- **Voluntary incentives program applies under Cluster Rules**
- **Sampling needs to be performed at bleach plant locations -- important to verify that sampling done under representative conditions**

The new Cluster Rules regulations are based on technologies that reduce pollutant generation during bleaching. However, the regulations do not require use of specific technologies, but instead limit the discharge of specific pollutants. This section focuses on:

- Wastewater discharge points
- Applicable regulations
- CWA inspection procedures
- Water-related EPCRA issues

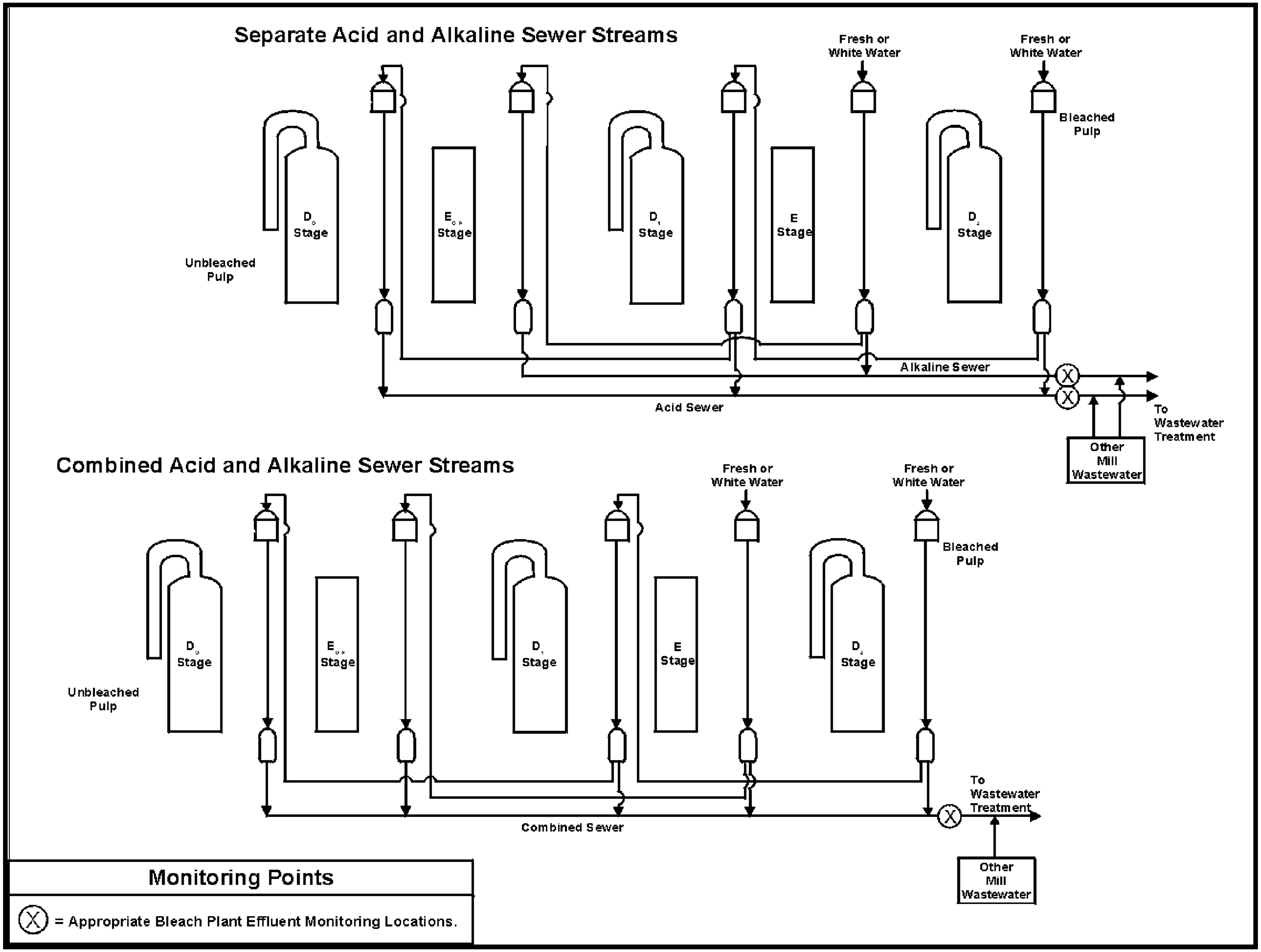
6.4.1 Discharge Points

Some wash water from each bleaching stage is reused in a preceding bleaching stage, while the rest is sewered. In general, kraft mills discharge wash water (collectively known as bleach plant effluent) either in:

- Two sewer lines, one that contains acid wastewater from the chlorinated bleaching stages and one that contains alkaline wastewater from the extraction stages, or
- One combined sewer line that contains wash water from all bleaching stages

Figure 6-10 shows the two configurations. Most mills have separate acid and alkaline sewers, which convey bleach plant effluent to the wastewater treatment plant.

Figure 6-10
Bleach Plant Sewer Stream Configurations



6.4.2 Applicable Regulations

The Cluster Rules regulations require all bleached kraft mills, both direct and indirect dischargers, to demonstrate compliance with limitations for 15 chlorinated compounds at the bleach plant. In addition, indirect discharge mills must demonstrate compliance with AOX limits at the bleach plant. See Section 7.3 for a more detailed discussion of the effluent limitations guidelines and standards established for mills subject to 40 CFR Part 430 (Subpart B).

NOTE! The EPA established a voluntary incentives program to encourage bleached kraft mills to achieve greater pollutant reductions than baseline regulatory requirements.

Voluntary Advanced Technology Incentives Program. In addition to the baseline wastewater regulations, as part of the Cluster Rules, EPA established the Voluntary Advanced Technology Incentives Program (VATIP) under 40 CFR Part 430 (Subpart B). This incentives program is intended to encourage bleached papergrade kraft mills to voluntarily implement pollution prevention controls beyond the baseline regulatory requirements. The program contains three tiers that reflect increasingly more effective levels of environmental protection. This increased environmental protection can be achieved with advanced pollution prevention technologies, such as oxygen delignification, ozone bleaching, and totally chlorine free (TCF) bleaching process operations. The incentives program includes more stringent limitations on the discharge of AOX than do the baseline Cluster Rules requirements. In addition, the incentives program imposes bleach plant flow reduction requirements. Tier 1 also requires participating mills to limit the lignin content of the pulp they bleach.

Mills that enter the program may do so on a line-by-line basis, so that the more stringent limitations are only applicable to those lines enrolled. In return for voluntarily accepting more stringent effluent limits, participating mills have additional time to achieve compliance and are subject to reduced monitoring requirements. (For more details see *Technical Support Document for the Voluntary Advanced Technology Incentives Program,* October, 1997.)

6.4.3 CWA Inspection Techniques

Because the Cluster Rules require mills to demonstrate compliance by monitoring bleach plant effluent, NPDES and pretreatment compliance assessments must focus on the bleach plant as well as the wastewater treatment plant. This section discusses the steps required to perform an inspection of the bleaching process and will:

- Assist inspectors in assessing kraft pulp mill compliance with NPDES permit limits applied at the mill's bleach plant effluent; and
- Assist POTWs as they assess the compliance of kraft pulp mills with pretreatment permits

6.4.3.1 Record Reviews

To demonstrate compliance with the bleach plant effluent permit limits, mills must monitor their bleach plant effluent discharges and maintain records of the monitoring. Discharge Monitoring Reports (DMRs) must be submitted to the mill's permitting authority annually, or more frequently if required by permit.

Permit review. The inspector should review permit requirements for bleach plant effluent, noting the required monitoring locations and frequency. Although the mill must monitor at the frequency specified in its permit, the Cluster Rules specify minimum monitoring frequencies for all pollutants monitored at the bleach plant, as indicated in Figure 6-11.

NOTE! The inspector should determine if mill operations are consistent with the permit. If an inconsistency is found, the inspector should determine if the facility is making an unauthorized discharge or if a permit modification is required.

Figure 6-11
Pollutant Monitoring Frequencies for Bleach Plants

Pollutant	Minimum Monitoring Frequency
Chloroform	Weekly
TCDD and TCDF	Monthly
Chlorinated phenolic compounds	Monthly
AOX (for indirect discharge mills)	Daily

DMR review. The inspector should review DMRs (and any other available monitoring data) to determine whether there has been a violation of permit limits and to identify any excursions from typical performance which may not have been violations. Events occurring at the mill at the time of the excursions should be reviewed with mill operators.

Bleaching process operations. Typically, kraft mills monitor and record information about certain parameters in order to control the bleaching process. The operation and control of pulping and bleaching processes determines, to a large extent, the quantity of chlorinated pollutants generated. The inspector should review bleach plant records to determine if operations at the time that compliance samples were collected were

NOTE! The inspector should review bleach plant operating records to determine if compliance samples were collected during normal operations.

representative of the normal operation of the bleach plant, or if bleaching operations were inappropriately manipulated in order to achieve compliance. In addition, the inspector should identify any excursions from typical performance to understand how well controlled bleach plant operations are. Records of the following parameters may provide such information:

- *Bleach plant discharge flow*. Bleach plant limits for TCDD, TCDF, and the chlorinated phenolic compounds are expressed as concentrations (31.9 picograms/liter for TCDF; <Minimum Level (ML) for the others). The inspector should review records of the bleach plant discharge flow to determine if samples were collected during normal operations with representative discharge flows. Samples collected during periods of abnormally high flow may enable the mill to comply with concentration permit limits through dilution.

- *Chemical application rates*. Effluent limitations guidelines are based on complete (100 percent) substitution of chlorine dioxide for chlorine and hypochlorite. Compared to chlorine dioxide bleaching, chlorine and hypochlorite generate greater quantities of chlorinated pollutants. Mills are not required to eliminate the use of chlorine and hypochlorite, but only to demonstrate compliance with their permit limits. Inspectors should review the records to determine:

  - Whether these chemicals are still in use. If so,
  - That samples were collected under the bleaching conditions specified in the permit. For example, mills that continue to use chlorine and hypochlorite may agree to sample when these chemicals are used to represent "worst case" conditions with respect to the generation of chlorinated organic pollutants. Alternatively, the permit may require collection of samples on a more frequent basis than specified in the regulation. The inspector should verify that permit conditions were met.

- *Kappa number and kappa factor*. The *kappa number* indicates the lignin content of the pulp. The pulping process removes much of the lignin and mills generally measure the kappa number after pulping to properly adjust chemical application rates and otherwise optimize bleaching control parameters. The lower the kappa number, the lower the required chemical application rate to produce a given pulp quality. *Kappa factor* is the ratio of chlorine bleaching chemicals applied to the lignin content of the pulp. Use of a lower kappa factor reduces the potential for formation of TCDD/F and other chlorinated pollutants. Inspectors should review bleach records to understand the kappa factor variability. High kappa factors may led to excessive discharges of chlorinated pollutants. Note that mills may consider those values to be confidential business information (CBI). Although this does not affect the inspector's ability to review the information, special handling procedures for the data may apply (see Section 3 for a general discussion of CBI issues).

- *Temperature and pH in and across bleach stages*. Mills control the temperature and pH of each bleaching and extraction stage to control pulp quality. Any inconsistency in temperature and pH may indicate a disruption in bleaching operations that may have led to increased pollutant discharges.

! *Production data*. Chloroform permit limits are mass-based. The inspector should compare bleach plant production records to the permit file to verify that an appropriate production value was used as the basis of chloroform permit limits. (For a more detailed discussion of mass-based permit limits, see Section 7.3.1.) If an inconsistency is found, the inspector should refer the matter to the permit writer to determine if the facility is making an unauthorized discharge or if a permit modification is appropriate.

6.4.3.2 Physical Inspection of the Bleach Plant (Facility Site Review)

The bleach plant should be inspected following the general procedures described in the *NPDES Compliance Inspection Manual*. The inspection should include interviews of bleach plant personnel. By examining the bleach plant equipment and by interviewing mill staff, the inspector may uncover bleach plant conditions which could lead to problems in compliance with bleach plant effluent limitations (see Figure 6-12).

Figure 6-12
Conditions that May Lead to Problems in Compliance with Bleach Plant Effluent Limitations

If ...	Then...
Bleaching towers and extraction stages show signs of corrosion	Inefficient bleaching operations may persist, leading to excessive pollutant discharge
Bleach plant washers and savealls leak	Pollutant discharges may be escaping detection
Sewer line(s) contain excessive entrained air	Monitoring results may be inaccurate
Sampling procedures are not documented	Invalid laboratory results may persist
Monitoring points are incorrectly placed	Monitoring results do not reflect accurate pollutant discharge
Bleach plant schematic is inconsistent with bleach plant layout	Incorrect monitoring locations may be in use; wastewater flows used to calculate mass discharges may be inaccurate

6.4.3.3 Flow Monitoring Evaluations

Prior to the Cluster Rules, few mills regularly monitored bleach plant effluent flow or pollutant loadings. The Cluster Rules' wastewater regulations require mills to collect compliance samples for all chlorinated pollutants (except AOX from direct discharging mills) from the point where the wastewater containing such pollutants leaves the bleach plant. The appropriate location(s) should be specified in the permit. Because limits for dioxins and chlorinated phenolic compounds are expressed as concentrations, EPA strongly recommends that permit writers require mills to continuously measure bleach plant effluent flow. Flow measurement will help verify that samples are representative of normal operations. Inspectors must examine the monitoring locations and determine whether:

- Monitoring location(s) captures all bleach plant effluent streams; and
- Flow monitor(s) functions properly (i.e., is properly installed, calibrated, and maintained)

Inspectors should refer to the *NPDES Compliance Inspection Manual* (EPA 300-B-94-014) for more discussion of flow monitoring evaluations.

6.4.3.4 Sampling Evaluations

Demonstration of compliance with limits for 2,3,7,8-TCDD, 2,3,7,8-TCDF, chloroform and chlorinated phenolic compounds at the bleach plant effluent requires that mills use appropriate sampling procedures.

> **NOTE! Each mill is required to follow any specific sampling procedures specified in its permit.**

Collection methods. Appropriate sample collection procedures are determined by the physical and chemical properties of the pollutants of concern.

2,3,7,8-TCDD; 2,3,7,8-TCDF; and the chlorinated phenolic compounds (and AOX for indirect dischargers). Samples analyzed for these pollutants may be collected as grab composite samples collected from both the acid sewer and the alkaline sewer. Typically, the composite is collected every four hours, for 24 hours. Mills may collect samples by using a continuous automated sampling device, if appropriate for the sampling location specified in the permit. For these pollutants, the mills may demonstrate compliance by preparing a flow proportioned composite of the acid and alkaline sewer samples, resulting in one sample of bleach plant effluent for analysis. (If necessary to achieve the applicable method's minimum level, EPA recommends that mills test the effluents separately for reliable determination of chlorophenolic compounds, 2,3,7,8-TCDD and 2,3,7,8-TCDF.)

Chloroform. For chloroform, however, separate samples and analyses of all bleach plant filtrates discharged

> **NOTE! Samples to be analyzed for chloroform require special handling because of chloroform's volatility.**

separately are required to prevent the loss of chloroform through air stripping as the samples are collected and measured, or through chemical reaction when the acid and alkaline samples are combined. If separate acid and alkaline sewers do not exist, compliance samples must be collected from the point closest to the bleach plant that is or can be made physically accessible.

Samples to be analyzed for chloroform will typically be collected every four hours for 24 hours. However, because chloroform is volatile, samples must never be collected using a continuous automated sampling device (unless such a device has been demonstrated to be suitable for sampling volatile compounds). In addition, the following special sampling procedures apply:

- ! Samples should be cooled during collection because the bleach plant effluent streams are hot
- ! Samples should not contain air bubbles

Figure 6-13 summarizes sampling procedures for each pollutant.

Figure 6-13
Recommended Bleach Plant Effluent Sampling Evaluation Collection Procedures

Pollutant Monitored	Container	Preservative*	Minimum Sample Volume	Collection Method
Chloroform	Glass vial with Teflon septum	3 granules (10 mg) $Na_2S_2O_3$ per vial, 2 drops HCl per vial, 4 °C	12 x 40 mL each grab	! Grab (1 every 4 hours) ! 24-hour composite prepared by lab
2,3,7,8-TCDD and 2,3,7,8-TCDF	Amber glass bottle with Teflon lid liner	$Na_2S_2O_3$, for samples > pH 11, add H_2SO_4 to pH 7-9, 4 °C	2 x 1,000 mL	! Grab (1 every 4 hours) or continuous automatic composite ! 24-hour composite
Chlorinated phenolic compounds	Amber glass bottle with Teflon lid liner	$Na_2S_2O_3$, H_2SO_4 to pH 2-3, 4 °C	3 x 1,000 mL	
AOX (for indirect dischargers)	Amber glass bottle with Teflon lid liner	$Na_2S_2O_3$, HNO_3 to pH 2-3, 4 °C	500 mL	

* Note: sodium thiosulfate ($Na_2S_2O_3$) is required only if free chlorine is present in the wastewater

6.4.3.5 Laboratory/QA Evaluations

As discussed in Section 7.4.5, many kraft mills operate on-site laboratories to analyze BOD_5 and TSS. Unlike the test procedures for BOD_5 and TSS, the test procedures for chloroform, 2,3,7,8-TCDD, and 2,3,7,8-TCDF are complex and require specialized laboratory equipment. As a result, many mills contract laboratories to perform bleach plant effluent testing. Inspectors should examine sample handling procedures to ensure QC procedures are followed. Each mill should have written QC procedures for mill staff. Inspectors should review these procedures and determine whether they are followed.

Inspectors should review documentation to determine if contract laboratories use the test methods specified in the NPDES permit. Figure 6-14 lists the test method that must be used for each pollutant limited in bleach plant effluent.

Figure 6-14
Test Method for Each Pollutant Limited in Bleach Plant Effluent

Pollutant	Method
Chloroform	601, 624, 1624B and standard methods 6210B, 6230B
12 Chlorinated Phenolic Compounds	1653
2,3,7,8-TCDD and 2,3,7,8-TCDF	1613

6.5 EPCRA Issues and Inspection Considerations

NOTE! See Appendix D for overview of EPCRA regulations and basic assessment procedures.

General concerns. The basic regulatory requirements for EPCRA are not process-specific but rather apply on a facility-wide basis. Thus the basic requirements of EPCRA are discussed in Appendix D.

For the bleach plant operations, key EPCRA issues will be to quantify releases of applicable toxic chemicals in the annual Toxic Release Inventory (TRI) report (known as the "Form R" report), and to comply with emergency reporting requirements. The emergency reporting requirements apply under both EPCRA and CERCLA. The releases subject to these emergency reporting requirements are releases that are not federally permitted and that exceed certain reportable quantities. For certain releases that are "continuous" and "stable in quantity and rate," the mill may be able to use special reporting options so that a notice is not required after each such release. See the discussion of continuous releases in Appendix D for further detail on the differences between standard emergency reporting and reporting of continuous releases.

For this process area, air emissions of chlorine or chloroform from bleach plant emission points are one potential source of releases that could be subject to EPCRA and CERCLA emergency reporting (the reportable quantity for each of these compounds is 10 pounds per 24-hour period). In addition, raw material spills could result in releases that are not federally permitted and exceed applicable reportable quantities. See Appendix D for a non-exclusive list of hazardous substances associated with kraft pulp mills and the corresponding reportable quantity values for each substance.

The determination of what constitutes a "federally permitted release" can be complex. However, it is important to note that if the mill as a matter of normal operations emits an applicable pollutant in amounts that exceed the reportable quantity **and** there is no emission limit established for the pollutant, then the emergency reporting provisions likely apply. For instance, a mill should file appropriate emergency reports if no chloroform emission limit applies to a bleaching system, and the bleaching system normally emits more than 10 pounds of chloroform in a 24-hour period. In this circumstance, the reduced continuous release reporting options likely are available, as discussed in Appendix D.

Inspection considerations. The EPCRA compliance assessment generally will focus initially on a records review. The inspector should review the following materials:

- *Emergency preparedness information*. These obligations are not process-specific, and thus the basic assessment considerations are covered for all facility operations in Appendix D to this manual.

- *TRI Form R*. Check to ensure that the form is on file, and that the source has adequately considered: (1) on-site air, water, and land releases, including land disposals of toxic chemicals, associated with the bleach plant operations and (2) transfers of waste containing those toxic chemicals. For wastewater discharge from the bleach plant, verify that the mill accounted for the residual TRI compounds found in wastewater treatment plant sludges that are associated with bleach plant effluent. Also, ask to see the estimation technique being used for air and water releases associated with bleach plant operations. If the estimation technique involves an assumed reduction efficiency for control methods (either for air or water control measures), make sure that the assumed efficiency is consistent with the overall efficiency that the mill is achieving. The overall assumed efficiency should account for any excess air or water releases in a manner consistent with the actual percent of operating time air control device or wastewater treatment upsets occur. Uncontrolled emission episodes or periods of reduced control efficiency can have a significant impact on the estimate of total releases.

- *Emergency notifications*. Request documentation that the mill has filed all required notices.

If an air or water inspector plans to screen for EPCRA compliance, the inspector should confirm the necessary information with the facility contact during the opening conference or just in advance of the closing conference. For an announced inspection, the inspector should ask the source to have ready EPCRA-related documentation so that this screening check can be performed without interrupting the main focus of the inspection. A screening checklist is included as part of the example assessment form in Appendix E.

In addition to a screening-type records review inspection, an EPCRA inspector may want to conduct further assessments to identify potential compliance concerns with emergency notification requirements. As one technique, the inspector first can check material storage and handling spill records, and citizen complaints since the previous inspection. The inspector should then cross-check those incidents with notification records identified in EPA's ERNS database, records on file with state/local emergency officials, or records requested from the mill. If this type of investigation identifies episodes of abnormal discharges for which no notification was provided, the inspector should consider a follow-up investigation to determine if reportable quantity thresholds were exceeded.

References:

1. Dence, C.W. and D.W. Reeve, *Pulp Bleaching Principles and Practices*. TAPPI Press, 1996.

2. Buonicore, A.J and Davis, W.T., eds., *Air Pollution Engineering Manual*, Air and Waste Management Association, 1992.

3. Chemical Pulping Emission Factor Development Document (Revised Draft), U.S. Environmental Protection Agency, July 8, 1997.

4. U.S. Environmental Protection Agency, Pulp and Paper NESHAP: A Plain English Description, EPA-456/R-98-008, November 1998.

SECTION 7: ASSESSMENT MODULE FOR THE WASTEWATER TREATMENT PLANT

7.1 Introduction

This section provides the information for conducting a compliance assessment of the wastewater treatment plant, including a general description of typical wastewater treatment plant operations at kraft pulp mills. The section also describes kraft mill pollutants and outlines the regulatory requirements for this area of kraft pulp mills.

CONTENTS

7.2 Overview of Process and Discharges

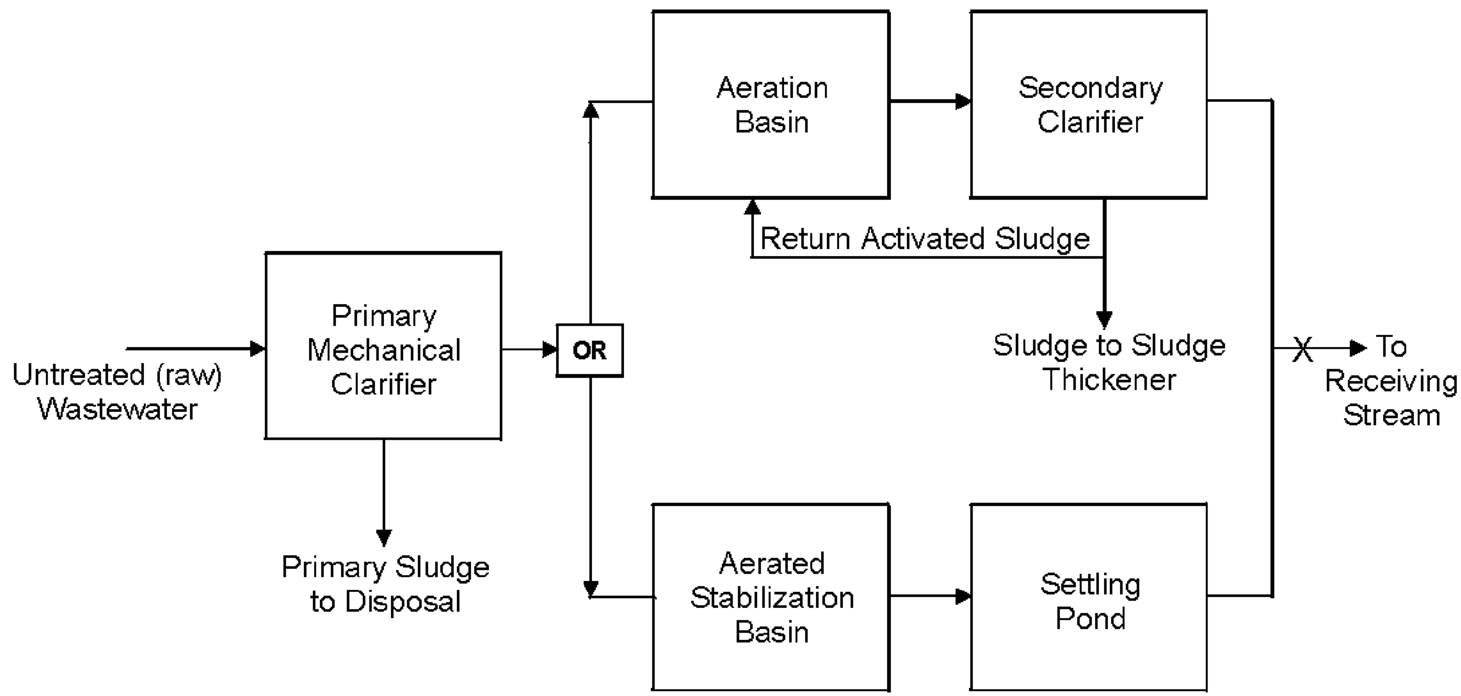
7.2.1 Description of the Process

Kraft pulp mills treat wastewater using primary (physical) and secondary (biological) treatment to reduce pollutant discharges to receiving waters. Kraft mills typically collect and treat the following wastewaters:

! Water used in wood handling and barking
! Digester, turpentine recovery, and evaporator condensates
! Wastewater from brown stock screening
! Bleach plant effluent
! Paper machine white water
! Spent pulping liquor spills from pulp processing areas

Figure 7-1 shows a typical sequence of the major equipment systems in the wastewater treatment plant. The function of each of these systems is described below.

Figure 7-1
Diagram of Wastewater Treatment Plant Major Equipment Systems



X - Point at which flow and pollutant content measured.

Primary treatment. Mills use primary treatment to remove suspended solids from wastewater, then treat the wastewater further in secondary treatment. Primary treatment processes used by kraft mills typically involve screening followed by either sedimentation or flotation.

Sedimentation. Kraft mills use mechanical clarifiers or, occasionally, settling ponds that provide sufficient holding time to enable suspended solids to settle. After settling occurs in the mechanical clarifier, the resulting sludge (which contains up to six percent solids) is pumped from the clarifier to sludge handling facilities where it is dewatered prior to disposal. Mechanical clarifiers can remove as much as eighty to ninety percent of suspended solids.

Settling ponds, a less sophisticated alternative to mechanical clarifiers, also remove suspended solids by sedimentation. Settling ponds may be clay-lined, synthetic-lined, or unlined and earthen, and have longer retention times than clarifiers. Settling ponds produce a less constant solids loadings than mechanical clarifiers, but still provide sufficient solids removal prior to secondary treatment.

Flotation. Flotation is a solids removal process that introduces a gas, usually air, into the wastewater stream. The gas adheres to the suspended solids, reducing their density and causing them to rise to the surface of the water, where they are skimmed off. The advantage of flotation clarification over sedimentation is that lighter particles that require very long retention times to settle are removed more quickly.

A common modification of this process is dissolved air flotation (DAF), in which air under pressure is injected into the wastewater. DAF units are more efficient than conventional flotation clarifiers because more air is introduced into the wastewater, thereby removing more solids.

Secondary treatment. Kraft mills employ secondary treatment to reduce biochemical oxygen demand (BOD_5) and toxicity in wastewaters. This process makes use of microorganisms (mostly bacteria and fungi) under aerobic conditions to digest the organic matter in the wastewater. The organic matter is removed as sludge and the treated wastewater is discharged into receiving waters. Because pulp mill wastewater is deficient in nitrogen and phosphorus relative to its high carbon load, these nutrients are usually added to the process to enhance microbial activity. Kraft mills generally use one (or more) of two basic types of secondary treatment processes described below.

Aerated and non-aerated stabilization basins. About seventy-five percent of U.S. kraft mills use aerated stabilization basins. These basins are equipped with continuous mechanical aerators or diffusers to introduce air into the wastewater. By aerating the wastewater, an increased amount of oxygen is introduced into the wastewater stream. This action significantly speeds up the biological activity compared to a non-aerated basin, so that a retention time of five days may achieve ninety percent BOD_5 removal. The continuous aeration also provides thorough mixing which allows mills to operate effective aeration lagoons at depths up to twenty-five feet. These basins are typically lined with clay or a combination of synthetics and clay.

Some kraft mills use basins without mechanical aerators. Known as stabilization basins, this is the simplest form of aerobic treatment. This process uses shallow basins that cover very large areas and relies on natural diffusion of air into the wastewater to create aerobic conditions. At depths greater than four feet, anaerobic micro-organisms will become active in the lowest levels; thus, stabilization basins are shallow. Typically, the basin is earthen; however, some are lined with compacted clay. Wastewater retention time may last up to thirty days to achieve up to ninety percent BOD_5 removal.

Some kraft mills use both aerated and non-aerated basins. The stabilization basin, which may precede or follow the aerated stabilization basin, serves as a "polishing" or "holding" pond to remove additional organic wastes, including biological solids, or to control final effluent discharge to receiving waters.

Activated sludge system. This system features a microbial floc held in suspension in an aeration chamber. Soluble organic matter in the wastewater is metabolized by the microbial floc which changes it into solids, thereby increasing the suspended solids load. After aeration, treated wastewater is routed to a clarifier where the settled solids are removed as sludge. A significant fraction of this sludge is recycled back to the aeration chamber to maintain the high level of microbial floc (this is the "activated sludge"). The sludge that is removed is dewatered and disposed. Retention time for this system can range from less than six to over 12 hours.

7.2.2 Air Pollutant Emissions

The two main sources of air pollutants that may be emitted from the basic wastewater treatment plant operations are the pulping condensates and the bleach plant effluent. The pulping condensates may include total reduced sulfur (TRS) compounds as well as volatile organic compounds (VOC), such as methanol. The primary pollutants of concern for the bleach plant effluent are chloroform and methanol. Air emission concerns for the pulping condensates and bleach plant effluent are covered in Sections 4 and 6, respectively. The other sources of volatile compounds that could be released as air emissions from basic wastewater treatment plant operations are relatively minor in comparison to emissions from other mill operations and are generally not subject to specific regulation.

In addition, if a mill operates a sludge incinerator, there will be emissions from the incinerator. Inorganic gases (such as CO, NO_x, SO_x, and HCL) may be present, as well as particulate matter (including ash and heavy metals) and organic gases. The only compound subject to specific federal regulations for industrial wastewater sludge incinerators is mercury (40 CFR Part 61, Subpart E). In most cases, compliance with the Subpart E incinerator requirements involves only an initial test to document mercury levels, with a follow up estimate of the impact on mercury emissions if operating conditions are changed. For this reason, these emissions are not discussed further in this section.

7.2.3 Water Pollutant Discharges

As discussed above, kraft mills treat wastewater in order to minimize effluent impacts on receiving waters. Generally, treated effluent is discharged from the wastewater treatment system from one discharge point. The following pollutants of concern exist at all kraft mills: BOD_5, total suspended solids (TSS), color, and chemical oxygen demand (COD). At kraft mills that bleach pulp with chlorine-containing compounds, additional pollutants of concern are: chloroform; 2,3,7,8-TCDD; 2,3,7,8-TCDF; chlorinated phenolic compounds; and adsorbable organic halides (AOX). Each of these pollutants is discussed below.

BOD_5 and TSS. High concentrations of organic matter found in kraft mill wastewater result in large quantities of BOD_5. Treatment of this BOD_5 results in the generation of large quantities of TSS. In general, kraft mills achieve ninety percent (or greater) removal of these pollutants when primary and secondary treatment are well-operated.

Color. Kraft pulp mill effluents contain highly colored lignin and lignin derivatives that have been solubilized and removed from wood during pulping and subsequent bleaching operations. For kraft mill wastewaters, color is determined by spectrophotometric comparison of the sample with a 1 mg/L solution of platinum, in the form of chloroplatinate ion. The color of kraft mill wastewaters is considered to be the color of the water from which turbidity has been removed ("true" color). Further, wastewater color is highly pH dependent, so the pH of color samples is adjusted to pH 7.6.

The EPA has not promulgated national regulations for color because the potential for significant aesthetic or aquatic impacts from color discharges is driven by highly site-specific conditions, such as the color of the receiving stream and the relative contribution of the mill discharge to the stream flow. However, many individual NPDES permits contain water quality-based effluent limitations on the discharge of color, developed to address local conditions.

COD. COD is a measure of the quantity of chemically oxidizable material present in wastewater. Sources of COD include the pulping area, chemical recovery area, bleaching area, and papermaking area. A portion of COD is readily biodegradable while the rest is resistant to biodegradation (i.e., "refractory"). Although the amount and sources of refractory COD will vary from mill to mill, some portion of it is derived from black liquor; thus, COD biodegradability indicates the degree to which black liquor is recovered from brown stock pulp and kept out of wastewater through effective BMPs. Wastewater COD loads also relate to discharges of toxic organic pollutants that are not readily biodegraded. Although EPA has not established COD effluent limitations guidelines at this time, EPA is planning to do so in a future rulemaking.

Chloroform. Chloroform is an extremely volatile compound that is generated during the bleaching of pulp with hypochlorite, chlorine, or chlorine dioxide. Hypochlorite bleaching results in the greatest amount of chloroform generation, while chlorine dioxide bleaching results in the least amount of chloroform generation. As chloroform is generated, it partitions to air and to bleach plant effluent (with a small fraction remaining with the pulp). Any chloroform found in bleach plant effluent that is not emitted to the air prior to reaching the wastewater treatment plant may be volatilized or degraded during secondary treatment or discharged in the effluent.

2,3,7,8-TCDD (dioxin) and 2,3,7,8-TCDF (furan). During the late 1980s, bleaching with chlorine and hypochlorite were discovered to be sources of dioxin and furan. Although use of chlorine dioxide (ClO_2) bleaching minimizes the formation of chlorinated pollutants, measurable quantities of 2,3,7,8-TCDF and possibly 2,3,7,8-TCDD may still be formed. Dioxin and furan are not effectively degraded during wastewater treatment; they partition to the sludge and may be discharged with TSS into receiving waters untreated.

Chlorinated phenolic compounds. Chlorinated phenolic compounds include phenols, guaiacols, catechols, and vanillins substituted with from one to five chlorine atoms per molecule. Typically, bleaching processes that result in the formation of 2,3,7,8-TCDD and 2,3,7,8-TCDF also generate the higher substituted tri-, tetra-, and penta-chlorinated compounds. EPA has established effluent limitations guidelines and pretreatment standards for the following twelve chlorinated phenolic compounds:

- Trichlorosyringol
- 3,4,5-Trichlorocatechol
- 3,4,6-Trichlorocatechol
- 3,4,5-Trichloroguaiacol
- 3,4,6-Trichloroguaiacol
- 4,5,6-Trichloroguaiacol
- 2,4,5-Trichlorophenol
- 2,4,6-Trichlorophenol
- Tetrachlorocatechol
- Tetrachloroguaiacol
- 2,3,4,6-Tetrachlorophenol
- Pentachlorophenol

Adsorbable organic halides (AOX). AOX is a measure of the total amount of halogens (chlorine, bromine, and iodine) bound to dissolved or suspended organic matter in a wastewater sample. In bleached kraft mill effluent, essentially all of the AOX is comprised of chlorinated compounds formed during bleaching with chlorine and other chlorinated bleaching agents. Inefficient application of chlorine-containing bleaching chemicals can generate increased levels of AOX. Minimizing AOX will usually have the effect of reducing the generation of chloroform, 2,3,7,8-TCDD, 2,3,7,8-TCDF, and chlorinated phenolic compounds. Some AOX is biodegraded during secondary treatment.

In addition to retaining the existing effluent limitations guidelines and standards for BOD_5, TSS, and pH, the Cluster Rules establish new effluent limitation guidelines and standards for bleached papergrade kraft mills for the other parameters described above, with the exception of color and COD. The Cluster Rules regulations require bleached kraft mills to meet limits on in-process streams *and* treated effluent, depending on the pollutant (see Section 7.3.3). See the References for further sources of information on the applicable discharges and control strategies.[1,2,3,4]

7.2.4 Solid/Hazardous Waste Discharges

Kraft pulp mills generate both primary sludge and secondary (biological) sludge. The collected sludges may be thickened in gravity or flotation thickeners and/or chemically conditioned prior to dewatering. Primary sludge is usually generated in greater quantities than biological sludge. Although the sludges potentially can be used for alternative beneficial uses, generally dewatered sludges are disposed of through land application, landfilling, or combustion. Because of concerns about potential contamination with dioxin, under paragraph 1(l)(ii) of the Consent Decree in EDF v Browner Civ. No. 89-0598 (D.D.C), EPA was required to make a hazardous waste listing determination for sludges from bleached kraft mill effluents *unless* the final effluent guidelines were based on the use of at least one of certain specified technologies. These technologies enable the mill to use less chlorine in bleaching pulp and thus to generate less dioxin contamination. After the promulgation of the Cluster Rules, EPA determined that the final guideline was based on the specified technologies, and thus EPA determined that it was not required to make a hazardous waste listing determination for pulp mill sludges.[5] If the sludges at a particular mill exhibit a hazardous waste characteristic, the sludges would be hazardous wastes even without an EPA listing determination.

Sludge handling processes. Some mills may perform sludge grinding, gravity, or flotation thickening or chemical preconditioning to achieve up to ten percent sludge solids content. Dewatering, the most common sludge handling process, is described below.

Belt filter press. Sludge is squeezed between two porous cloth belts. The dewatered sludge cake is scraped from the belts by blades. This operation results in typical sludge solids content of fifty percent for primary sludge and twenty percent for biological sludge.

Vacuum filters. Vacuum filter systems consist of a horizontal cylinder partially submerged in a tank of sludge. A layer of porous filter media fabric or tightly wound coils covers the outer surface of the cylinder. As the cylinder surface passes through the sludge tank, a layer of sludge adheres to the cylinder, and vacuum is applied. The dewatered sludge cake is then scraped off the fabric and consists of up to thirty percent solids.

Screw presses. Many kraft mills use screw presses that can achieve up to fifty-five percent sludge solids when dewatering primary sludge. This operation does not require preconditioning to achieve high sludge solids content.

Sludge disposal processes. Subsequent to sludge handling processes, kraft mills dispose of sludge by land application, landfill, or combustion. Each disposal method is discussed below.

Land application. Sludge from kraft mills is classified as a soil amendment because it is too low in nutrients to be of any value as a fertilizer. Due to concerns regarding dioxin and furan contaminated sludges, in 1994 EPA and AF&PA entered into an agreement governing the land disposal of sludge.[6] In this agreement, AF&PA agreed to compile annual monitoring reports for those mills that land apply materials with a dioxin/furan concentration equal to or greater than 10 ppt. Individual mills also entered in separate agreements with EPA governing the land application of their sludges.

Landfill. This is the most common disposal method. Kraft mills may use on-site landfills or off-site commercial landfills.

Combustion. Some mills will combust the sludge for heat recovery in a specialized sludge incinerator, or a hogged or fossil fuel power boiler. Currently, this disposal method is less common than landfilling.

7.2.5 EPCRA Chemicals and Reportable Releases

Facilities will have to provide information on chemicals used in the wastewater treatment plant to meet EPCRA's emergency preparedness requirements. Appendix D contains a process-based list of the types of hazardous chemicals that may be included in an EPCRA inventory for a kraft pulp mill.

On-site air, water and land (i.e., sludge) releases, including land disposals, of toxic chemicals from the wastewater treatment plant and off-site transfers of waste containing these toxic chemicals may have to be accounted for in filing TRI Form R reports. In addition, EPCRA/CERCLA emergency release reporting could apply for off-site releases that are not federally permitted and that exceed a certain reportable quantity. These releases most likely would involve water discharges resulting from wastewater treatment plant upsets or could involve spills resulting from material storage and handling activities.

These EPCRA issues are discussed in Section 7.6.

7.3 CWA Regulatory Requirements

Section 402 of the Clean Water Act (CWA) mandated that EPA establish the National Pollution Discharge Elimination System (NPDES) program to minimize the discharge of pollutants to receiving waters. Within the NPDES program, industrial facilities that discharge process wastewaters from any point source into waters of the United States (i.e., direct dischargers) are required to obtain an NPDES permit. Permitting authorities must develop NPDES permits using technology-based effluent limitations guidelines established by EPA for the relevant industrial category. In cases where technology-based effluent limitations guidelines are insufficient to achieve and maintain the water quality standards of receiving waters, permitting authorities must impose water quality-based effluent limits (WQBELs) in addition to, or in place of, technology-based effluent limitations.

Technology-based effluent limitations. Technology-based effluent limitations guidelines and standards are established to require a minimum level of treatment for industrial point sources based on currently available in-plant process control and external treatment technologies, while allowing the discharger to use any available control technique to meet the limitations. The technology-based effluent limitations guidelines and standards established in 40 CFR Part 430 are based on the demonstrated performance of model process and treatment technologies that are within the economic means of the pulp and paper industry.

Kraft mills are subject to one of three federal effluent limitation regulations in 40 CFR Part 430:

- Subpart B for bleached papergrade kraft and soda mills
- Subpart A for dissolving kraft mills
- Subpart C for unbleached kraft mills

Mills that use purchased pulp, as well as pulp that they make on site, in their final product are also subject to effluent limitations regulations in:

- Subpart K for fine and lightweight papers
- Subpart L for tissue, filter, non-woven, and paperboard

For mills that discharge their wastewater directly to a receiving stream, these subparts establish effluent limitations guidelines that are implemented through the NPDES permit process. A mill is not required to comply with the guidelines until they are incorporated into the mill's NPDES permit, which is effective for five years. For mills that discharge their wastewater indirectly (i.e., to a POTW), the subparts establish pretreatment standards, which are effective on the dates specified in the regulations.

In the Cluster Rules, EPA revised effluent limitation guidelines and pretreatment standards for bleached papergrade kraft and soda mills, and revised the subcategorization scheme of Part 430. The EPA intends to promulgate revised regulations for unbleached kraft and dissolving kraft mills in future rulemakings.

Water quality-based effluent limitations (WQBELs). All receiving waters have ambient water quality standards which are established by the states or EPA in accordance with federal regulations to maintain and protect designated uses of the receiving water (e.g., aquatic life-warm water habitat, public water supply, and primary contact recreation). States can use the total maximum daily load (TMDL) process to quantify the allowable pollutant loadings in receiving waters, based on the relationship between pollution sources and in-stream water quality standards.

Some permitting authorities may find that the application of the technology-based effluent limitations guidelines result in pollutant discharges that still cause exceedances of the water quality standards in particular receiving waters. In such cases, permitting authorities are required to develop more stringent WQBELs for the pollutant to ensure that the water quality standards are met. For a description of how water quality standards are developed and incorporated into permits, refer to *Guidance for Water Quality-Based Decisions: The TMDL Process* (EPA 440/4-91-001) and *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001).

Summary of national regulatory requirements. This section describes the applicable national regulatory requirements for bleached, unbleached, and dissolving kraft mills, and points out where additional regulations may be added in the future. The inspector, however, should note that permit requirements will be specifically tailored for each discharging facility. Figure 7-2 summarizes the discussion of regulatory requirements presented below.

Figure 7-2
Wastewater Regulations for Existing Kraft Pulp Mills

Type of Kraft Mill	Direct or Indirect Discharger	BPT	Pre-Cluster Rules BAT	Cluster Rules BAT	Pre-Cluster Rules PSES	Cluster Rules PSES
Bleached Kraft Mills	Direct Discharger	✓	✓	✓		
	Indirect Discharger				✓	✓
Unbleached Kraft Mills	Direct Discharger	✓	✓			
	Indirect Discharger				✓	
Dissolving Kraft Mills	Direct Discharger	✓	✓			
	Indirect Discharger				✓	

7.3.1 Pollutants Regulated

Prior to the Cluster Rules, direct discharge kraft mills were subject to:

- Best practicable control technology currently available (BPT) and best conventional pollutant control technology (BCT) guidelines for the control of conventional pollutants (BOD_5, TSS, and pH)
- Best available technology economically achievable (BAT) guidelines for the control of toxic and nonconventional pollutants (pentachlorophenol and trichlorophenol, chemicals commonly used as biocides)
- New source performance standards (NSPS) for the same pollutants for new direct dischargers

Indirect discharge kraft mills were subject to performance standards for existing sources or new sources (PSES or PSNS, as applicable) for the control of pentachlorophenol and trichlorophenol.

NOTE! For kraft pulp mills, the Cluster Rules add toxic and nonconventional pollutants to the list of regulated pollutants *only for bleached papergrade kraft mills*. All existing guidelines and standards for kraft mills remain in effect.

For kraft pulp mills, the Cluster Rules add new requirements only for bleached papergrade kraft mills. For this subset of kraft mills, the Cluster Rules adds effluent limitations guidelines and standards for the following BAT and PSES pollutants (and NSPS/PSNS for new sources): chloroform; 2,3,7,8-TCDD; 2,3,7,8-TCDF; twelve chlorinated phenolic compounds; and AOX. All of the pre-Cluster Rules effluent limitation guidelines and standards applicable to kraft pulp mills remain in effect, although the Cluster Rules reorganized these limits into new subcategories.

7.3.2 Subcategorization

NOTE! Cluster Rules collapsed four previous bleached papergrade kraft mill subparts into 40 CFR 430 Subpart B and three previous unbleached kraft subparts into 40 CFR Part 430 Subpart C.

The Cluster Rules reorganized the subcategorization scheme of Part 430 to simplify the categories. Previously, mills were grouped by the types of products manufactured. The Cluster Rules reduced the number of subcategories by grouping mills by similar processes.

In the previous regulation, bleached kraft mills were divided into four subparts and unbleached kraft mills were divided into three subparts. As a result, the remaining pre-Cluster Rules limits (i.e., BPT for BOD_5, TSS, and pH, and BAT and PSES for pentachlorophenol and trichlorophenol) for the four previous bleached kraft mill subparts now exist as four segments of 40 CFR Part 430 (Subpart B). Likewise, the remaining pre-

Cluster Rules limits for the three previous unbleached kraft subparts now exist as three segments of 40 CFR Part 430 (Subpart C).

7.3.3 Compliance Monitoring Requirements and Locations

Before the Cluster Rules, all compliance monitoring for direct dischargers occurred at a location in the plant downstream of treatment but prior to the point at which the final effluent is discharged to the receiving waters. The revised BAT regulations require all bleached kraft mills, both direct and indirect dischargers, to demonstrate compliance with limitations for fifteen chlorinated compounds at the bleach plant (see Section 6). Bleach plant effluent limits are necessary for 2,3,7,8-TCDD, 2,3,7,8-TCDF, and the twelve chlorinated phenolic pollutants because pulp bleaching is the principal source of these pollutants, and it would not be possible, in all instances, to properly assess compliance at the final mill effluent due to dilution effects created by other wastewaters. Bleach plant effluent limits for chloroform are also necessary because there is the potential for volatilization and loss in mill sewer systems.

Direct discharge bleached kraft mills must assess compliance with AOX limitations at the point at which the final effluent is discharged to receiving waters (unless the permit provides otherwise). Indirect discharge mills, however, must assess compliance with AOX limitations at the bleach plant, because POTWs cannot achieve, through wastewater treatment alone, the degree of AOX removal achieved by in-process technologies that form the basis of BAT.

NOTE! Direct discharge bleached kraft mills must assess compliance with AOX limitations at the final effluent discharge. Indirect discharge mills, however, must assess compliance with AOX limitations at the bleach plant.

For the remaining regulated pollutants, the compliance monitoring requirements still apply at the point of final discharge. Note that, for the biocides pentachlorophenol and trichlorophenol, most mills certify that they do not use these chemicals and thus need not monitor effluent to demonstrate compliance. Figure 7-3 summarizes the discharge monitoring requirements that apply.

7.3.4 Production Definitions

Limits for BOD_5 and TSS, established before the Cluster Rules, are production normalized -- that is, they are expressed as pounds per 1,000 pound (or kg/kkg) of product. *Product* is defined as "... the annual off-the-machine production (including off-the-machine coating where applicable) divided by the number of operating days during that year." This definition includes the weight contributed by coatings and additives (e.g., clay, dyes, strengthening agents, etc.) which may account for as much as twenty percent of a final paper product's weight. If the mill produces market pulp, product is defined as production of market pulp in air-dried metric tons (ADMT) with ten percent moisture content.

Figure 7-3
Monitoring Requirements

Pollutant	Monitoring Location, Bleached Papergrade Kraft Mills	
	Direct Discharge Facilities	Indirect Discharge Facilities
Chlorinated Phenolic Pollutants*	Bleach plant effluent	Bleach plant effluent
2,3,7,8-TCDD	Bleach plant effluent	Bleach plant effluent
2,3,7,8-TCDF	Bleach plant effluent	Bleach plant effluent
Chloroform	Bleach plant effluent	Bleach plant effluent
AOX	Final effluent	Bleach plant effluent
Pentachlorophenol	Final effluent (or certify not used)	Final effluent (or certify not used)
Trichlorophenol	Final effluent (or certify not used)	Final effluent (or certify not used)
BOD_5	Final effluent	No national standards
TSS	Final effluent	No national standards
pH	Final effluent	No national standards

* Chlorinated phenolic pollutants are: tetrachlorocatechol; tetrachloroguiacol; trichlorosyringol; 4,5,6-trichloroguaiacol; 3,4,6-trichlorocatechol; 3,4,5-trichlorocatechol; 3,4,5-trichloroguaiacol; 2,3,4,6-tetrachlorophenol; 3,4,6-trichloroguaiacol; pentachlorophenol; 2,4,6-trichlorophenol; 2,4,5-trichlorophenol.

NOTE! *Product* is defined as off-machine tons (or air dry tons for market pulp) for BOD_5 and TSS limits, but as air-dried tons of unbleached pulp entering the bleach plant for AOX and chloroform limits.

The Cluster Rules limits for AOX and chloroform are also production normalized (with the exception noted below). However, for the Cluster Rules limits, *product* is defined as "... the annual unbleached pulp production entering the first stage of the bleach plant divided by the number of operating days during that year." The unbleached pulp must be measured in air-dried metric tons (with ten percent moisture) of brown stock pulp entering the bleach plant at the stage in which chlorine-containing compounds are first applied to the pulp. The other pollutant limits established by the Cluster Rules (2,3,7,8-TCDD; 2,3,7,8-TCDF; and the 12 chlorinated phenolic compounds; as well as AOX and chloroform limits for mills that certify to using totally chlorine free bleaching) are expressed as pollutant concentrations (e.g., micrograms per liter and picograms per liter). Note that the limitations, expressed as less than the minimum level (<ML), are concentrations because the minimum level is a concentration.

Typically, when effluent limitation guidelines are production normalized, permit limits are expressed as pounds of pollutant per day. To calculate these limits, the permit writer uses a daily production calculated from one year's data representative of operations for the five years prior to permit issuance. In certain circumstances, however, production for the past five years is not appropriate. For example, if a mill significantly expanded its operations, production should be based on data representative of the period of increased production. When effluent limitation guidelines are expressed as concentrations, permit limits are typically expressed as concentrations as well.

7.3.5 Storm Water Permitting

The CWA requires an NPDES permit for storm water discharges associated with industrial activity. As discussed in Appendix B, EPA or state agencies (as applicable) typically issue "general" permits to authorize discharges from a group of similar facilities. Storm water discharges from some mills, however, may be covered by site-specific "individual" permits. Where EPA is the NPDES permitting authority, most mills will be covered by EPA's multi-sector general permit (MSGP) requirements. State permit requirements will vary but, in general, can be expected to include requirements comparable to the MSGP requirements. The main elements of the permit are to maintain a storm water pollution prevention (SWPP) plan and conduct certain limited monitoring (quarterly visual examinations of grab samples and, in some cases, analytical tests for particular pollutants, such as COD, TSS, and total recoverable iron).

Both the wastewater treatment plant operations and the sludge landfill/land application sites at a kraft pulp mill are potential sources of contaminated storm water. The EPA considers landfills and land application sites a separate sector within the MSGP. The EPA has listed general best management practices (BMPs) for these operations. In addition, treatment works for sewage are a separate sector for which EPA also has developed appropriate BMPs. Although this MSGP sector is not specifically applicable nor binding to industrial wastewater treatment facilities, many of these BMPs are relevant to industrial facilities. Thus, the SWPP for kraft pulp mill wastewater treatment facilities should have comparable BMPs to sewage treatment works and should cover the same basic potential sources of contaminated storm water. Figures 7-4 and 7-5 outline the BMP guidelines established by EPA for treatment works and landfills, respectively. For landfill and land application sites, the monitoring requirements in Figure 7-6 apply in addition to the basic quarterly visual monitoring requirements applicable to all sources covered by the MSGP.

Figure 7-4
General Storm Water BMPs for Treatment Works

Activity	BMPs
Preparation of Biological and Physical Treatment Process	! Use drip pans under drums and equipment where feasible ! Store process chemical inside buildings ! Inspect the storage yard for filling drip pans and other problems regularly ! Train employees on procedures for storing and inspecting chemicals
Soil Amending and Grass Fertilizing	! Use the appropriate amount of fertilizer ! Do not overfertilize ! Train employee on proper fertilizing techniques
Liquid Storage in Above-Ground Storage Containers	! Maintain good integrity of all storage containers ! Install safeguards (such as diking or berming) against accidental releases at the storage area ! Inspect storage tanks to detect potential leaks and perform preventive maintenance ! Inspect piping systems (pipes, pumps, flanges, couplings, hoses, and valves) for failures or leaks ! Train employees on proper filling and transfer procedures
Pest Control	! Minimize pesticide application -- only apply pesticide if needed ! Train employees on proper pesticide application
Sludge Drying Beds	! Ensure drying bed is draining properly (e.g., check for clogging) ! Avoid overfilling drying bed ! Grade the land to divert flow around drying bed ! Berm, dike, or curb drying bed areas ! Cover drying beds
Sludge Storage Piles	! Confine storage of sludge to a designated area as far from any receiving water body as possible ! Store sludge on an impervious surface (e.g., concrete pad) ! Grade the land to divert flow around storage piles ! Berm, dike, or curb sludge storage piles ! Cover sludge storage piles
Sludge Transfer	! Promptly remove any sludge spilled during transfer ! Conduct transfer operations over an impervious surface ! Avoid transferring sludge during rain events ! Grade the land to divert flow around transfer areas ! Berm, curb, or dike transfer areas ! Avoid locating transfer operations near receiving water bodies
Incineration -- Ash Impoundments/Piles	! Line ash impoundments with clay (or other type of impervious material) ! Ensure ash impoundments will hold maximum volume of ash and a 10-year, 24-hour rain event ! Curb, berm, or dike ash storage areas ! Avoid locating ash storage areas near receiving water bodies
Miscellaneous	! Properly dispose of grit/scum and dispose of screens on a daily basis ! Maximize vegetative cover to stabilize soil and reduce erosion

Figure 7-5
Potential Sources of Pollution and General Storm Water BMPs for Landfills

Potential Pollutant Sources	BMPs
Erosion from: ! Exposed soil from excavating cells/trenches ! Exposed stockpiles of cover materials ! Inactive cells with final cover but not yet finally stabilized ! Daily or intermediate cover placed on cells or trenches ! Erosion from haul roads (including vehicle tracking of sediments)	! Stabilize soils with temporary seeding, mulching, and geotextiles; leave vegetative filter strips along streams ! Implement structural controls such as dikes, swales, silt fences, filter berms, sediment traps and ponds, outlet protection, pipe slope drains, check dams, and terraces to convey runoff, to divert storm water flows away from areas susceptible to erosion, and to prevent sediments from entering water bodies ! Frequently inspect all stabilization and structural erosion control measures and perform all necessary maintenance and repairs ! Stabilize haul roads and entrances to landfill with gravel or stone ! Construct vegetated swales along road ! Clean wheels and body of trucks or other equipment as necessary to minimize sediment tracking (but contain any wash waters [process wastewaters]) ! Frequently inspect all stabilization and structural erosion control measures and perform all necessary maintenance and repairs
Application of fertilizers, pesticides, and herbicides	! Observe all applicable Federal, State, and local regulations when using these products ! Strictly follow recommended application rates and methods (i.e., do not apply in excess of vegetative requirements) ! Have materials such as absorbent pads easily accessible to clean up spills
Exposure of waste at open face	! Minimize the area of exposed open face as much as is practicable ! Divert flows around open face using structural measures such as dikes, berms, swales, and pipe slope drains ! Frequently inspect erosion and sedimentation controls
Waste tracking onsite and haul roads, solids transport on wheels and exterior of trucks or other equipment (common with incinerator ash)	! Clean wheels and exterior of trucks or other equipment as necessary to minimize waste tracking (but contain any wash waters [process wastewaters])
Uncontrolled leachate (commingling of leachate with runoff or runon)	! Frequently inspect leachate collection system and landfill for leachate leaks
General sources	! Maintain landfill cover and vegetation ! Maintain leachate collection system

Figure 7-6
Stormwater Monitoring Requirements for Landfill/Land Application Sites

Pollutant	Monitoring Requirements
Total Suspended Solids (TSS)	! In 2nd year of permit, conduct quarterly monitoring ! Calculate average concentration for TSS -- if > 100 mg/L, then conduct same quarterly sampling in 4th year of permit ! In 4th year of permit, conduct quarterly TSS monitoring if landfill/land application activities or SWPP plan have been altered such that the storm water discharges will be adversely affected
Total Recoverable Iron	! In 2nd year of permit coverage, conduct quarterly monitoring ! Calculate average Total Recoverable Iron concentration -- if > 1.0 mg/L, then conduct same quarterly sampling in 4th year of permit ! In 4th year of permit, conduct quarterly Total Recoverable Iron monitoring if landfill/land application activities or SWPP plan have been altered such that the storm water discharges will be adversely affected

7.4 CWA Inspection Techniques

The *NPDES Compliance Inspection Manual* (EPA 300-B-94-014) provides inspectors with the information necessary to prepare for and perform thorough compliance assessments of wastewater treatment plants at direct discharging kraft mills that must comply with NPDES permits. See Section 2.4 of this manual for a description of the various types of NPDES inspections addressed in the *NPDES Compliance Inspection Manual*. Wastewater inspections of indirect discharging kraft mills may be undertaken as part of an Approval Authority's evaluation of a POTW's pretreatment program. The Approval Authority will either be the EPA Regional Office or the State with an approved NPDES program. *Guidance for Conducting a Pretreatment Inspection* (EPA 300 R92-009) details the procedures an Approval Authority should use to conduct a Pretreatment Compliance Inspection, including procedures for reviewing Industrial User files and visits to Industrial Users.

Note that a facility is not required to comply with national effluent limitations guidelines until they are incorporated into the facility's NPDES permit. Permit requirements will be specifically tailored for each discharging facility. The inspection procedures discussed below refer to the requirements of 40 CFR Part 430. Compliance, however, must always be evaluated against a mill’s permit.

NOTE! Compliance must always be evaluated against a mill’s permit, because national effluent limitations guidelines are not binding until they are incorporated in an NPDES permit. Also, mills are only authorized to discharge wastewaters from operations identified in their permit application.

The purpose of this section is to provide further information specific to kraft mills that will assist:

- Inspectors in assessing kraft pulp mill compliance with NPDES permit limits applied at the mill's final effluent discharge to the receiving stream. This section generally outlines procedures consistent with conducting a Compliance Evaluation Inspection (CEI) or Compliance Sampling Inspection (CSI)
- POTWs as they assess the compliance of kraft pulp mills with pretreatment permits
- Approval Authorities when inspecting POTWs that receive wastewater from kraft pulp mills

7.4.1 Record Reviews

The elements of a comprehensive record review undertaken as part of an NPDES compliance inspection are presented in Sections 2A (Pre-Inspection Preparation) and 3A (Documentation, Recordkeeping, and Reporting Evaluation Procedures) of the *NPDES Compliance Inspection Manual*. Pre-inspection preparation includes review of facility background information, such as:

- General mill information
- Copies of all permits, regulations and restrictions placed on the mill discharge (including the NPDES permit application, "fact sheet," and other information in the NPDES permit file)
- Receiving stream water quality standards
- Mill compliance and enforcement history (including Discharge Monitoring Reports)

While on site, the inspector should review mill records to verify that the permit description of mill operations is correct, current, and complete. In addition, the inspector should:

- Verify that the mill is meeting all recordkeeping and reporting requirements
- Determine the mill status with any compliance schedules established as part of an enforcement order
- For indirect dischargers, verify that the mill is meeting POTW pretreatment requirements

Record review activities specific to kraft mills are described below.

As described in Section 4.6.2, Best Management Practices (BMPs) promulgated as part of the Cluster Rules require bleached kraft mills to monitor the influent to the wastewater treatment system for a measure of organic content such as COD or Total Organic Carbon (TOC). Alternatively, the mill may use a measure related to spent pulping liquor losses measured continuously, such as conductivity or color. The Discharge Monitoring Reports (DMRs) and reports of BMP monitoring activities must be submitted to the permitting authority annually, or more frequently if required by permit. Further, as discussed in Section 4.5, mills deciding to comply with the MACT standards for pulping process condensates by transporting the condensates to, and treating them in, the mill's biological treatment system, have additional monitoring and recordkeeping requirements.

Prior to the inspection, the inspector should review the following to focus the on-site phase of the inspection:

Permit review. Review permit(s) applicable to the effluent discharges, the permit application and fact sheet. In addition, the inspector may want to review air emission permits to determine if the mill chose to comply with MACT standards for pulp mill condensates by using the mill biological treatment system. If so, a multi-media screening inspection opportunity exists for the water inspector. The water inspector can review the MACT requirements for monitoring the treatment system and all available monitoring reports. See Section 4.5.3 for a discussion of inspection procedures for determining compliance with the MACT standards for pulping condensates.

DMR review. The inspector should review DMRs submitted since the last inspection to determine whether there has been a violation of permit limits and to identify any excursions from typical performance that may not have been violations. If problems are indicated, they should be discussed during the on-site inspection. Events occurring at the mill and in the treatment plant at the time of the excursions should be reviewed with mill operators to determine both the cause of the problem and the corrective action taken by the mill.

Identify black liquor spills. Black liquor (spent pulping liquor) spills may upset the operation of the wastewater treatment plant. Indications of such a spill may be initially detected during DMR review, as described above. If the inspector identifies any excursions from typical treatment system performance, during the on-site inspection the inspector should:

- Review records of the influent flow and pollutant load (COD, TOC, conductivity, or color) that the mill is required to maintain in accordance with the Cluster Rules' BMP requirements. If BMP action levels were exceeded, did the mill undertake the required corrective actions?
- Review operator logs to determine if spills were recorded
- Interview operators (detailed in Section 7.4.2)
- Verify that the mill prepared a report of all spills and intentional diversions not contained at the immediate process area
- Review spill record reports required by BMPs
- Consider forwarding the information to an EPCRA inspector for follow-up on emergency notification requirements

Determine if MACT standards were met. If a mill has chosen to comply with MACT standards for pulp mill condensates by transporting the condensates to, and treating them in, the mill biological treatment system, treatment system upsets may result in exceedances of MACT standards. If the inspector identifies any excursions from typical treatment system performance, the inspector should assess compliance with the applicable MACT standards or forward the concern to the air inspector for follow-up (see Section 4.5.3).

7.4.2 Physical Inspection of Wastewater Treatment Plants (Mill Site Review)

The elements of a comprehensive facility site review undertaken as part of an NPDES compliance inspection are presented in Section 4 (Facility Site Review) of the *NPDES Compliance Inspection Manual*. Site review includes a physical inspection of the wastewater treatment plant, as well as an evaluation of operation and maintenance procedures and practices. The inspector should visually examine:

- Wastewater treatment plant influent characteristics
- Process controls
- All components of the wastewater treatment plant, including supply of treatment chemicals and sludge handling equipment
- Equipment condition
- Safety controls and equipment
- Effluent characteristics
- Flow measurement devices

The inspector should also interview treatment plant operators and maintenance staff. Topics discussed should include:

- Policies and procedures
- Organization
- Staffing and training
- Planning and scheduling
- Record systems
- Spare parts and treatment chemical inventory controls
- Stand-by equipment

During these interviews, the inspector should determine if there have been any production changes that were not anticipated when the permit was issued.

Facility site review issues specific to kraft mills are discussed below.

Interview wastewater treatment plant personnel. Inspectors should interview wastewater treatment plant operators and staff to determine:

- How personnel in the pulping area report imminent upsets or discharges of highly contaminated wastewater (i.e., shock loads) to wastewater treatment personnel
- How wastewater treatment plant personnel respond to spills in the process area
- If there have been mill upsets that affected wastewater treatment plant operations (that may not have been identified during record review)

- How any spills or intentional diversions of process materials (pulp, black liquor, soap, turpentine, lime mud, or other materials) were accommodated by wastewater treatment
- Number and level of certified operators

Remember, even though permit limits have not been exceeded, the failure to *document* a spill not contained in the immediate process area constitutes a violation of the spent liquor, soap and turpentine BMP requirements discussed in Section 4.6. In addition, exceedances of influent monitoring action levels established as part of the BMP Plan do not constitute permit violations; however, failure to *investigate* and *correct* exceedances are violations.

Examine wastewater treatment plant equipment. In addition to evaluating the final effluent monitoring equipment, inspectors should examine the equipment used to monitor the influent to the wastewater treatment plant, as required by BMPs. For direct dischargers, monitoring must be conducted at the point influent enters the wastewater treatment system. For indirect dischargers, monitoring must be conducted at the point of discharge to the POTW. Mills may select alternate monitoring locations in order to isolate possible sources of black liquor, soap, or turpentine from other streams routed to treatment, such as non-contact cooling water. Inspectors should review the mill's BMP plan to identify these locations. Inspectors should examine the monitoring equipment to ensure that it is operational and in the specified (and appropriate) location. Inspectors should also determine how the equipment is calibrated and at what frequency.

7.4.3 Flow Monitoring Evaluations

The elements of flow monitoring evaluations undertaken as part of an NPDES compliance inspection are presented in Section 4B (Physical Inspection of the Facility) and Section 6 (Flow Measurement) of the *NPDES Compliance Inspection Manual*. Flow monitoring evaluations include a review of the general conditions of those flow measurement devices necessary for compliance with NPDES permit conditions, such as:

- Surcharging of influent lines, overflow weirs and other structures
- Flowthrough bypass channels
- Overflows at alternative discharge points
- Flow from unknown source or origin

NPDES permits require accurate determination of the quantity of wastewater discharged. Thus, accuracy of the flow measurement must be determined by the inspector. The inspector should verify that:

- Facility-installed flow devices are properly installed
- Corrosion and solids accumulation are not interfering with the operation of the flow measurement device

- The flow measurement system measures the entire wastewater discharge, is installed at an appropriate site, and meets all permit requirements
- Flow measurement devices are properly calibrated at an appropriate frequency
- Calculations made using primary measurements are correct and accurate

The inspector also should review historical records for evidence of continuous flow measurement, evaluate the mill's data handling and reporting (including quality control procedures), and collect accurate flow data during the inspection to validate the mill's monitoring data. There are no flow measurement issues unique to kraft pulp mill wastewater treatment plants.

7.4.4 Sampling Evaluations

The elements of sampling evaluations undertaken as part of an NPDES compliance inspection are presented in Section 5 (Sampling) of the *NPDES Compliance Inspection Manual*. During a sampling evaluation the inspector should assess the mill's sampling program to verify:

- That the program complies with the mill's permit and with 40 CFR Part 136
- Sample preservation and handling (including holding times prior to analysis) conform to 40 CFR Part 136
- That the mill has reported accurate data in discharge monitoring reports

The inspector may also collect samples of mill effluent to verify compliance with daily maximum effluent limitations. The *NPDES Compliance Inspection Manual* provides extensive detail about proper sample collection techniques, sample identification methods, sample preservation and holding time, transfer of custody and sample shipment, quality control, and data handling and reporting. Sampling evaluation activities specific to kraft mills are described below.

All kraft mills will have final effluent limits on the discharge of BOD_5 and TSS, as well as on pH. Bleached papergrade kraft mills will also have limits on the discharge of AOX. Inspectors should verify that the mill follows the method-specified sampling procedures, summarized in Figure 7-7 (see 40 CFR Part 136 for more detail). Note that each mill is required to analyze for all pollutants specified in its permit and to follow any permit-specified sampling procedures.

Figure 7-7
Sampling Procedures for BOD_5, TSS, pH and AOX

Pollutant	Container	Preservation	Maximum Holding Time
BOD_5	Plastic or glass	Cool, 4 ºC	48 hrs
TSS	Plastic or glass	None	7 days
pH	Plastic or glass	None, analyze immediately	Continuously monitor or analyze immediately
AOX	Amber glass bottle with Teflon®-lined lid	$Na_2S_2O_3$ to remove free chlorine, HNO_3 to pH 2-3, Cool 4 ºC	6 months*

* Sample must be analyzed no less than 3 days after collection.

7.4.5 Laboratory/QA Evaluations

The elements of laboratory and QA evaluations undertaken as part of an NPDES compliance inspection are presented in Section 7 (Laboratory Procedures and Quality Assurance) of the *NPDES Compliance Inspection Manual*. For laboratories operated by the mill, the inspector should evaluate:

- Facilities and equipment
- Precision and accuracy
- Data handling and reporting
- Personnel qualifications and training

Laboratory performance is also evaluated by the DMR QA program, in which participating laboratories analyze performance evaluation samples containing constituents normally found in industrial and municipal wastewaters.

At kraft mills, on-site analyses for BOD_5 and TSS are common due to the short holding time allowed prior to analysis. In contrast, many mills will contract laboratories to perform AOX analysis because of its long holding time and because it requires complex procedures and equipment.

Whether the analyses are performed on site or at contract laboratories, all pollutants must be analyzed using the analytical method specified in 40 CFR Part 136. Note that the analytical methods for AOX, TCDD, TCDF, and chlorine phenolics were recently promulgated and will appear in a future revision to 40 CFR Part 136. Figure 7-8 lists the analytical methods that must be used for each pollutant sampled at the wastewater treatment plant. The methods for pollutants sampled at a bleach plant effluent location are listed in Section 6 (Figure 6-14).

Figure 7-8
Analytical Methods

Pollutant	Method
AOX	1650
BOD_5	405.1
TSS	160.2
pH	150.1

7.4.6 Special Considerations for Kraft Pulp Mill Wastewater Treatment Plants

Inspectors should be aware of three potential special considerations for kraft mill wastewater treatment plants:

- Non-continuous discharge of wastewater
- Co-treatment of municipal wastewater
- Foam restrictions of treated wastewater

Non-continuous dischargers. A mill is a non-continuous discharger if, for reasons other than treatment plant upset control (e.g., to protect receiving water quality), the mill is prohibited by the NPDES authority from discharging pollutants during specific periods of time or is required to release its discharge on a variable flow or pollutant loading rate basis. However, one-day maximum limitations and thirty-day average limitations were developed for *continuous* dischargers. Because non-continuous dischargers release higher flows than continuous dischargers during their limited discharge periods, they will release greater daily pollutant loads than continuous dischargers. These high daily pollutant loads, however, may not reflect the pollutant control actually achieved by non-continuous dischargers on an annual basis. To allow for such circumstances, EPA established annual average discharge limitations for non-continuous dischargers.

Regulations promulgated prior to the Cluster Rules that are still in effect require that the NPDES authority establish alternative maximum day and average of thirty consecutive days effluent limitations for non-continuous dischargers, in addition to applying the mass-based annual average limitations. These alternative daily and monthly limitations must be concentrations that reflect the performance of BPT, BCT, or NSPS wastewater treatment, as appropriate. See 40 CFR 430.01(k)(1).

In the new effluent limitations guidelines promulgated by EPA as part of the Cluster Rules, EPA did not require the NPDES authority to include maximum one-day and thirty-day average concentration limitations for non-continuous dischargers. Instead, EPA will defer to the NPDES authority to establish maximum day and maximum thirty-day average limitations that are necessary to protect receiving water quality.

Figure 7-9 shows a summary of permit specifications for bleached and unbleached kraft mills. Inspectors should review mill permits to determine whether the limits specified are accurate.

Figure 7-9
Summary of Permit Specifications for Non-Continuous Dischargers

Limitations *Required* for Non-continuous Dischargers		
Applicable Limitations	**Bleached Papergrade Kraft and Soda (Subpart B)**	**Unbleached Kraft (Subpart C)**
Annual average	✓	✓
One-day maximum concentration, reflective of BPT or NSPS	If determined by permitting authority to be necessary to protect receiving water quality	✓
30-day average concentration, reflective of BPT or NSPS	If determined by permitting authority to be necessary to protect receiving water quality	✓

Co-treatment of municipal wastewater. Some mills operate wastewater treatment plants that receive and treat municipal waste. These mills operate wastewater treatment plants with sufficient capacity to accommodate the municipal wastewater from surrounding communities. Mills that treat municipal wastewater may chlorinate this stream before it is mixed with pulp mill wastewater. These mills may be subject to standards and monitoring requirements typical of sanitary wastewater treatment plants, especially those for total and fecal coliform. Inspectors should review monitoring records to determine whether these mills are in compliance with permit limits.

Foam restrictions. Treated wastewaters from some mills experience excessive foaming. Although foam is not regulated nationally, some state or regional authorities may require mills to control wastewater foam for aesthetic purposes. Inspectors should review any permit requirements and verify whether mills meet the applicable requirements.

7.4.7 Storm Water Inspection Considerations

To evaluate compliance with storm water permit requirements, the inspector should:

- Conduct a records review to assure that the SWPP plan is up-to-date and includes all required elements, and to assure that the mill has performed all of the required self-monitoring and self-inspection procedures
- Review required monitoring and inspection data -- if the data indicate potential problems with storm water contamination, determine what, if any, corrective actions were taken by the mill in response to the data
- Observe control and prevention measures to evaluate whether good operation and maintenance practices are being used

The inspector should review Section 9 for further discussion of these basic storm water inspection steps. The inspector should also consider the following procedures to evaluate compliance with potential storm water contamination problems specifically relevant to wastewater treatment plant operations:

- Review the SWPP plan to document that runon/runoff from the wastewater treatment plant area is addressed
- Evaluate the quarterly visual inspection records to determine if any concerns are noted -- if so, document that appropriate corrective actions were taken
- Determine what BMPs are used to eliminate/reduce discharges from wastewater treatment plant areas
- Visually observe BMP implementation to check for excessive wear or damage to containment mechanisms and for evidence of poor material handling (evidence of spills, leaks, uncovered raw materials, etc.)

7.5 RCRA Issues

Kraft mills do not generate significant quantities of hazardous wastes. As part of a consent decree, EPA considered making a determination of whether it was appropriate to list bleached kraft mill wastewater treatment sludges as hazardous wastes because wastewater treatment sludge generated at bleached papergrade kraft mills may contain dioxin and furan if these pollutants contaminate wastewaters at these mills. Because the Cluster Rules effluent limitations guidelines and standards are based on bleaching technologies that substantially reduce the use of chlorine-containing compounds, EPA has determined that the dioxin and furan content of wastewater treatment sludges will also be substantially reduced, and no listing determination is required.[5] If the sludges at a particular mill exhibit a hazardous waste characteristic, the sludges would be hazardous wastes even without an EPA listing determination.

7.6 EPCRA Issues and Inspection Considerations

NOTE! See Appendix D for detailed overview of EPCRA regulations and basic assessment procedures.

General concerns. The basic regulatory requirements for EPCRA are not process-specific but rather apply on a facility-wide basis. Thus the basic requirements of EPCRA are discussed in Appendix D. For wastewater treatment plant operations, the key EPCRA issues will be to quantify air, water and land releases in the annual Toxic Release Inventory (TRI) report (known as the "Form R" report). In addition, wastewater treatment plant upsets could result in water discharges that exceed applicable reportable quantities that would require emergency notification under EPCRA and parallel provisions of CERCLA.

Inspection considerations. Generally, the EPCRA compliance assessment will focus initially on a records review. The inspector should review the following materials:

! *Emergency preparedness information*. These obligations are not process-specific, and thus the basic assessment considerations are covered for all facility operations in Appendix D to this manual.

! *TRI Form R*. Check to ensure that the form is on file and that the mill has adequately considered releases associated with the wastewater treatment plant operations, including but not limited to, the water discharges and air releases of volatile compounds such as methanol. Also, ask to see the estimation technique being used. If the estimation technique involves an assumed reduction efficiency for control methods, make sure that the assumed efficiency is consistent with the overall efficiency that the mill is achieving. The overall assumed efficiency should account for any excess releases that occur as a result of treatment upsets in a manner consistent with the actual percent of operating time such releases occur. Uncontrolled discharge episodes or periods of reduced control efficiency can have a significant impact on the estimate of total releases.

! *Emergency notifications*. Request documentation that the mill has filed all required notices.

If a water inspector plans to screen for EPCRA compliance, the inspector should confirm the necessary information with the facility contact during the opening conference or just in advance of the closing conference. For an announced inspection, the inspector should ask the source to have ready EPCRA-related documentation so that this screening check can be performed without interrupting the main focus of the inspection. A screening checklist is included as part of the example assessment form in Appendix E.

In addition to a screening-type records review inspection, an EPCRA inspector may want to conduct further assessments to identify potential compliance concerns with emergency notification requirements. As one technique, the inspector first can check wastewater treatment plant upset reports and citizen complaints since the previous inspection. The inspector then should cross-check those incidents with notification records identified in EPA's ERNS database, records on file with state/local emergency officials, or records requested from the mill. If this type of investigation identifies episodes of abnormal discharges in which no notification was provided, the inspector should consider a follow-up investigation to determine if reportable quantity thresholds were exceeded.

References:

1. *Proposed Technical Development Document for the Pulp, Paper and Paperboard Category and Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards.* U.S. Environmental Protection Agency, Washington, D.C., October 1993.

2. *Supplemental Technical Development Document for Effluent Limitations Guidelines and Standards for the Pulp, Paper, and Paperboard Category Subpart B (Bleached Papergrade Kraft and Soda) and Subpart E (Papergrade Sulfite)*, U.S. Environmental Protection Agency, Document Control Number 14487, October 15, 1997.

3. *Data Available for Limitations Development for Toxics and Nonconventional Pollutants*, U.S. Environmental Protection Agency, November 12, 1997.

4. *Final Analysis of Data Available for Development of COD Limitations*, Eastern Research Group, prepared for U.S. Environmental Protection Agency, August, 25, 1997.

5. U.S. Environmental Protection Agency, Letter of December 12, 1997, to K. Florini (Environmental Defense Fund) and D. Lenett re Pulp and Paper Mill Sludge under EDF v. Browner, Civ. No. 89-0598 (D.D.C.)

6. Memorandum of Understanding between the American Forest & Paper Association and the U.S. Environmental Protection Agency, Regarding the Implementation of Land Application Agreements Among AF&PA Member Pulp and Paper Mills and the U.S. Environmental Protection Agency (executed April 14, 1994).

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SECTION 8: ASSESSMENT MODULE FOR POWER BOILER OPERATIONS

8.1 Introduction

CONTENTS

This section addresses the power boilers commonly used at kraft pulp mills. The regulations that will apply are not unique to kraft pulp mills and affect power boilers used in various manufacturing processes. Thus, this section generally provides only an abbreviated overview of this process area, the regulatory requirements that apply, and recommended assessment procedures. Where appropriate, specific issues relevant to kraft mills are discussed. In addition, Appendix E contains an example assessment form specifically designed to address the issues raised in this process area.

8.2 Overview of Process and Discharges

8.2.1 Description of the Process

Energy generation to meet electric and steam needs at kraft pulp mills is provided in part by the recovery boiler; industry information indicates that approximately 40 percent of on-site power needs typically will be met by recovery boiler operations. The remaining generation needs are made up of power boilers burning various fuels. Increasingly, mills are relying on waste wood, wood chips and bark (so-called "hogged fuel"), as well as other materials such as tire-derived fuel, as fuel sources. For wood-fired boilers, a traveling-grate type boiler, where hogged fuel is mass-fed onto a traveling grate, would be a typical boiler type.[1,2] However, coal, fuel oil and natural gas all remain significant fuel types for on-site power boilers. For coal-fired boilers, either spreader stoker or pulverized coal boilers may be used at some mills, and both types of boilers are addressed in this section.

8.2.2 Air Pollutant Emissions

The major emissions of regulatory concern from power boilers are particulate matter, SO_2 and NO_x. The quantity of each pollutant produced is a function of the fuel characteristics, the firing method, and the combustion characteristics for each boiler. In general, kraft mill power boilers currently do not use add-on control equipment for the control of SO_2 or NO_x. Most mills will limit the sulfur in the fuel they burn to meet state sulfur-in-fuel limits, and more modern boilers may have some form of low NO_x burner or other combustion control design features that act to limit NO_x emissions. Generally, only coal- and hogged fuel/bark-fired boilers use particulate matter add-on control devices. Multicyclones, scrubbers, ESPs, and fabric filters are the most commonly used devices for the control of particulate emissions from coal-fired boilers. Particulate emissions from hogged fuel/bark-fired boilers are generally controlled by mechanical collectors, scrubbers and, more recently, ESPs. Section 8.3 provides an overview of the regulations that apply to these emissions and basic inspection techniques for power boiler air emissions.

8.2.3 Water Pollutant Discharges

In 1989, 5 to 15 percent of the flow discharged to the wastewater treatment plant originated in power operations at kraft mills.[4] This wastewater may include non-contact cooling water, air pollution control blowdown (e.g., scrubber blowdown), and boiler blowdown. Boiler blowdown water may contain small amounts of materials such as:

- Soluble inorganic salts (chlorides, sulfates)
- Precipitated solids containing calcium and magnesium salts
- Corrosion products (both soluble and insoluble)

In addition, the wastewater may contain parts per million concentrations (mg/liter) of conditioning chemicals, such as inorganic phosphates, sodium hydroxide, and ethylenediamine tetraacetic acid (EDTA) (a chelating agent). Sodium sulfite or hydrazine may be added to control corrosive gases, most commonly dissolved oxygen and carbon dioxide. Ammonia, morpholine, or cyclohexane may be added to adjust pH. In addition, various starches and other organic materials may be added to retard solids deposition.[5] These water discharges from the power boilers are sent to the wastewater treatment plant for treatment prior to discharge. See Section 7 for a discussion of regulatory and inspection issues for the wastewater treatment plant.

In addition, storm water associated with power boiler operations and potential releases of oil to receiving waters (if applicable based on the types of boilers used at a mill) are two areas that are subject to regulation and may involve compliance issues at some mills. Section 8.4 provides an overview of the CWA requirements that may apply for both storm water and oil handling.

8.2.4 Solid/Hazardous Waste Discharges

Bottom and fly ash are the primary solid wastes generated by power boiler operations. This material is usually landfilled, although ash in some situations may be either reused as an additive for various products or spread over agricultural or forest lands. Section 8.5 briefly discusses RCRA issues and inspection procedures for the power boiler process area.

8.2.5 EPCRA Chemicals and Reportable Releases

Facilities will have to provide information on chemicals used in the power boiler area to meet EPCRA's emergency preparedness requirements. Appendix D contains a process-based list of the types of hazardous chemicals that may be included in an EPCRA inventory for a kraft pulp mill. On-site air, water and land releases, including land disposals, of toxic chemicals from the power boiler area and off-site transfers of waste containing these toxic chemicals may have to be accounted for in TRI Form R reports. TRI toxic chemicals may be found in fly and bottom ash -- especially for coal or oil-fired boilers. In addition, EPCRA/CERCLA emergency release reporting could apply for off-site releases that are not federally permitted and that exceed a certain reportable quantity (RQ). A primary example of this type of release from power boiler operations would involve air emissions of SO_2 or NO_2 that are not federally permitted releases and exceed the applicable daily RQ (500 pounds for SO_2 and 10 pounds for NO_2). These EPCRA issues are discussed in Section 8.6.

8.3 Air Issues and Inspection Techniques

8.3.1 Air Regulations

Basic emission limits. Fossil fuel-fired combustion sources are perhaps one of the most heavily regulated source categories for air pollution. For federal standards, NSPS subparts D, Db and Dc could all potentially apply to power boilers at a kraft pulp mill. In addition, some plants potentially could use gas fired turbines that could be subject to NSPS subpart GG. Figures 8-1 through 8-7 summarize these NSPS subparts.

Special NSPS Considerations for Wood-fired Boilers

- **Subject to Subpart D only if also combust fossil fuels -- if so, subject to PM, SO_2 and NO_x limits**
- **Subject to Subpart Db and Dc PM limits**
- **Under Subpart Db and Dc, subtract out wood fuel usage in determining compliance with SO_2 limits for fossil fuels**
- **Under Subpart Db, subject to NO_x limit only if also combust fossil fuels**

State SIP regulations also generally will include standards for at least particulate matter and SO_2 from pre-NSPS combustion sources. Although these limits may be expressed similarly to the NSPS (such as grains per dry standard cubic foot (gr/dscf) or lb/mmBtu for particulate matter, or lb/mmBtu for SO_2), many States will express particulate matter limits in the form of process weight regulations and SO_2 limits as sulfur-in-fuel limits. Recent requirements designed to limit NO_x emissions as part of ozone attainment strategies may also apply to the mill's power boilers. Because States have a number of regulations that may apply, this summary does not address these regulations in any further detail.

Figure 8-1
Particulate Matter, Sulfur Dioxide and Nitrogen Oxides Requirements for Fossil Fuel Fired Steam Generators (NSPS Subpart D)

Regulatory Area	Requirements
Applicability	Fossil fuel and fossil fuel/wood residue-fired steam generating units for which construction or modification is commenced after August 17, 1971, and that have a heat input capacity >73 MW (250 mmBtu/hr). Fossil fuel use must be $\geq$10 percent.
Emission Standard/ Avg. Time*	! PM: - 0.10 lb/mmBtu/3-hr. avg. - 20% opacity, except for one 6-min. period per hr. of 27% opacity/6-min. avg. ! SO_2: 0.80-1.2 lb/mmBtu depending on fuel fired/3-hr. avg. ! NO_x: 0.20-0.80 lb/mmBtu depending on fuel fired/3-hr. avg. ! Note: SO_2 standard inapplicable to gaseous fossil fuel-fired units
Monitoring	
System/ Procedure	! PM: Opacity CEMS, except not required if only gaseous fossil fuel burned ! SO_2: CEMS, except not required if only gaseous fossil fuel burned or if no control device used and SO_2 monitored by fuel sampling and analysis ! NO_x: CEMS, except if test shows emissions <70% of emission limit
Exceedance Level	! Opacity CEMS: Any 6-min. period of avg. opacity > opacity limit ! CEMS: Any 3-hr. period of avg. SO_2 or NO_x emissions > emission limit
Reporting and Recordkeeping	! Quarterly excess emission reports (EERs); semiannual reporting if history of no exceedances ! Other general NSPS reporting and recordkeeping requirements apply

Figure 8-2
Particulate Matter Requirements for Industrial-Commercial-Institutional Steam Generating Units (NSPS Subpart Db)

Regulatory Area	Requirements
Applicability	! Steam generating units for which construction, modification, or reconstruction is commenced after June 19, 1984, with a heat input capacity >29 MW (100 mmBtu/hr), except for certain new/modified oil-fired units prior to June 19, 1986, and units meeting Subpart Da requirements:
Emission Standard/ Avg. Time*	! If use coal, oil, wood, or municipal-type solid waste (alone or in combination with other fuels), PM less than 0.05 lb/mmBtu to 0.20 lb/mmBtu heat input, depending on fuel type/6-hr. avg. ! If use coal, oil, or wood (alone or in combination with any other fuels), 20% opacity, except for one 6-min. period per hr. of 27% opacity/6-min. avg.
Monitoring	
System/ Procedure	! Opacity CEMS (if subject to opacity standard)
Exceedance Level	! Any 6-min. period in which opacity > opacity standard
Reporting and Recordkeeping	! Opacity EER's quarterly, with semiannual report if no exceedances ! Records of amounts of each fuel combusted, with recorded calculation of annual capacity factors maintained on a quarterly basis ! Other general NSPS requirements apply

* Averaging time based on minimum sampling time of performance test if not stated explicitly in standard.

Figure 8-3
Sulfur Dioxide Requirements for Industrial-Commercial-Institutional Steam Generating Units (NSPS Subpart Db)

Regulatory Area	Requirements
Applicability	! Steam generating units for which construction, modification, or reconstruction is commenced after June 19, 1984, and that have a heat input capacity >29 MW (100 mmBtu/hr), except for: - Certain coal and oil-fired affected units for which construction, modification, or reconstruction is commenced on or before June 19, 1986 - Units also meeting the applicability requirements under Subpart J - Units also meeting the applicability requirements under Subpart E - Steam generating units meeting the applicability requirements under Subpart Da
Emission Standard/ Avg. Time	! Various standards expressed in lb of SO_2/mmBtu heat input, depending on fuel type/30-day rolling avg. with limited exception for certain units burning only very low sulfur oil ! Various percent reduction requirements, depending on fuel type/30-day rolling average ! Percent reduction not applicable to facilities: - With annual capacity factor for coal and oil $\leq$30% - In noncontinental areas - Using a duct burner where $\geq$70% heat input from exhaust gases entering the duct burner - Burning very low sulfur oil
Monitoring	
System/ Procedure	! Inlet/outlet SO_2 CEMS with diluent (used as performance test method), subject to following alternatives: - For inlet CEMS, fuel sampling and analysis in "as fired" condition using Reference Method (RM) 19 - For inlet or outlet CEMS, daily RM 6B testing - If burning only very low sulfur oil, may use fuel supplier certification instead of any CEMS
Exceedance Level	! Any 30-day rolling avg. in which SO_2 is > applicable standard(s)
Reporting and Recordkeeping	! Quarterly reports of emissions and monitor performance data, and capacity factors for fuels used ! If fuel pretreatment used, signed statement with quarterly report indicating removal efficiency achieved and documenting proper procedures ! If demonstrating compliance for units using only very low sulfur oil by obtaining fuel supplier certifications, quarterly certification that only such fuel was used ! Records of amounts of each fuel combusted, with recorded calculation of annual capacity factors maintained on a quarterly basis ! Other general NSPS requirements apply

Figure 8-4
Nitrogen Oxides Requirements for Industrial-Commercial-Institutional Steam Generating Units (NSPS Subpart Db)

Regulatory Area	Requirements
Applicability	! Steam generating units for which construction, modification, or reconstruction is commenced after June 19, 1984, and that have a heat input capacity >29 MW (100 mmBtu/hr), except for steam generating units subject to the applicability requirements under Subpart Da
Emission Standard/ Avg. Time	! Various NO_x (expressed as NO_2) emission limits expressed in lb/mmBtu heat input, depending on fuel type/30-day rolling avg. ! 24-hr. avg. (initial performance test), 3-hr. avg. (other performance tests) for units with federally-enforceable low capacity factors and low nitrogen fuels ! Exemption from NO_x emission standard: Units with heat input capacity $\leq$73 MW (250 mmBtu/hr) **and** federally-enforceable low capacity factors/low nitrogen fuels
Monitoring	
System/ Procedure	! NO_x CEMS (used as performance test method), except not required for: - Duct burners used in a combined cycle system (use RM 20) - Low capacity factor/low nitrogen fuel facilities that are either subject to the 24-hr./3-hr. emission standards or are exempt from the NO_x emission standards (use RM 7 or RM 7 alternates) ! Facilities using low nitrogen fuels, but with capacity factors >10%, can use NO_x CEMS or EPA-approved predictive approach (used as performance test method for initial and "upon request" 30-day tests only)
Exceedance Level	! Any 30-day rolling avg. in which NO_x CEMS data (or calculated NO_x rate from operating conditions) > applicable emission standard
Reporting and Recordkeeping	! For facilities subject to continuous NO_x monitoring requirements, quarterly reports on emissions/monitor performance data; semiannual reporting if no exceedances in limited circumstances ! For facilities with federally-enforceable low capacity factors ($\leq$10%) and low nitrogen fuels, quarterly reports on: annual capacity factor, average fuel nitrogen content if residual oil fired, and, if applicable, performance test results, hours of operation, and number of hours since last performance test ! Plan for monitoring operating conditions, if applicable ! Records of amounts of each fuel combusted, with recorded calculation of annual capacity factors maintained on a quarterly basis ! For residual-oil fired facilities that have federally-enforceable low capacity factors ($\leq$10%) and low nitrogen fuels, or that have heat input capacity $\leq$73 MW and use low nitrogen fuel: records of nitrogen content of residual oil combusted, with calculated quarterly average ! For facilities with federally-enforceable low capacity factors ($\leq$10%) and low nitrogen fuels, record for each operating day: calendar date, hours of operation, and hourly steam load ! Other general NSPS requirements apply

Figure 8-5
Particulate Matter Requirements for Small Industrial-Commercial-Institutional Steam Generating Units (NSPS Subpart Dc)

Regulatory Area	Requirements
Applicability	! Steam generating units for which construction, modification, or reconstruction is commenced after June 9, 1989, and that has a maximum design heat input capacity of ≥2.9 MW (10 mmBtu/hr) but ≤29 MW (100 mmBtu/hr)
Emission Standard/ Avg. Time	! PM less than various levels of lb/mmBtu heat input for facilities with heat input capacity ≥8.7 MW, and combusting coal or wood (either alone or in combination with other fuels)/6-hr. avg. ! 20% opacity for facilities with heat input capacity ≥8.7 MW and combusting coal, wood or oil, with allowance for one 6-min. period per hr. of up to 27% opacity/6-min. avg.
Monitoring	
System/ Procedure	! Opacity CEMS if combust coal, wood or residual oil either alone or in combination with other fuels
Exceedance Level	! Any 6-min. period in which opacity > opacity standard
Reporting and Recordkeeping	! Quarterly EERs, except semiannual report if no excess emissions ! All performance test data ! Amounts of each fuel combusted during each day ! Other general NSPS requirements apply

* Averaging time based on minimum sampling time of performance test if not stated explicitly in standard.

Figure 8-6
Sulfur Dioxide Requirements for Small Industrial-Commercial-Institutional Steam Generating Units (NSPS Subpart Dc)

Regulatory Area	Requirements
Applicability	! Steam generating units for which construction, modification, or reconstruction is commenced after June 9, 1989, and that have a maximum design heat input capacity ≥2.9 MW (10 mmBtu/hr) but ≤29 MW (100 mmBtu/hr)
Emission Standard/ Avg. Time	! General SO_2 standard is both: - Various levels of lb/mmBtu heat input, depending on fuel type/30-day rolling avg., unless supplier certification applicable - Various levels of % reduction, depending on fuel type/30-day rolling avg., unless supplier certification applicable ! % reduction standards do not apply to certain facilities fired with coal (alone or in combination with other fuels) that meet specified criteria ! For oil-fired facilities, unless fuel supplier certification applies, standard is either: - 0.50 lb/mmBtu/30-day rolling avg. - 0.5 weight % sulfur in fuel/30-day rolling avg.
Monitoring	
System/ Procedure	! Monitoring procedures used as compliance determination method in all cases ! Inlet/outlet SO_2/diluent CEMS, except outlet only if no % reduction applies ! Daily as-fired fuel sampling and analysis (FSA) or Reference Method (RM) 6B are alternatives to SO_2 CEMS in specified situations ! For FSA of oil, measurements on tank filling basis -- not daily -- allowed ! Fuel supplier certifications of sulfur content alternative to CEMS for: - Distillate oil-fired affected facilities - Residual oil/coal-fired facilities with heat input capacities between 2.9 and 8.7 MW
Exceedance Level	! Any 30-day rolling avg. in which data shows failure to achieve compliance
Reporting and Recordkeeping	! Quarterly reports of all emissions/monitor performance data, except semiannual reporting if maintain a history of no exceedances ! For fuel supplier certifications, quarterly report includes: - Certification that records submitted account for all fuel combusted - All certification records ! All performance test data ! Maintain records of amounts of each fuel combusted during each day, and fuel supplier certification that include, for residual oil or coal, name of supplier, sampling location, sampling method, and sulfur analysis results; for distillate oil, certification includes only the name of the supplier and a statement that the oil supplied meets distillate oil specifications ! Other general NSPS requirements apply

Figure 8-7
Sulfur Dioxide and Nitrogen Oxides Requirements for Gas-fired Turbines (NSPS Subpart GG)

Regulatory Area	Requirements
Emissions Unit(s)	! Stationary gas turbine units for which construction, modification, or reconstruction commenced after October 3, 1977, and that has a heat input at peak load ≥10 mmBtu/hr, based on lower heating value of fuel fired
Emission Standard/ Avg. Time	! SO_2: Either achieve a limit of ≤ 0.015% by volume at 15% O_2 (dry basis), or use fuel with ≤ 0.8% sulfur by weight ! NO_x: Achieve a limit established by equations included in the standard, expressed on a % by volume basis at 15% O_2 (dry basis) [see § 60.332(a)-(l) for actual values and exceptions]
Monitoring	
System/ Procedure	! SO_2: Monitor sulfur content of fuel fired (used for direct compliance with % sulfur standard) ! NO_x: Continuous monitoring of fuel consumption and ratio of water to fuel being fired for units using water injection, and monitor nitrogen content of fuel being fired
Exceedance Level	! Daily period in which sulfur content of fuel fired >0.8% ! Any 1-hr period in which avg. water-to-fuel ratio data < baseline ! Any period in which nitrogen content > allowance used in baseline performance test
Reporting and Recordkeeping	! For NO_x, semiannual EER (for parameter exceedances) that also include avg. water-to-fuel ratio, avg. fuel consumption, ambient conditions, gas turbine load, and nitrogen content of fuel during exceedance periods, plus graphs or figures developed during performance test ! Other general NSPS provisions apply

Asbestos NESHAP. In addition to the basic emission limits applicable to the power boilers, a number of mills may have asbestos-containing material (ACM) used to insulate steam pipes or used for similar purposes in the power boiler process area. Any demolition or renovation activity that involves removing or disturbing asbestos-containing material may be subject to the requirements in 40 CFR Part 61, Subpart M. Generally, Subpart M requires prior notice of demolition/renovation activity that will disturb a certain amount of asbestos and requires compliance with a number of work practice and waste disposal requirements. Figure 8-8 provides a brief overview of these requirements.

Figure 8-8
Asbestos Demolition and Renovation (D&R) Requirements
(NESHAP 40 CFR Part 61, Subpart M)

Regulatory Area	Requirements
Applicability	! Covers regulated ACM (RACM) only: friable asbestos, certain "Category I" nonfriable material with >1% asbestos that has become friable, or other "Category II" nonfriable material with >1% asbestos that likely will be crumbled/pulverized or be reduced to powder as a result of the D&R activity [see 40 CFR 61.141 for all definitions] ! For pipes, the D&R activity must affect ≥80 linear meters (260 linear feet) ! For other facility components, the threshold is ≥15 square meters (160 square feet) ! For planned renovations, consider all planned activities for the calendar year in determining total amount of RACM that will be disturbed ! A number of exceptions and alternatives also apply [see 40 CFR 61.145(a)]
Notice Requirements	! General rule is written notice ≥10 working days prior to the removal activity begins (i.e., any activity that could disturb the RACM), or at least 10 days before end of the calendar year preceding the year in which applicable planned renovation activity occurs ! Follow-up notice required if the amount of asbestos affected changes by ≥20%, or if start date of work changes ! Exceptions apply for emergency D&R activities ! Regulations prescribe elements that must be included in the notice and require use of form included in Subpart M (or a similar form)
Work Practices	! General rule is to remove RACM prior to any activity that could break up/disturb the RACM or preclude access for subsequent removal ! Wetting requirements apply in numerous stripping and other situations, although use of ventilation system to a glove bag and leak tight wrapping with no visible emissions is alternative for stripping procedures, and leak tight wrapping is alternative to wetting after removal. Other wetting exceptions apply ! Careful handling procedures to preclude disturbing the RACM apply ! Other specific requirements apply
Waste Disposal	! Additional work practice standards apply for handling RACM ! Must deposit the RACM at a landfill that meets specific Subpart M requirements ! A RCRA-type manifest system must be used by the facility, with follow-up reporting required if the generating facility does not receive a receipt from the disposal facility within 45 days ! Other specific requirements apply

8.3.2 Inspection Techniques

8.3.2.1 Pre-inspection Steps

As discussed in Section 3, there are a number of steps that should be routinely taken prior to conducting an actual on-site inspection, including file review. As part of the file review, the inspection should consider at least the following items:

Permit verification. One objective of a standard Level 2 air inspection will be to verify that the operating permit includes all of the appropriate requirements. Prior to the inspection, the permit should be reviewed to determine what conditions apply to the facility's power boilers. This permit review is particularly critical in the case of power boilers because the federal and State regulatory requirements are so varied. In reviewing a facility's permit, the inspector should consider the following questions:

- What fuels are permitted to be burned in the power boiler(s)?
- If special fuels/wastes may be burned, are they subject to any limits, constraints, or reporting/recordkeeping requirements?
- Are there any specific maintenance or testing requirements, such as annual testing or semiannual boiler or control device maintenance?
- Do NSPS requirements apply?
- What types of modifications have occurred, and were NSR requirements met?
- Has debottlenecking occurred in the main mill process areas, and thereby increased utilization of the power boilers? If so, were potential NSR applicability issues addressed?

NOTE! Check Title V permit materials for process diagrams/layouts.

Process diagrams/layouts. Obtain a simplified diagram of the mill's power boilers and note what control(s) are employed. This type of diagram may be available in the Part 70 operating permits file if submitted with the application. Use this information to:

- Determine where the power boiler(s) are located in order to perform a quick initial evaluation of stack opacity upon arrival.
- Understand how the control room(s) for the boiler operations are set up, what process and control parameters can be evaluated from the control rooms, and what distributed control system (DCS) data capabilities are on-site. Especially for larger boilers, a significant portion of the on-site inspection for the power boilers will occur in the control room(s), and an up-front understanding of what data are available, both real-time data and historical data from a DCS, can streamline the on-site phase of the investigation.

Evaluation of periodic monitoring reports. Review any monitoring reports that have been submitted since the last inspection in order to prioritize the need for follow-up while on-site. As noted in Figures 8-1 through 8-7, the NSPS subparts for boilers and turbines require excess emissions reports (EER) for continuous emission monitoring system (CEMS) data in a number of instances. In addition, as mills obtain operating permits under Part 70 programs, the permit conditions that implement Part 64 compliance assurance monitoring (CAM) or Part 70 periodic monitoring will likely require parameter monitoring for particulate matter control devices in those cases where the NSPS or comparable State monitoring requirements do not apply. In those cases, the semiannual Part 70 reports will include data on any parameter excursions that have occurred.

The inspector should confirm that any periods of excess emissions/parameter excursions indicated in the reports are within regulatory limits. If not, the inspector may need to evaluate on-site records that document the reasons for the excess emissions. The review will be necessary to evaluate claims of allowable excursions, such as those from startup, shutdown, or malfunction periods.

Evaluation of episodic malfunction reports. Review malfunction reports submitted since the last inspection, if available. If the reports identify corrective actions to be taken by the facility, the inspector should note the need to verify during the on-site inspection that the corrective steps were actually taken and that they resolved the problem.

If a malfunction report is required for all or some specified subset(s) of malfunctions, the inspector also should note any discrepancies between the periods covered by the malfunction reports submitted and the claimed reasons for excess emissions included an EER (if required). Significant discrepancies signify errors in monitoring or malfunction reporting that should be addressed with the facility either as part of the inspection or by agency compliance staff responsible for processing periodic and episodic reports.

8.3.2.2 On-site Inspection Steps

The on-site inspection for power boilers should include direct compliance determinations where practicable (such as confirming compliance with sulfur-in-fuel limits or conducting RM 9 visible emission observations for opacity standards). In other cases, the inspector will have to conduct indirect compliance assessments (such as to evaluate compliance with particulate matter limits). In these cases, the inspector should use indirect compliance indicators to evaluate whether operating conditions for a particular boiler/control equipment combination are consistent with baseline values. The baseline values may be established during a performance test or other pertinent data (such as design standards). If the boiler is operating outside normal ranges, follow-up activities may be warranted. The following subsections summarize specific areas that should be checked during the inspection.

> **NOTE! Visible emission checks are unnecessary for gas-fired boilers.**

Visible emissions. Begin with a visible emission observation (VEO) using Method 9 or comparable State procedures. If weather and site conditions permit, the inspector should check for visible emissions before entering the facility. Generally, a 12 to 30 minute VEO can account for a full ESP rapper operating cycle and allow the inspector to determine if any cyclic patterns are present. Where ESPs or fabric filters are used and further evaluation is warranted, the inspector should observe the stack plume over a continuous period to identify any "puffing" (i.e. spiking) problems. A VEO should not be necessary for boilers firing only natural gas, although a smoking natural gas boiler is typically indicative of combustion problems.[1]

Evaluation of proper operation of control equipment. Because coal and wood-fired power boilers typically use control equipment for the abatement of particulate emissions, a routine Level 2 inspection should include an evaluation of control equipment operation and maintenance in addition to a VEO. The appropriate steps for this phase of the inspection will vary depending upon the type of control device(s) being used. Possible particulate matter abatement systems at kraft mill power boilers include multicyclones, scrubbers, ESPs, and fabric filters.

Multicyclones. Inspections of multicyclones are relatively limited due to restricted equipment access and the limited number of key operating parameters to be evaluated. Detailed checks for proper operation require internal access to the multicyclone. This requires scheduling a visit during boiler outage with full consideration of all safety restrictions that apply. Routine checks that are available include:

- Pressure drop across the device
- Proper hopper discharge
- Gas flow rates near nominal design rates

The initial VEO, although appropriate for determining compliance with any required opacity limits, usually does not provide useful information about multicyclone performance because the controls do not normally collect the smaller light scattering particles. Because multicyclones only collect the larger sized particles, little or no observable shift in opacity may be noted when performance has decreased. Note that for units with multicyclone controls only, opacity CEMS data likely will not be available.

Pressure drops (in the normal pressure drop range) across a multicyclone are useful only if extreme values are present. Although very low or very high pressure drops tend to indicate that something is wrong inside the multicyclone and that maintenance is required, small shifts in pressure drop have little meaning in evaluating performance.

> **NOTE! See Section 5 for detailed overview of scrubber and ESP inspection techniques.**

Scrubbers. Because the venturi scrubbers applied to power boilers are nearly identical to those applied to lime kilns, a detailed discussion of the appropriate data and operating parameters to be evaluated in a Level 2 inspection can be found in Section 5.3.3.2. It should be noted, however, that there is a difference in the operating pH of these two scrubbers. Lime kiln scrubbers operate under alkaline conditions; whereas power boilers operate under acidic conditions. As a result of the acidic conditions, the power boiler scrubber may be more susceptible to corrosion problems.[1]

Electrostatic precipitators (ESPs). ESPs applied to power boilers and those applied to recovery boilers are also quite similar, both with respect to layout and key parameters that should be evaluated. A detailed discussion of the appropriate data and operating parameters (including opacity CEMS data) to be evaluated in a Level 2 inspection can therefore be found in Section 5.3.3.2. It is important to note, however, that power boiler and recovery boiler ESPs are not identical. A critical distinction between the two precipitators is the increased possibility of resistivity problems that exists with power boilers:[1,2]

! *Low resistivity concerns* are generally not expected, except on stoker-fired boilers and boilers firing high-sulfur coal. Possible indicators of low resistivity include: (1) reduced primary and secondary voltages; (2) significantly increased primary and secondary voltages, especially in the inlet fields; (3) decreased spark rates, especially in the inlet fields; or (4) all or most fields at either the primary current or secondary current limits. In addition, low resistivity may be indicated by a VEO and/or review of opacity CEMS data that indicates rapper reentrainment problems. Where low resistivity is suspected, the inspector should look for changes in temperature or fuel quality that could be responsible for the change in resistivity.

! *High resistivities* can significantly impair performance if an ESP is not designed to handle the high values. As the ash becomes more difficult to remove from the collector plates, power levels decrease and sparking increases throughout the ESP. In severe cases, virtually no normally expected increase in power or current levels occurs from inlet to outlet. Possible causes of increased resistivity include a change in coal sulfur content, a change in other ash constituents, or a change in temperature.

Basic Fabric Filter Assessments

! **VEO**
! **Opacity CEMS data (if applicable)**
! **Static pressure drop**
! **Inlet and outlet gas temperatures**
! **Compressed air pressure (pulse jet systems only)**
! **Walkaround inspection for air infiltration, corrosion and fugitive emissions**

Fabric filters. There are a number of variables that can be used to qualitatively check baghouse operations for symptoms of operating and/or design problems. Each of these checks provides some indication of the typical problems that can occur with fabric filter operations. Note that as sources develop compliance assurance monitoring approaches to satisfy 40 CFR Part 64, a mill's Part 70 operating permit should contain specific fabric filter parameters to be monitored. Those parameters should be the most appropriate to indicate proper performance for the particular fabric filter application.

The key external inspection parameters and their relevance in evaluating the operation and maintenance of filters are summarized in Figure 8-9.[1,2]

Figure 8-9
Fabric Filters: External Level 2 Inspection Parameters[1,2]

Inspection Parameters	Relevance in Evaluating Filter O&M
Opacity/Visible Emissions	! Unless condensable plume is present, average opacity should be low; opacity levels >5-10% warrant follow-up inspection ! Opacity should increase slightly after cleaning cycle ! Significant increase in opacity may indicate pinhole leak in given module of row of bags ! Length of time required to restore opacity to previous levels indicates severity of problem
Pressure Drop	! Reverse air and pulse jet systems generally should operate at overall static pressure drops <6 in. W.C. ! Except for large holes and tears, pressure drop is not as sensitive as opacity for detecting bag holes and tears ! Increase in pressure drop (1-2 in. W.C. from baseline) may indicate cleaning system problems, increase in gas flow through filter, or increase in dust layer resistance to gas flow ! Gradual increase in pressure drop usually indicates bag blinding caused by deeper penetration of particulate into fabric weave ! Low pressure drop may indicate air infiltration problems ! For reverse air systems, reverse direction static pressure drop should be <0.0 during cleaning
Inlet/Outlet Gas Temperatures	! Temperatures should be maintained within moderate range, slightly below the maximum temperature rating for the type of bag in use ! Short term excursions > 25°F above rated temperature for bags being used can cause bag damage ! Low temperatures below acid vapor dewpoint can cause acid attack to bags
Cleaning System (should be checked when time between cleaning cycles is too long)	! Pulse-jet systems should fire with resounding thud, with compressed air pressures normally of 60 to 90 psig, although site-specific baseline values important because of difference in designs. Compressed air gauges generally will be located only on the compressed air manifold ! Reverse-air systems should isolate each filter compartment ! Reverse-air and dwell cycles should be sequenced to allow flexing and release of dust cake under gentle conditions
Hopper Discharge, Air Infiltration, Corrosion, Fugitive Emissions	! Check for plugged or damaged hoppers, which can allow ash to build up in bags and bags to be shut off from gas flow ! Listen for an air rushing sound to detect for severe air infiltration problems on negative pressure units. For reverse air systems, listen near hopper poke holes/access hatches, compartment side access hatches, and ductwork expansion joints. For pulse jet systems, listen near top access hatches, hopper solids discharge valves, ductwork expansion joints, and welded side walls ! Check for signs of corrosion on hopper wall, top access hatches, and other portions of the baghouse. Corrosion can indicate low temperature operation and possible chemical attack of the bags

If the basic inspection steps indicate potential problems, the inspector can follow-up on several issues, as appropriate. Figure 8-10 identifies several possible follow-up considerations.

Figure 8-10
Fabric Filters: Follow-up Level 2 Inspection Parameters[2]

Follow-up Procedure	Relevance in Evaluating Filter O&M
Opacity Monitor QA	! If VEO and opacity CEMS data provide significantly different results, check opacity CEMS QA data for possible monitor problems ! Evaluate daily zero and span checks at monitor console ! Confirm fault lamps do not indicate major malfunctions ! Discuss with mill personnel if any other QA activities have been conducted recently and check records to evaluate results
Inlet/Outlet Gas Temperatures (Pulse jet systems)	! Check inlet and outlet temperatures for temperature drop on hot gas streams. Monitors generally located near baghouse inlet and fan inlet ! Temperature drop from inlet to outlet should range from 5-25°F; higher drops could indicate air infiltration problems ! Increase in baseline temperature drop of 5-10°F (at similar process rate to baseline conditions) also indicates air infiltration concerns
Compressed Air Leaks/Inoperative Diaphragm Valves (Pulse jet systems)	! If static pressure drop is significantly higher than baseline levels, conduct walkaround check for compressed air pipe leaks and check for inoperative diaphragm valves ! For leaks, check threaded fittings leading to manifolds and leading from the manifolds to the diaphragm valves ! Severe leaks can be detected audibly; for smaller leaks, look for oil deposition on the outside of the fittings ! For inoperative valves, check valves to determine if frozen in the closed position -- Note: This concern is applicable only to cold weather conditions for units that do not have compressed air dryers and that have valves mounted below the air manifolds
Records Checks	! For frequent bag failure problems, check bag failure records. Spatial bag failure record charts may be used by mill personnel to spot localized causes of bag failures. Timeline records may also be used to indicate when increases in failure rates indicates potential need to rebag entire compartment. Check any lab tests on fabric to evaluate potential need to replace bags ! Check internal inspection/tracer dust test records to evaluate quality of the mill's efforts to track causes of bag failures/other operating problems and to develop appropriate procedures to minimize control problems

For many safety reasons, including OSHA confined space entry regulatory restrictions, agency inspectors should not conduct internal baghouse inspections. In some situations, an inspector may be able to arrange with plant personnel to open one or more top access hatches to conduct a visual check of clean side conditions of a pulse jet baghouse. The inspector must not break the plane of the hatch opening while conducting this observation. Fresh dust deposits on the top surface of the tube sheet indicates likely bag holes or leaks.[2]

In addition, as noted in Figure 8-10, the agency inspector can check records of internal inspections conducted by mill personnel. Typical key points in an internal inspection include the following:

- Proper installation and tensioning of bags
- Presence and patterns of deposits on "clean side" of fabric filter
- Location and integrity of baffle plate
- Apparent bag/hopper pluggage
- Moisture or oil problems blinding the bag
- Evidence of high temperatures in fabric filter

Finally, for units with chronic high levels of excess emissions, the inspector should review the startup and shutdown procedures for the boiler with the mill operators. Baghouses cannot operate during early stages of startup or late stages of shutdown procedures because of the low temperatures. Verify that the operators are scheduling startup and shutdown cycles consistent with good O&M practices for minimizing emissions.[2] One check would be to compare similar mills to determine whether the mill with problems has significantly higher startup/shutdown periods than a typical mill.

Evaluation of proper operation of process equipment. During a Level 2 inspection, the inspector should review pertinent boiler operating data that directly affects compliance with applicable requirements. If sulfur-in-fuel limits apply, the records of fuel sulfur content should be checked. If operating limits apply, such as limits on the type of fuel that may be burned or restrictions on hours or levels of operation, the appropriate records for those operating conditions should be checked.

Key Process Parameter Checks

- **Fuel sulfur content (for sulfur-in-fuel standards)**
- **Basic operating data (fuel type and operating hours/levels) to the extent permit limits apply**
- **Follow-up checks on fuel characteristics, firing conditions, or ash characteristics if compliance problems suspected**

Furthermore, a number of other boiler process parameters can affect emissions. The appropriate parameters are highly boiler-specific. However, Figure 8-11 summarizes a number of potential process operating conditions and data sources that may be appropriate for this type of process evaluation. If potential compliance problems are suspected, the inspector may want to evaluate some of these conditions as applicable. The values for these parameters collected during the inspection should be used to determine if the boiler is operating at normal production levels and also should be compared with historic baseline data obtained during performance tests.[1]

Most critical boiler parameters are recorded through automated distributed control systems (DCS) at modern mills (especially for larger boilers), or some other records at older mills (such as log sheets, strip charts or chart recorders). The availability of DCS data allows for quick access to data and potential trend analysis capability. If the data are not available through a DCS, copies of the other records may be obtained after the inspection to provide necessary documentation.

Figure 8-11
Power Boiler O&M: Key Level 2 Inspection Parameters[2]

Fuel Characteristics	
Fuel Type(s)	! Generally specified in operating permit ! Various types of wood waste have significantly different moisture contents and size distributions which can affect ability to change loads rapidly
Ultimate Analysis (sulfur, nitrogen, chlorine, ash)	! Ultimate analyses data are usually available in laboratory data sheets kept on file ! Check for regulatory requirements pertaining directly to sulfur content ! Higher than allowed sulfur content will cause excessive SO_2 emissions ! Much lower than normal sulfur content may create problems for ESPs ! Nitrogen content roughly indicates potential for NO_x formation
Proximate Analysis (volatile matter, fixed carbon, moisture, ash, heating value)	! Heating value is directly related to amount of fuel that must be burned to generate specific amount of steam ! Reduced heating values generally result in increased ash, SO_2, and other emissions
Fuel Sizing	! Sizing is important variable in boilers where coal, wood, or refuse-derived fuel is mechanically distributed ! Changes in fuel size distribution can adversely affect adequacy of fuel/air distribution and increase PM emissions
Free-swell Index (Grate-based Boilers)	! Determined using ASTM Procedure D 720-67, although the test is not typically performed ! For grate-based boilers, coals with high free-swell indices are especially prone to combustion problems

Figure 8-11 (cont.)
Power Boiler O&M: Key Level 2 Inspection Parameters[2]

Firing Conditions	
Load	! Determine boiler load using steam generation rate data and/or feed water flow rate data ! High boiler loads in excess of permitted value likely to cause a general increase in pollutant emissions ! High boiler loads may generate substantially increased NO_x due to high combustion zone temperatures (although any load/NO_x relationship will vary between boilers) ! Below-design boiler loads generate insufficient heat in the boiler, which allows for the emission of partial oxidation products, CO, and carbonaceous PM
O_2 Concentrations (excess air rates)	! Flue gas O_2 concentration data should be obtained from both economizer outlet unit and (if available) O_2 monitor that accompanies SO_2 and/or NO_x CEMS ! Emissions of CO, partial oxidation products, and PM occur rapidly as O_2 concentration decreases from desired range
CO Concentrations	! CO monitor rarely in place -- portable monitor likely necessary ! Significant increases in hourly average and instantaneous CO data indicate combustion problems that can lead to changes in pollutant characteristics, as well as increases in pollutant generation
Air Infiltration	! Best indicated by gradual increase in average O_2 concentration at given boiler load ! May also be indicated by audible leaks in lower areas of boiler unit and/or boiler drafts close to or exceeding 0.0 in W.C. ! Air infiltration cools down gas stream thereby inhibiting completion of oxidation reactions

Figure 8-11 (cont.)
Power Boiler O&M: Key Level 2 Inspection Parameters[2]

Firing Conditions (cont.)	
Overfire and Underfire Air Flow Rates (Stoker boilers)	! Overfire air supply header and undergrate plenum pressure data for inspection period are available from control room static pressure monitors ! Data are usually recorded once per shift in unit operating logs ! Shifts from baseline overfire and underfire pressures combined with obvious increases in emissions (CO and stack opacity) could indicate non-ideal combustion conditions
Soot Blowing Practices	! Soot blower activation frequency can be determined by observing indicator lights in soot blower control room or by using DCS data ! Information about soot blowing cycle is helpful in interpreting performance of air pollution control system
Fuel/Air Distribution	! Fuel air distribution can be evaluated qualitatively by observing grate from protected, side-access hatches ! Large variations in side-to-side and front-to-back fuel bed thickness may cause combustion problems, thereby leading to increased pollutant emissions
Boiler Draft (static pressure in combustion chamber)	! Monitored by gauge located upstream of heat exchange equipment ! Static pressure below normal -0.05 to -0.25 range suggests ambient infiltration into combustion zone ! Positive (greater than atmospheric) static pressure may indicate fugitive emissions from boiler -- emissions are usually visible
Ash Characteristics	
Loss-on-ignition (LOI) and Appearance	! High LOI values are associated with above-normal concentrations of carbonaceous matter in exhaust gases ! Can reduce ESP efficiency or lead to baghouse/ESP fires
Fugitive Emissions	! Fugitive emissions may indicate poor ash handling/transportation practices

Asbestos NESHAP compliance evaluation. Finally, the on-site inspection provides an opportunity to screen for compliance with asbestos demolition and renovation (D&R) notice requirements. The inspector should interview mill personnel to determine whether any maintenance, repair or similar construction activity conducted since the last inspection involved insulated piping or similar locations likely to involve asbestos-containing materials, and, if so, whether asbestos compliance issues were considered and properly addressed. Obtain copies of any notice provided concerning the D&R activities. If there was activity but no notice was filed, follow-up to determine whether asbestos-containing materials were involved, and, if so, whether the applicability provisions of Subpart M were triggered (see the summary of Subpart M requirements in Figure 8-8). Also, verify that the wastes containing the removed asbestos-containing material were properly sent to a waste disposal site that meets the requirements of Subpart M. The mill should have copies of all waste shipment records required under Subpart M.

For routine inspections conducted in response to an asbestos D&R notification, see the procedures outlined in applicable Agency guidance, such as *Guidelines for Asbestos NESHAP Demolition and Renovation Inspection Procedures* (EPA 340/1-90-007, November 1990).

8.4 Water Issues and Inspection Considerations

General process wastewaters. As noted in Section 8.2.3, a significant percentage of the overall flow to the wastewater treatment plant involves process wastewater from power operations. However, the effluent limits and monitoring requirements under the CWA do not involve specific requirements applicable to the power boiler wastewaters. Instead, the inspector will evaluate compliance with any permit limits for pollutants that originate in power operations at the wastewater treatment plant (see Section 7).

Oil-fired boilers. If the mill operates oil-fired boilers, additional requirements under the Clean Water Act may apply specifically to power boiler operations. The basic structure of these requirements is as follows:

- *Part 110 of the CWA* prohibits discharges of oil that violate applicable water quality standards, cause a film or sheen upon (or a discoloration of) the surface of the water or on the adjoining shoreline, or cause a sludge or emulsion to be deposited beneath the surface of the water or on the adjoining shoreline. If a prohibited discharge occurs, then the owner or operator must provide immediate notification to the National Response Center.

- *Part 112* requires a Spill Prevention Control and Countermeasure (SPCC) plan for oil-storing/consuming facilities, except where underground storage is ≤ 42,000 gallons and unburied storage is ≤ 1320 gallons (with no single container > 660 gallons). In addition to developing the plan, Part 112 imposes obligations related to response planning, plan updating, and employee training.

- *Parts 116 and 117* designate hazardous substances and reportable quantities (RQs) for those substances. Except for allowable discharges to a POTW or under an NPDES permit, discharges of a designated substance in excess of the applicable RQ must be reported to the federal government in accordance with applicable Department of Transportation regulations.

For these requirements, the key assessment procedures are to:

- Assure that the mill has developed an SPCC plan, if required
- Inquire about past instances of spills, leaks, and similar events
- Identify how the facility reacted to the event and whether similar events appear to recur

This type of assessment provides a useful screening opportunity for the air inspector, given that the water inspector generally will evaluate NPDES compliance issues at the wastewater treatment plant and not in the power boiler process area. The air inspector can note generally whether spills have occurred, and then the water inspector can evaluate the details of the spill, and the facility's response, in a follow-up discussion with facility staff or on-site inspection if warranted. Appropriate details for a follow-up inspection include:

- The material and quantity spilled, and the RQ for the material
- The waters affected by the discharge
- The timing of notice in relation to the timing of the spill
- The facility's response, whether the response was consistent with the SPCC, whether the SPCC was adequate to address the spill, and appropriate modifications to the SPCC
- Identification of health and safety issues for the plant, the community and the receiving waters

Storm water requirements and inspection procedures. The CWA requires an NPDES permit for storm water discharges associated with industrial activity. As discussed in Appendix B, EPA or State agencies (as applicable) typically issue "general" permits to authorize discharges from a group of similar facilities. Storm water discharges from some mills may, however, be covered by site-specific "individual" permits. Where EPA is the NPDES permitting authority, most mills will be covered by EPA's multi-sector general permit (MSGP) requirements. State permit requirements will vary but, in general, can be expected to include requirements comparable to the MSGP requirements. The main elements of the permit are to maintain a storm water pollution prevention (SWPP) plan and conduct certain limited monitoring (quarterly visual examinations of grab samples and, in some cases, analytical tests for particular pollutants).

The MSGP requirements applicable to the paper and allied products sector do not specifically address power boiler operations at pulp mills. However, the MSGP also includes separate requirements for the steam electric power generating sector. Because the various MSGP requirements for different sectors apply to all co-located activities at a facility, these requirements will apply to power boilers that supply electricity to kraft mill process operations. For the power generating sector, the MSGP includes specific SWPP elements that are in addition to the requirements applicable to all general permits (see

Figure 8-12). The MSGP also requires specific monitoring of total recoverable iron in the second and possibly fourth year of permit coverage for the steam electric generating facilities.

Figure 8-12
Measures and Controls for Inclusion in Steam Electric Power Generating Facility SWPP Plan

Activity/Pollutant Source	Measures and Controls
Fugitive Dust Emissions	! Plan must describe measures to prevent or minimize fugitive dust emissions from coal handling areas ! Facility shall consider establishing procedures to minimize offsite tracking of coal dust. To prevent offsite tracking, facility may consider: -- Specially designed tires; or -- Washing vehicles in designated areas before they leave the site and controlling wash water
Delivery Vehicles	Plan must describe measures that prevent or minimize contamination of storm water runoff from delivery vehicles arriving on site. At a minimum, facility should consider the following: ! Develop procedures for the inspection of delivery vehicles arriving on site and ensuring overall integrity of the body of the container ! Develop procedures to control leakage or spillage from vehicles or containers and ensure that proper protective measures are available for personnel and environment
Fuel Oil Unloading Areas	Plan must describe measures that prevent or minimize contamination of storm water runoff from fuel oil unloading areas. At a minimum, facility must consider using the following measures or an equivalent: ! Use containment curbs in unloading areas ! During deliveries, station personnel familiar with spill prevention and response procedures must be present to ensure that any leaks or spills are immediately contained and cleaned up ! Use spill and overflow protection (drip pans, drip diapers, and/or other containment devices shall be placed beneath fuel oil connectors to contain any spillage that may occur during deliveries or due to leaks at such connectors)
Chemical Loading/Unloading Area	Plan must describe measures that prevent or minimize the contamination of storm water runoff from chemical loading/unloading areas. At a minimum, facility must consider using the following measures or an equivalent: ! Use containment curbs at chemical loading/unloading areas ! During deliveries, station personnel familiar with spill prevention and response procedures must be present to ensure that any leaks or spills are immediately contained and cleaned up ! Where practicable, chemical loading/unloading areas should be covered, and chemicals should be stored indoors

**Figure 8-12 (cont.)
Measures and Controls for Inclusion in Steam Electric Power Generating Facility SWPP Plan**

Activity/Pollutant Source	Measures and Controls
Miscellaneous Loading/Unloading	Plan must describe measures that prevent or minimize contamination of storm water runoff from loading and unloading areas. Facility may consider: ! Covering the loading area; ! Minimizing storm water runon to the loading area by grading, berming, or curbing the area around the loading area to direct storm water away from the area; or ! Locating the loading/unloading equipment and vehicles so that leaks can be controlled in existing containment and flow diversion systems
Liquid Storage Tanks	Plan must describe measures that prevent or minimize contamination of storm water runoff from above ground storage tanks. At a minimum, facility must consider employing the following measures or an equivalent: ! Use protective guards around tanks ! Use containment curbs ! Use spill and overflow protection (drip pans, drip diapers, and/or other containment devices shall be placed beneath chemical connectors to contain any spillage that may occur during deliveries or due to leaks at such connectors) ! Use dry cleanup methods
Large Bulk Fuel Storage Tanks	Plan must describe measures that prevent or minimize contamination of storm water runoff from liquid storage tanks. At a minimum, facility must consider employing the following measures or an equivalent: ! Comply with applicable State and federal laws, including Spill Prevention Control and Countermeasures (SPCC) ! Containment berms
Oil Bearing Equipment in Switchyards	Plan must describe measures to reduce the potential for storm water contamination from oil bearing equipment in switchyard areas. Facility may consider: ! Level grades and gravel surfaces to retard flows and limit the spread of spills ! Collection of storm water runoff in perimeter ditches
Oil and Chemical Spills	Plan must describe measures for an oil or chemical spill, or reference the appropriate section of their SPCC plan. At a minimum: ! The structural integrity of all above ground tanks, pipelines, pumps, or other related equipment should be visually inspected on a weekly basis ! All repairs deemed necessary based on the findings of the inspections shall be completed immediately to reduce the incidence of spills and leaks occurring from such faulty equipment
Residue Hauling Vehicles	! All residue hauling vehicles shall be inspected for proper covering over the load, adequate gate sealing, and overall integrity of the body container ! Vehicles without load covers or adequate gate sealing or with poor body or container conditions must be repaired as soon as practicable

Figure 8-12 (cont.)
Measures and Controls for Inclusion in Steam Electric Power Generating Facility SWPP Plan

Activity/Pollutant Source	Measures and Controls
Ash Loading Areas	Plant procedures shall be established to reduce and/or control the tracking of ash or residue from ash loading areas including, where practicable, requirements to clear the ash building floor and immediately adjacent roadways of spillage, debris, and excess water before each loaded vehicle departs
Areas Adjacent to Disposal Ponds or Landfills	Plan must describe measures that prevent or minimize contamination of storm water runoff from areas adjacent to disposal ponds or landfills. Facility must develop procedures to: ! Reduce ash residue which may be tracked on to access roads traveled by residue trucks or residue handling vehicles ! Reduce ash residue on exit roads leading into and out of residue handling areas
Landfills, Scrapyards, and General Refuse Sites	Plan must address landfills, scrapyards, and general refuse sites. Facility should refer to applicable BMPs for Storm Water Discharges from Landfills and Land Application Sites, and for Storm Water Discharges from Scrap and Waste Material Processing and Recycling Facilities
Maintenance Activities	For vehicle maintenance activities performed on site, facility shall consider the applicable BMPs for Storm Water Discharges from Vehicle Maintenance or Equipment Cleaning Operations at Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, or the United States Postal Service
Material Storage Areas	Plan must describe measures that prevent or minimize contamination of storm water from material storage areas. Facility may consider: ! Flat yard grades, ! Runoff collection in graded swales or ditches, ! Erosion protection measures at steep outfall sites, ! Covering lay down areas, ! Storing the materials indoors, ! Covering the material with a temporary covering made of polyethylene, polyurethane, polypropylene, or hapalon, or ! Minimizing storm water runon by constructing an enclosure or building a berm around the area

To evaluate compliance with basic storm water requirements, the inspector should:

! Review applicable records to assure that the SWPP is up to date and includes all required elements, and that the mill has performed all required self-monitoring and self-inspection procedures

- Evaluate the results of monitoring and inspection data to determine whether those records indicate potential compliance concerns -- if the data indicate potential problems, follow up with mill personnel to determine what corrective actions, if any, were taken in response to the monitoring/inspection results
- Observe control and prevention measures to evaluate whether good operation and maintenance practices are being used
- Verify that the mill does not have improper connections that permit non-storm water to be discharged from storm water outfalls

In addition to these basic steps, the following procedures should be used to evaluate compliance with storm water requirements that may be specifically applicable to power boiler operations:

- If the mill has coal-fired boilers, carefully review measures to control coal pile runon/runoff and to minimize fugitive dust emissions from coal piles
- For oil-fired boilers, check containment curbs and similar measures used at delivery locations and for tank storage for adequate O&M. Observe deliveries if possible to document that required procedures are used and appropriate staff are involved in fuel handling -- coordinate this evaluation with an evaluation of the mill's SPCC plan
- Check inspection reports to evaluate the mill's compliance with the inspection requirements and adequacy of response actions to problems detected

8.5 RCRA Issues and Inspection Considerations

NOTE! See Appendix C for overview of RCRA requirements and inspection techniques for hazardous waste generator concerns.

The solid waste generated by power boiler operation is generally non-hazardous solid waste. The bottom and fly ash from combustion is either landfilled with other solid wastes or may be sold or reused as an additive. See Section 9 for a discussion of solid waste landfill issues. To the extent a mill generates specific hazardous wastes in ancillary power boiler operations, then those wastes must be handled as hazardous wastes in accordance with standard RCRA procedures. See Appendix C for an overview of the regulatory requirements that apply and appropriate inspection procedures for these generator requirements.

In addition, the Cluster Rules provide a specific exemption from RCRA for certain condensates recovered in the pulping area that contain methanol. This exemption allows the mill to burn the condensates in the power boilers without having to comply with RCRA requirements for boilers and industrial facilities. See Section 4.5 for further discussion.

8.6 EPCRA Issues and Inspection Considerations

NOTE! See Appendix D for overview of EPCRA regulations and basic assessment procedures.

General concerns. The basic regulatory requirements for EPCRA are not process-specific but rather apply on a facility-wide basis. Thus the basic requirements of EPCRA are discussed in Appendix D.

For the power boiler area, key EPCRA issues will be to quantify releases of toxic chemicals to the air, water, or land in the annual Toxic Release Inventory (TRI) report (known as the "Form R" report), and to comply with emergency reporting requirements. The emergency reporting requirements apply under both EPCRA and CERCLA. The releases subject to these emergency reporting requirements are releases that are not federally permitted and that exceed certain reportable quantities. For certain releases that are "continuous" and "stable in quantity and rate," the mill may be able to use special reporting options so that a notice is not required after each such release. See the discussion of continuous releases in Appendix D for further detail on the differences between standard emergency reporting and reporting of continuous releases.

For this process area, the air emissions from the power boilers are one potential source of releases that could be subject to EPCRA and CERCLA emergency reporting. These emissions units generally will emit SO_2 and NO_x. Both SO_2 and NO_2 are hazardous substances subject to EPCRA emergency release reporting. The reportable quantity for these two substances is 500 and 10 pounds per 24-hour period, respectively. Also, if the power boilers are used for TRS control, the boilers may emit TRS compounds such as hydrogen sulfide or methyl mercaptan (each with a reportable quantity of 100 pounds per 24-hour period). See the list in Appendix D of other potential chemical releases associated with kraft pulp mill air emission sources.

The determination of what constitutes a "federally permitted release" can be complex. However, it is important to note that if the mill as a matter of normal operations emits an applicable pollutant in amounts that exceed the reportable quantity **and** there is no emission limit established for the pollutant, then the emergency reporting provisions likely apply. For instance, a mill should file appropriate emergency reports if no NO_x emission limit applies to a power boiler, and the unit normally emits more than 10 pounds of NO_2 in a 24-hour period. In this circumstance, the reduced continuous release reporting options likely are available, as discussed in Appendix D.

Inspection considerations. The EPCRA compliance assessment generally will focus initially on a records review. The inspector should review the following materials:

! *Emergency preparedness information*. These obligations are not process-specific, and thus the basic assessment considerations are covered for all facility operations in Appendix D to this manual.

- *TRI Form R*. Check to ensure that the form is on file and that the source has adequately considered releases associated with the power boilers and associated equipment. Also, ask to see the estimation technique being used. If the estimation technique involves an assumed reduction efficiency for control methods, make sure that the assumed efficiency is consistent with the overall efficiency that the mill is achieving. The overall assumed efficiency should account for any excess emission releases in a manner consistent with the actual percent of operating time such releases occur. Uncontrolled emission episodes or periods of reduced control efficiency can have a significant impact on the estimate of total releases.

- *Emergency notifications*. Request documentation that the mill has filed all required notices.

If an agency air inspector plans to screen for EPCRA compliance, the inspector should confirm the necessary information with the facility contact during the opening conference or just in advance of the closing conference. For an announced inspection, the inspector should ask the source to have ready EPCRA-related documentation so that the screening check can be performed without interrupting the main focus of the inspection. A screening checklist is included as part of the example assessment form in Appendix E.

In addition to a screening-type records review inspection, an EPCRA inspector may want to conduct further assessments to identify potential compliance concerns with emergency notification requirements. As one technique, the inspector first can check excess emission reports, malfunction reports, and citizen complaints since the previous inspection. The inspector then should cross-check those incidents with notification records identified in EPA's ERNS database, records on file with the State/local emergency coordinator, or records requested from the mill. If this type of investigation identifies episodes of abnormal emissions in which no notification was provided, the inspector should consider a follow-up investigation to determine if reportable quantity thresholds were exceeded.

References:

1. *Kraft Pulp Mill Inspection Guide.* Prepared for U.S. EPA under Contract No. 68-01-6310, Work Assignment No. 65, Pedco Environmental, Inc., Cincinnati, Ohio, January 1983.

2. Richards, J., *Baseline Inspection Techniques, Student Manual,* Air Pollution Training Institute Course 445, 2nd Edition, 1996.

3. *Ohio EPA's Operation and Maintenance (O&M) Guidelines for Air Pollution Control Equipment*, prepared for Ohio Environmental Protection Agency, under Contract No. 0810252, Environmental Quality Management, Inc., February 1993.

4. *Proposed Technical Development Document for the Pulp, Paper and Paperboard Category and Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards.* U.S. Environmental Protection Agency, Washington, D.C., October 1993.

5. Christman, R.C. et al., *Activities, Effects and Impacts of the Coal Fuel Cycle for a 1,000 MWe Electric Power Generating Plant*, Final report prepared for U.S. Nuclear Regulatory Commission, February 1980.

6. H.A. Simons Ltd. et al., *Water Use Reduction in the Pulp and Paper Industry 1994*, a Monograph sponsored by Fletcher Challenge Canada Limited and coordinated by Pulp and Paper Research Institute of Canada, November 1994.

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SECTION 9: ASSESSMENT MODULE FOR WOODYARD, PAPERMAKING, AND OTHER OPERATIONS

9.1 Introduction

This section provides information for conducting a compliance assessment of the areas within the mill that generally receive little attention from agency inspectors -- including woodyard operations, papermaking activities, on-site landfills, and other general mill operations. In addition, Appendix E contains an example assessment form specifically designed to address the issues raised in this process area.

CONTENTS

9.2 Overview of Processes and Discharges

9.2.1 Description of the Process

Woodyard operations. Wood preparation entails converting wood into a form amenable to chemical pulping. Mills that receive wood in the form of logs typically cut logs to manageable lengths and then conduct the following five operations: conveying/washing logs via flume, debarking, chipping, knotting and screening, and storage and transfer. A brief description of each is provided below.[1,2]

Log flumes. Prior to debarking, water-filled channels or flumes are used by a number of mills to convey logs, as well as to provide washing. Flume water is typically recycled; however, it must occasionally be purged. Solids are commonly dredged out and landfilled or land applied.

Debarking. Because bark has very little useful fiber and contains dirt that reduces the overall pulp quality, logs (roundwood) are usually debarked before being used for pulp manufacturing. Prior to removal, the bark is softened by one of various techniques, including: spraying the logs with water, soaking the logs in ponds, or steaming the logs in special chambers. The bark is then removed either mechanically through abrasive action or hydraulically using a high pressure water jet. Once removed from the logs, the bark is either flung from the machine or allowed to fall through openings along the base of the machine onto a conveyor situated below. If the bark is to be used as boiler fuel, any residual moisture is removed by presses.

Chipping. After the logs have been debarked, they must be reduced in size so that cooking chemicals can easily penetrate the wood fiber to separate lignin and carbohydrates from the cellulose. This is achieved by feeding the logs into chippers, which use powerful high-speed rotating knives to reduce the wood to a uniform size.

Screening. After passing through the chipper, the wood contains fines, slivers, and oversized chips. Wood chips are therefore passed over vibratory screens to remove oversized chips and fines. Oversized chips remain on the upper screen and are recycled to a chipper, slicer, or crusher. Fines drop into a collection hopper below the screens and are usually used, along with bark, as boiler fuel.

Storage and transfer. After screening, chips are generally stored in large outside piles or chip silos. The chips are typically moved to subsequent operations by conveyors or augers.

Papermaking. Kraft pulp -- wood fibers -- that is dried, baled or rolled, and sold as a finished product is known as market pulp. Some bleached kraft mills (including all mills that make dissolving grade pulp) sell market pulp. Other bleached kraft mills send pulp either as a slurry or partially dried (wet evaporated) to other mill sites. The remainder of the bleached kraft mills, and virtually all mills that produce unbleached kraft pulp, use the pulp on site to make paper and paperboard.

Paper is a felted sheet formed on a fine screen from a water suspension of fibers and non-fibrous additives.[1] Paperboard is distinguished from paper by thickness greater than 0.3 mm. Materials mixed with the pulp before it is made into paper are called wet-end additives. Materials applied to the formed paper are called coatings. Additives and coatings can contribute up to 10 to 40 percent of the weight of the finished paper. Commonly used additives and coatings are:

- Rosin and starch, sizing agents used to control penetration of liquids
- Clay, talc, and titanium dioxide, fillers that improve optical and surface properties
- Alum (aluminum sulfate) used to control pH and fix additives onto fibers
- Dyes, pigments, and brightening agents, used to color paper
- Polymer emulsions (latexes, acrylics, polyvinyl acetate) used for coatings

Although some mills manufacture market pulp only, most U.S. kraft mills produce paper or paperboard as their final product. Market pulp is typically dried on a fourdrinier-type machine or an air float dryer. Papermaking operations generally consist of the following three discrete processes:

Pulp stock preparation. Pulp stock is processed to obtain desired qualities, such as surface, opacity, strength, and feel, in the finished paper and paperboard products. Stock preparation processes include pulp mixing and dispersion, beating and refining, and the addition of wet-end additives. Softwood and hardwood pulp are frequently combined to produce paper or paperboard of desired finished properties. Beating and refining make the finished product stronger, more uniform, more dense, more opaque, and less porous.

Wet end operations. The Fourdrinier machine is the most commonly employed paper machine for the manufacture of paper and paperboard. The first two operations performed by this machine, sheet formation and pressing, are referred to as "wet end" operations. Pulp fibers in the form of a fiber slurry are distributed evenly onto a thin moving wire mesh belt ("the wire") through which excess water drains. Suction from a series of hydrofoils, vacuum boxes, and vacuum rolls further extracts water from the formed sheet. From the wire, the formed sheet passes through a series of presses designed to remove additional water and compress the fibers. Excess water containing valuable entrained fiber is captured and, after a series of thickening and cleaning steps, recycled.[1]

Dry end operations. The remaining operations performed by the Fourdrinier -- drying, calendering, reeling, winding, and application of surface treatments -- are referred to as "dry end" operations. The sheet leaves the presses and enters the dryer, where steam-heated rollers evaporate any residual water, and fibers begin to adhere to one another. The sheet is then pressed between heavy rolls in the calender that reduce the thickness of the paper and create a smooth surface. If the paper is to be finished, surface treatments such as external sizing or coating are added, and super calendering is performed. Finally, the paper is wound onto a reel for intermediate storage. On- or off-machine rewinding is later performed to cut and wind the full-size reels into smaller, more manageable rolls. At this point, the rolls are wrapped and deemed ready for distribution.[1]

General mill services and operations. Kraft pulp mills will have other ancillary operations not discussed in Sections 4 through 8. These processes include:

Solid waste landfills. In addition to landfilling wastewater treatment plant sludges (see Section 7), kraft pulp mills may use on-site landfills for other mill wastes, including fly and bottom ash from combustion sources, lime mud, and green liquor dregs. These landfills will be subject to State-specific regulations developed under Subtitle D of RCRA. The EPA guidelines for industrial landfills generally impose few requirements on States other than certain general siting criteria. State solid waste programs will require mills to obtain permits for each landfill and may impose a variety of conditions such as leachate collection, operator training, self-inspection, ground water/surface water monitoring, and similar requirements. Leachates, however, are typically routed to the wastewater treatment system.

Industrial refrigeration. Kraft mills may operate customized industrial refrigeration equipment for certain mill activities, especially related to bleach plant operations. Because of the use of chlorofluorocarbons in this type of equipment, there are certain stratospheric ozone protection regulations that may apply.

Laboratories. Kraft mills operate laboratories to test the properties of their raw materials, pulp, finished paper products and wastewater. Some of the wastes generated by laboratories are hazardous wastes, which mills generally dispose of off-site, using a waste disposal service. Laboratory wastewaters are treated in the mill wastewater treatment plant.

Water supply treatment. Water sources for pulp and paper mills are categorized as either surface water or ground water. Surface water sources from lakes, rivers and reservoirs contain varying amounts of inorganic and organic contaminants. Groundwater taken from springs and wells usually contain relatively high concentrations of dissolved mineral matter. It is necessary to treat the raw water to reduce impurities to a level that will not adversely affect equipment operation or product quality. Depending on specific requirements, water treatment may employ a combination of sedimentation, filtering, and coagulation. Supplemental processes include chlorination, aeration, de-aeration, demineralization, and fine filtration. Water treatment may generate sludges that are disposed in on-site landfills. In addition, as with on-site laboratories, water treatment may involve chemical handling. However, water treatment operations generally are not a significant compliance concern.

General maintenance/shop/fueling facilities. As with any large facility, pulp mills will have a number of ancillary maintenance, shop and fueling operations that service the needs of the facility. These operations will trigger waste handling requirements and may raise storm water concerns as well.

9.2.2 Air Pollutant Emissions

Wood handling. Most of the air emissions from a woodyard, except those from pneumatic conveying systems, are fugitive. Common sources of these fugitive emissions include haul roads, debarkers, and chips that are received dry (shaving and saw dust). In general, control measures consist of containment of sources and watering (or paving) haul roads and other traveled areas. Water may also be used on the debarkers to reduce dust and to wash the logs, as well as on shaving and saw dust to reduce fugitive emissions at transfer points. Emissions from the pneumatic conveying cyclone are generally controlled by the use of water sprays, which can reduce cyclone emissions by 95 percent.[2]

Papermaking. Air emissions from papermaking consist mainly of water with little or no particulate matter emitted by the dryers.[4] Some particulate matter emissions may occur as a result of raw material storage and handling activities, such as starch silos. Emissions of volatile organic compounds, including hazardous air pollutants, may derive from:

- Pulp stock
- Recycled whitewater
- Additives

As part of the Cluster Rules development, EPA considered whether standards should be set for papermaking activities. To make this determination, EPA evaluated several test results from kraft pulp mills. The following pollutants were the primary HAPs identified in these tests:

- Methanol
- Acetaldehyde
- MEK
- Tetrachloroethylene
- Propionaldehyde

These analyses documented that the additives contributed little to the total HAP emissions.[3] Because the additives tend to have high boiling points, very small quantities are likely to volatilize and result in air emissions.[4] Furthermore, EPA determined that the control techniques for HAP emissions from paper machine vents are impractical based on the cost per ton of pollutant removed.[3]

Other activities. Air emissions from other miscellaneous activities generally are not regulated and do not raise significant concerns, although some air emission control requirements for solvent parts washers may apply. In addition, general fugitive dust and nuisance requirements likely apply. For the on-site landfills, odorous air emissions and fugitive dust may raise concerns in some situations. Finally, stratospheric ozone protection requirements may apply to certain industrial refrigeration units used at a mill (such as chlorine dioxide chillers).

9.2.3 Water Pollutant Discharges

Wood handling. Wastewater sources in the wood handling area of a kraft mill include:

- Wet barking
- Log washing or chip washing
- Log flumes or log ponds

In the 1970s, wet wood handling contributed up to 25 percent of the BOD_5 load discharged by mills that employed these practices. Wastewater regulations for conventional pollutants include specific allowances for discharges from wet wood handling operations only for mills that employ them. Over the past 20 years, use of wet woodyard operations has declined. In EPA's 1990 survey of the industry, of the total wastewater flow generated by kraft mills, only one to two percent originated in wood preparation operations.[5] Storm water discharges from wood yards also are subject to CWA regulation and are specifically addressed in EPA's multi-sector general permit (MSGP) developed for kraft mills. Storm water issues are discussed in more detail in Section 9.4, as well as in Appendix B.

Papermaking. Papermaking accounts for a significant portion (25 to 35 percent by volume) of the wastewater discharges generated by kraft mills.[5] Pollutants discharged from the papermaking processes consist primarily of BOD_5 and TSS. These pollutants are treated in the mill's wastewater treatment plant prior to discharge. There are no specific regulatory concerns associated with the wastewater from papermaking. To the limited extent a mill uses outdoor material handling and storage areas for papermaking operations, this process may also contribute to a mill's storm water discharge. Storm water issues are discussed in more detail in Section 9.4, as well as in Appendix B.

Other activities. Under 40 CFR 430.01(m), leachate from unbleached kraft pulp mill solid waste landfills is considered process wastewater where these leachate wastewaters are commingled with other process wastewaters. Leachates typically constitute a very small proportion of the total volume treated in the mill wastewater treatment plant. In addition, a mill's landfill permit may include monitoring requirements to evaluate potential contamination of ground or surface waters. Surface water runoff from the landfill area also will be subject to storm water requirements. Other miscellaneous industrial activities conducted onsite (miscellaneous shop, maintenance and storage facilities) may also be subject to general storm water requirements and be covered by a mill's storm water pollution prevention plan.

9.2.4 Solid/Hazardous Waste Discharges

Woodyard, papermaking and other miscellaneous operations identified in this section typically will generate some solid wastes. Bark and other wood wastes constitute the largest residual waste stream at most facilities.[6] However, much of this wood waste will be used as power boiler fuel; any remaining wastes that require disposal generally would constitute non-hazardous solid waste. Papermaking operations also generate a number of solid waste residuals, such as fibers, fillers and broke from the paper machine, coating residue and broke from finishing operations, and cleaner and junker rejects from wastepaper processing.[7] In addition, some of the papermaking wastes may have to be handled as hazardous wastes depending on the type of additives used. Used oil, certain solvents, spent fluorescent light bulbs, and similar wastes may have to be handled as hazardous wastes to the extent generated by the other miscellaneous activity areas at the mill.

9.2.5 EPCRA Chemicals and Reportable Releases

Wood handling. The EPCRA issues for woodyard operations are relatively minor. See Appendix D for a general discussion of EPCRA issues and inspection procedures, as well as a list of chemicals that may be located in the woodyard that would be subject to EPCRA inventory and other emergency preparedness requirements.

Papermaking. The papermaking process involves the manufacture, processing, and use of a significant number of reportable hazardous chemicals. Kraft pulp mills engaged in paper and paperboard production must provide information on hazardous chemicals used in the papermaking process to State and local emergency agencies in order to satisfy EPCRA's emergency preparedness provisions. Appendix D contains a process-based list of chemicals that may be covered in an inventory for a typical mill. In addition to the listed items, mills generally will have a number of additional specific chemicals that will vary from mill to mill depending on the additives used by a particular mill. On-site air and land releases, including land disposals, of toxic chemicals associated with the papermaking process and off-site transfers of waste containing these toxic chemicals may also have to be accounted for in TRI Form R reports; and EPCRA/CERCLA emergency reporting could apply for off-site releases that are not federally permitted and that exceed a certain reportable quantity. Section 9.6 and Appendix D discuss these issues.

Other activities. The emergency release requirements under EPCRA are not expected to raise significant concerns with respect to the other activity areas addressed in this Section 9, although miscellaneous material handling spills and other accidental releases may trigger emergency notification requirements. In addition, the emergency preparedness requirements do not raise specific process-based concerns, although the chemical inventory and TRI reporting obligations may apply for various chemicals associated with these miscellaneous mill activity areas.

9.3 Air Issues and Inspection Considerations

Wood handling. Although some permits may include specific work practice standards for woodyard operations, generally the only applicable requirements are generic opacity standards, general nuisance provisions, or general requirements for proper operation and maintenance of a facility. Consistent with these types of requirements, the inspector should:

! Conduct a visual evaluation of fugitive dust sources. If fugitive dust sources appear high in comparison to other mills, interview plant personnel about the mill's procedures for reducing fugitive emissions and note this information for subsequent evaluation against other mills' procedures.

! Verify that the mill is conducting any control measures or work practices that are required by permit or regulation. If water spray systems are used, verify the location of spray nozzles and visually determine if the water spray pattern is adequate. The water flow rate should be recorded along with the water supply pressure for each system. Compare these data to design or other baseline values for the water spray system.

In addition, the inspector should determine whether there have been any modifications to the woodyard operations that could allow for increased production (and emissions) in other areas of the mill. If so, the increased emissions in the other process areas that are associated with the ability to increase production may trigger new source review (NSR) permit requirements. Document how the mill addressed NSR issues when making the woodyard modifications.

Papermaking. As with the woodyard operations, there generally are no specific air regulations that apply to the papermaking operations. There may be some small controls in place, such as cyclones on fine paper finishing vents or filter systems on starch silos. The inspector may conduct a visual screening check for visible emissions in this area.

In addition, as with woodyard operations, NSPS or NSR requirements for other process areas may be triggered if papermaking improvements allow for increased production (and emissions) in those other process areas. For instance, EPA has previously noted these concerns in advising a State agency in the context of a planned papermaking press replacement.[8] The agency noted that the papermaking modification would increase mill production capacity and would likely increase TRS and particulate matter emissions from units outside the papermaking area that are the types of units affected under NSPS Subpart BB (such as digesters and washer systems). These emission increases potentially could trigger NSPS and/or NSR applicability. In this determination, the Agency noted a key distinction in determining whether NSPS or NSR requirements are triggered:

- Because the NSPS do not apply to the papermaking operations, the NSPS would be triggered only if the increase in production allowed by the press modification required a capital expenditure on a unit of the type subject to the NSPS (e.g., a digester)

- For PSD, the entire mill is considered the affected source, so any "significant" emission increase (as defined in the applicable NSR program) from the mill as a whole would trigger NSR review

The inspector should determine what, if any improvements have been made or are scheduled for the papermaking operations and then interview plant personnel to determine how the mill addressed (or plans to address) NSPS and NSR concerns associated with the modification(s).

Industrial refrigeration. Owners and operators of complex customized refrigeration appliances used in various industries, including pulp and paper, are required to follow service practices that maximize recovery and recycling during the service and disposal of industrial process refrigeration equipment that contains chlorofluorocarbons (CFCs). Where the same system is used as both industrial process refrigerant equipment and comfort-cooling equipment, the appliance is considered industrial process refrigeration equipment if at least 50 percent of its capacity is used in an industrial process refrigeration application.

Persons servicing or disposing of this equipment must be properly certified, and certified equipment and required service practices must be used. Also, because almost all of these appliances normally contain more than 50 pounds of refrigerant, specific leak repair requirements must be followed. The leak repair requirements are triggered when refrigerant is found to be leaking at a rate that would exceed 35 percent of the total charge in a 12-month period. The owner or operator must either repair such leaks within thirty days from the date the leak was discovered, or develop a dated retrofit/retirement plan within thirty days and complete actions under that plan within one year from the plan's date. However, under certain circumstances, additional time may be available.

These requirements are contained in 40 CFR Part 82 Subpart F, the regulations promulgated under section 608 of the Clean Air Act. The basic regulatory provisions include:

- Specific servicing requirements at § 82.156, including the leak repair requirements at § 82.156(i)
- Technician certification requirements at § 82.161
- Recordkeeping and reporting requirements at § 82.166, including the leak repair requirements at § 82.166(n) and (o)

In addition, there are a number of resources available from the Stratospheric Protection Division's Hotline ((800) 296-1996) or the EPA Website (*www.epa.gov/docs/ozone*). For the CFC program, EPA has developed various fact sheets, a Compliance Guidance, Self-Audit Checklist, and Training Module For Industrial Process Refrigeration Leak Repair Regulations Under Section 608, and an inspector's checklist. Applicability determinations for questions about the coverage of these regulations can be found at the ADI Website (see *http://www.epa.gov/oeca*).

Based on experience with the program to date, the inspector should focus on whether persons operating industrial refrigeration have failed to:

- Employ properly certified technicians for refrigerant recovery
- Use certified equipment for refrigerant recovery
- Repair substantial leaks
- Retrofit or retire equipment properly
- Submit information regarding leak repair or retrofit/retirement requirements

The example assessment form in Appendix E includes a checklist of appropriate questions that EPA has developed as part of its inspection guidance materials for the section 608 CFC program.

9.4 CWA Requirements and Inspection Considerations

9.4.1 NPDES Permit Review and Physical Inspection of the Woodyard

> **NOTE! Only mills employing wet woodyard operations should have permit allowances for such operations.**

The inspector should review the permit application and permit limit calculations and determine if the existing permit limits include allowances for discharges from wet wood handling operations. During the on-site inspection, the inspector should examine the woodyard to determine if wet woodyard operations are occurring. If an inconsistency is found, the inspector should consult with the permit writer and determine if a permit modification is required.

9.4.2 Storm Water Requirements

The CWA requires an NPDES permit for storm water discharges associated with industrial activity. As discussed in Appendix B, many permits are issued as "general" permits to authorize discharges from a group of similar facilities, although site-specific "individual" permits also may be used. The main permit elements are to develop and comply with a storm water pollution prevention (SWPP) plan and conduct certain limited monitoring (quarterly visual examinations of grab samples and, in some cases, analytical tests for certain pollutants).

Wood handling is likely to contribute to storm water runoff and is a focal point for storm water management at a mill. Wood handling activities such as log washing, bark removal, and chipping/sawing generate large quantities of wood chips, sawdust, and other debris. If exposed to storm water, these activities may contribute total suspended solids (TSS) and biochemical oxygen demand (BOD_5) to a mill's storm water discharge. On-site landfills also may contribute pollutants to storm water discharges. Storm water discharges from landfills frequently contain high TSS levels because of extensive land disturbance activities.

The EPA has established a multi-sector general permit (MSGP) for jurisdictions in which EPA is the NPDES permitting authority. State permit requirements vary but generally will include requirements comparable to the MSGP requirements. Because the MSGP is organized by various sectors, there is the possibility that a single mill will be subject to different sector portions of the MSGP. One example of this type of co-located MSGP coverage are the sectors for general kraft pulp mill operations (including woodyard, papermaking and other miscellaneous mill operations) and for landfill (or land application) operations. Figures 9-1 and 9-2 summarize the applicable best management practices (BMPs) that EPA has identified for these operations.

Figure 9-1
Suggested BMPs for Paper and Allied Product Manufacturing Facilities

Activity	Suggested BMPs
Outdoor loading and unloading	! Confine loading/unloading activities to a designated response and control area ! Avoid loading/unloading material in the rain ! Cover loading/unloading area or conduct these activities indoors ! Develop and implement spill plans ! Use berms or dikes around area ! Inspect containers for leaks or damage prior to loading ! Use catch buckets, drop cloths, and other spill prevention measures where liquid materials are loaded/unloaded ! Provide paved areas to enable easy collection of spilled materials
Raw and/or waste material storage areas	! Confine storage to a designated area ! Store materials inside ! Cover storage areas with a roof or tarp ! Use dikes or berms for storage tanks and drum storage ! Cover dumpsters used for waste paper and other materials ! Store materials on concrete pads to allow for recycling and spills of leaks ! Expedite recycling process for exposed scrap paper ! Develop and implement spill plans ! Provide good housekeeping (i.e., dust and debris collection) where cyclones are utilized ! Divert storm water around storage areas with ditches, swales, and/or berms
Log, lumber, and other wood product storage areas	! Practice good housekeeping measures such as frequent removal of debris ! Line storage areas with crushed rock or gravel or porous pavement to promote infiltration, minimize discharge, and provide sediment and erosion control ! Use ponds for collection, containment, and recycle for log spraying operations
Maintenance activities	For vehicle maintenance activities performed on site, facility shall consider the applicable BMPs for Storm Water Discharges from Vehicle Maintenance or Equipment Cleaning Operations at Motor Freight Transportation Facilities, Passenger Transportation Facilities, Petroleum Bulk Oil Stations and Terminals, or the United States Postal Service

Figure 9-2
Potential Sources of Pollution and General Storm Water BMPs for Landfills

Potential Pollutant Sources	BMPs
Erosion from: ! Exposed soil from excavating cells/trenches ! Exposed stockpiles of cover materials ! Inactive cells with final cover but not yet finally stabilized ! Daily or intermediate cover placed on cells or trenches ! Erosion from haul roads (including vehicle tracking of sediments)	! Stabilize soils with temporary seeding, mulching, and geotextiles; leave vegetative filter strips along streams ! Implement structural controls such as dikes, swales, silt fences, filter berms, sediment traps and ponds, outlet protection, pipe slope drains, check dams, and terraces to convey runoff, to divert storm water flows away from areas susceptible to erosion, and to prevent sediments from entering water bodies ! Frequently inspect all stabilization and structural erosion control measures and perform all necessary maintenance and repairs ! Stabilize haul roads and entrances to landfill with gravel or stone ! Construct vegetated swales along road ! Clean wheels and body of trucks or other equipment as necessary to minimize sediment tracking (but contain any wash waters [process wastewaters]) ! Frequently inspect all stabilization and structural erosion control measures and perform all necessary maintenance and repairs
Application of fertilizes, pesticides, and herbicides	! Observe all applicable Federal, State, and local regulations when using these products ! Strictly follow recommended application rates and methods (i.e., do not apply in excess of vegetative requirements) ! Have materials such as absorbent pads easily accessible to clean up spills
Exposure of waste at open face	! Minimize the area of exposed open face as much as is practicable ! Divert flows around open face using structural measures such as dikes, berms, swales, and pipe slope drains ! Frequently inspect erosion and sedimentation controls
Waste tracking onsite and haul roads, solids transport on wheels and exterior of trucks or other equipment (common with incinerator ash)	! Clean wheels and exterior of trucks or other equipment as necessary to minimize waste tracking (but contain any wash waters [process wastewaters])
Uncontrolled leachate	! Frequently inspect leachate collection system and landfill for leachate leaks
General sources	! Maintain landfill cover and vegetation ! Maintain leachate collection system

In the MSGP, EPA has established specific discharge monitoring requirements for paperboard mills, and landfills and land application sites (see Figure 9-3). These requirements are in addition to the quarterly visual checks required for all MSGP-permitted facilities.

Figure 9-3
Monitoring Requirements for Paperboard Mills and Landfill/ Land Application Sites

Facility/Pollutant	Monitoring Requirements
Landfills (and Land Application Sites)/ Total Suspended Solids (TSS)	! In 2nd year of permit, conduct quarterly monitoring ! Calculate average concentration for TSS -- if > 100 mg/L, then conduct same quarterly sampling in 4th year of permit ! In 4th year of permit, also conduct quarterly TSS monitoring if landfill/land application activities or SWPP plan have been altered such that the storm water discharges will be adversely affected
Landfills (and Land Application Sites)/ Total Recoverable Iron	! In 2nd year of permit coverage, conduct quarterly monitoring ! Calculate average Total Recoverable Iron concentration -- if > 1.0 mg/L, then conduct same quarterly sampling in 4th year of permit ! In 4th year of permit, also conduct quarterly Total Recoverable Iron monitoring if landfill/land application activities or SWPP plan have been altered such that the storm water discharges will be adversely affected
Paperboard Mills/Chemical Oxygen Demand (COD)	! In 2nd year of permit coverage, conduct quarterly monitoring ! Calculate average COD -- if > 120 mg/L, then conduct same quarterly sampling in 4th year of permit ! In 4th year of permit, also conduct quarterly COD monitoring if paperboard mill operations or SWPP plan have been altered such that the storm water discharges will be adversely affected

9.4.3 Storm Water Inspection Considerations

To evaluate compliance with basic storm water requirements, the inspector should:

! Review applicable records to assure that the SWPP is up to date and includes all required elements, and that the mill has performed all required self-monitoring and self-inspection procedures
! Evaluate the results of monitoring and inspection data to determine whether those records indicate potential compliance concerns -- if the data indicate potential problems, follow up with mill personnel to determine what corrective actions, if any, were taken in response to the monitoring/inspection results
! Observe control and prevention measures to evaluate whether good operation and maintenance practices are being used
! Verify that the mill does not have improper connections that permit non-storm water to be discharged from storm water outfalls

As a guide, the inspector should consider the example checklists included in EPA's *NPDES Compliance Inspection Manual* (EPA 300-B-9-014). The lists identify appropriate elements to cover in reviewing records and conducting visual observations of control and prevention measures. The inspector should also consider the following in investigating the possibility of improper cross connections of storm water and process wastewaters:[5]

- Evaluate results of any testing of storm water outfalls for indicators of non-storm water being discharged (such as results of pH testing)
- Determine whether storm water outfalls continue to have discharges during periods without rainfall
- Observe the storm water outfalls for indications of possible non-storm water discharges -- is there discoloration, odor, residues, floatables, affected vegetation, or structural damage such as peeling paint or corroded metal?
- Interview plant personnel about floor drains, boiler blowdown waters, and non-contact cooling waters -- does the mill have documentation to show that these sources are not connected to a storm water handling system?
- Focus especially on older facilities/process units

9.5 RCRA Issues and Inspection Considerations

> **NOTE! See Appendix C for detailed overview of RCRA hazardous waste regulations and basic assessment procedures.**

The woodyard operations, papermaking, and other general mill processes generate various miscellaneous solid waste streams. Some of these wastes are hazardous, such as spent solvents from parts degreasing. The inspector should review the basic hazardous waste generator (and used oil) requirements and assessment procedures outlined in Appendix C. A RCRA screening checklist is also included in Appendix E.

In addition, non-hazardous solid waste discharges may be handled in on-site solid waste landfills. Although the requirements for a landfill are highly State and source-specific, the inspector should consider at least the following with respect to RCRA compliance at these solid waste landfills:

- Verify that the mill properly excludes hazardous waste from the landfill -- document the waste streams that are landfilled on-site, and determine what methods were used to characterize the waste and make the non-hazardous waste determination
- Check to make sure that only permissible wastes are received for disposal
- Confirm that any required training, inspection and recordkeeping requirements are up to date and meet State regulatory/permit requirements
- Review any required monitoring data for evidence of potential contaminant leaks from the landfill site. Sampling and contaminant limits may be outlined in the solid waste permit

- Observe the landfill site to document any obvious problems with operation and maintenance, and check for obvious signs of spills and improper unloading practices
- Leachate control and handling should be reviewed at unbleached kraft mills. If the leachate is sent to the wastewater treatment plant or a stormwater outfall, consider whether such handling is allowed under the mill's NPDES permit(s). Also identify any requirements for leachate handling that are included in the solid waste permit

9.6 EPCRA Issues and Inspection Considerations

NOTE! See Appendix D for overview of EPCRA regulations and basic assessment procedures.

General concerns. The basic regulatory requirements for EPCRA are not process-specific but rather apply on a facility-wide basis. Thus the basic requirements of EPCRA are discussed in Appendix D. For the woodyard, papermaking, and other miscellaneous activities covered in this Section 9, the key EPCRA issues will be to quantify releases of applicable listed toxic chemicals in the Toxic Release Inventory (TRI) report (known as the "Form R" report). In addition, spills of raw materials handled in these process areas, or air emissions from papermaking operations, potentially could result in off-site releases that exceed applicable reportable quantities that would require emergency notification under EPCRA and parallel provisions of CERCLA.

Inspection considerations. The EPCRA compliance assessment generally will focus initially on a records review. The inspector should review the following materials:

- *Emergency preparedness information*. These obligations are not process-specific, and thus the basic assessment considerations are covered for all facility operations in Appendix D to this manual.

- *TRI Form R*. Check to ensure that the form is on file and that the source has adequately considered releases associated with these process areas. For papermaking activities, EPA has prepared guidance to assist facilities with TRI reporting.[7] Also, ask to see the estimation technique being used. If the estimation technique involves an assumed reduction efficiency for control methods, make sure that the assumed efficiency is consistent with the overall efficiency that the mill is achieving. The overall assumed efficiency should account for any excess emission/discharge releases in a manner consistent with the actual percent of operating time such releases occur. Uncontrolled emission/discharge episodes or periods of reduced control efficiency can have a significant impact on the estimate of total releases.

- *Emergency notifications*. Request documentation that the mill has filed all required notices.

If an air, water or RCRA inspector plans to screen for EPCRA compliance, the inspector should confirm the necessary information with the facility contact during the opening conference or just in advance of the closing conference. For an announced inspection, the inspector should ask the source to have ready EPCRA-related documentation so that this screening check can be performed without interrupting the main focus of the inspection. A screening checklist is included as part of the example assessment form in Appendix E.

In addition to a screening-type records review inspection, an EPCRA inspector may want to conduct further assessments to identify potential compliance concerns with emergency notification requirements. As one technique, the inspector first can check general mill upset reports and citizen complaints since the previous inspection. The inspector then should cross-check those incidents with notification records identified in EPA's ERNS database, records on file with State/local emergency officials, or records requested from the mill. If this type of investigation identifies episodes of abnormal releases in which no notification was provided, the inspector should consider a follow-up investigation to determine if reportable quantity thresholds were exceeded. For the process areas covered by this section, significant accidental releases from raw material or waste storage and handling would be the most likely areas of concern.

References:

1. Smook, G.A., *Handbook for Pulp and Paper Technologists*, Joint Textbook Committee of the Paper Industry. TAPPI, 1982.

2. *Kraft Pulp Mill Inspection Guide*. Prepared for U.S. EPA under Contract No. 68-01-6310, Work Assignment No. 65, Pedco Environmental, Inc., Cincinnati, Ohio, January 1983.

3. Leatherwood, C. (Eastern Research Group, Inc.) to Lassiter, P. (U.S. EPA), Memorandum re: Maximum Achievable Control Technology (MACT) Determination for Papermaking Systems, September 10, 1997.

4. Buonicore, A.J and Davis, W.T., eds., *Air Pollution Engineering Manual*, Air and Waste Management Association, 1992.

5. *Proposed Technical Development Document for the Pulp, Paper and Paperboard Category and Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards.* U.S. Environmental Protection Agency, Washington, D.C., October 1993.

6. *Profile of the Pulp and Paper Industry* (EPA/310-R-95-015), EPA Office of Compliance Sector Notebook Project, U.S. Environmental Protection Agency, September 1995.

7. *Title III Section 313 Release Reporting Guidance -- Estimating Chemical Releases from Paper and Paperboad Production*, U.S. Environmental Protection Agency, Office of Pesticides and Toxic Substances, EPA 560/4-88-004k, February 1988.

8. U.S. EPA Applicability Determination Index (ADI): Document Control #NR124.

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Kraft Pulp Mill Compliance Assessment Guide
(CAA, CWA, RCRA and EPCRA)

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List of Acronyms

Acronym	Term	Regulatory Program (Context)
ACM	Asbestos Containing Material	CAA (hazardous material)
ADI	Applicability Determination Index	CAA (EPA database)
AIRS	Aerometric Information Retrieval System	CAA (EPA database)
AOX	Adsorbable Organic Halides	NPDES (pollutant)
ASTM	American Society for Testing and Material	N/A (test method source)
BACT	Best Available Control Technology	CAA (technology-based emission limit)
BAT	Best Available Technology Economically Achievable	NPDES (technology-based effluent standard for toxic and non-conventional pollutants)
BCT	Best Conventional Pollutant Control Technology	NPDES (technology-based effluent standard for conventional pollutants)
BLO	Black Liquor Oxidation	N/A (TRS emissions control method)
BPT	Best Practicable Control Technology Currently Available	NPDES (technology-based effluent standard for all pollutants)
BMP	Best Management Practice	N/A (regulatory work practice)
BOD_5	Biochemical Oxygen Demand	NPDES (pollutant)
CAA	Clean Air Act	CAA
CAM	Compliance Assurance Monitoring	CAA
CBI	Confidential Business Information	N/A
CCA	Clean Condensate Alternative	CAA (pollution prevention-based-regulatory-alternative)
CDI	Case Development Inspection	RCRA (inspection type)
CEI	Compliance Evaluation Inspection	NPDES/RCRA (inspection type)
CEMS	Continuous Emission Monitoring System	CAA
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	CERCLA

List of Acronyms (cont.)

Acronym	Term	Regulatory Program (Context)
CESQG	Conditionally Exempt Small Quantity Generator	RCRA (category of hazardous waste generating facility)
CFR	Code of Federal Regulations	N/A
CME	Comprehensive Groundwater Monitoring Evaluation	RCRA (inspection type)
CMS	Continuous Monitoring System	CAA (Part 63 NEHSAP monitoring system)
COD	Chemical Oxygen Demand	NPDES (pollutant)
CSI	Compliance Sampling Inspection	NPDES/RCRA (inspection type)
CWA	Clean Water Act	CWA
DCE	Direct Contact Evaporator	N/A (kraft mill recovery furnace type)
DCS	Distributed Control Systems	N/A (automated data handling system)
DI	Diagnostic Inspection	NPDES (inspection type)
DMR	Discharge Monitoring Report	NPDES
DOT	Department of Transportation	N/A
D&R	Demolition and Renovation	CAA (asbestos-related term)
ECF	Elemental Chlorine-free	N/A (pulp bleaching term)
EER	Excess Emission Report	CAA
EPA	Environmental Protection Agency	N/A
EPCRA	Emergency Planning and Community Right-to-Know Act	EPCRA
ERNS	Emergency Response Notification System	EPCRA (database of reported spills)
ESP	Electrostatic Precipitator	N/A (particulate matter control device)
FIP	Federal Implementation Plan	CAA (plan for attaining NAAQS)
FR	Federal Register	N/A
HAP	Hazardous Air Pollutant	CAA

List of Acronyms (cont.)

Acronym	Term	Regulatory Program (Context)
HSWA	Hazardous and Solid Waste Amendments	RCRA
HVLC	High Volume, Low Concentration	CAA (TRS emissions category)
IDEA	Integrated Data for Enforcement Analysis System	N/A (EPA multimedia compliance database)
LAER	Lowest Achievable Emission Rate	CAA (technology-based emission standard)
LDR	Land Disposal Restrictions	RCRA (hazardous waste pretransportation requirements)
LEPC	Local Emergency Planning Committee	EPCRA
LQG	Large Quantity Generator	RCRA (category of hazardous waste generating facility)
LSI	Legal Support Inspection	NPDES (inspection type)
LVHC	Low Volume, High Concentration	CAA (TRS emissions category)
MACT	Maximum Available Control Technology	CAA (technology-based hazardous air pollutants emission standard)
MEE	Multiple Effect Evaporator	N/A (kraft mill recovery furnace component)
MLVSS	Mixed Liquor Volatile Suspended Solids	CAA (biological treatment system parameter)
MRR	Monitoring, Reporting, and Recordkeeping	N/A
MSDS	Material Safety Data Sheet	EPCRA
MSGP	Multi-sector General Permit	NPDES (industrial storm water permit type)
NAAQS	National Ambient Air Quality Standards	CAA (health-based standards for criteria pollutants)
NCG	Noncondensible Gas Stream	N/A
NDCE	Non-direct Contact Evaporator	N/A (kraft mill recovery furnace type)
NEIC	National Enforcement Investigations Center	N/A
NESHAP	National Emission Standards for Hazardous Air Pollutants	CAA

List of Acronyms (cont.)

Acronym	Term	Regulatory Program (Context)
NO_x	Nitrogen Oxide	CAA (pollutant)
NPDES	National Pollution Discharge Elimination System	NPDES (permitting program)
NRC	National Response Center	CERCLA (hazardous substance release reporting center)
NSPS	New Source Performance Standards	CAA and NPDES (technology-based standards)
NSR	New Source Review	CAA (regulatory program)
OAQPS	Office of Air Quality Planning and Standards	N/A
OC	Office of Compliance	N/A
ODP	Oven Dried Pulp	N/A
O&M	Operation and Maintenance	N/A
ORP	Oxidation Reduction Potential	CAA (bleach plant scrubber monitoring parameter)
PAI	Performance Audit Inspection	NPDES (inspection type)
PCI	Pretreatment Compliance Inspection	NPDES (inspection type)
PCS	Permit Compliance System	NPDES (EPA database)
PERM	Program for Effective Residuals Management	NPDES (permit-specific requirement)
PM	Particulate Matter	CAA (pollutant)
POTW	Publicly Owned Treatment Works	NPDES
PHA	Process Hazard Analysis	CAA (RMP element)
PSD	Prevention of Significant Deterioration	CAA (type of NSR permitting program)
PSES	Performance Standards for Existing Sources	CAA (emission limits)
	Pretreatment Standards for Existing Sources	NPDES (technology-based pretreatment standards))
PSNS	Performance Standards for New Sources	NPDES (emission limits)
	Pretreatment Standards for New Sources	NPDES (technology-based pretreatment standards)

List of Acronyms (cont.)

Acronym	Term	Regulatory Program (Context)
QA/QC	Quality Assurance/Quality Control	N/A
RACM	Reportable Asbestos Containing Material	CAA (hazardous material)
RACT	Reasonably Available Control Technology	CAA (technology-based emission limits)
RCRA	Resource Conservation and Recovery Act	RCRA
RCRIS	Resource Conservation and Recovery Information System	RCRA (EPA database)
RI	Reconnaissance Inspection	NPDES (inspection type)
RMP	Risk Management Plan	CAA (regulatory program)
RQ	Reportable Quantity	CERCLA/EPCRA (reporting threshold for hazardous/extremely hazardous chemical releases)
SARA	Superfund Amendments Reauthorization Act	EPCRA
SERC	State Emergency Response Commission	EPCRA
SIP	State Implementation Plan	CAA (plan for attaining NAAQS)
SFIP	Sector Facility Indexing Project	N/A
SFR	Steam-to-Feed Ratio	CAA (steam stripper monitoring parameter)
SPCC	Spill Prevention Control and Countermeasure	NPDES (oil discharge prevention/control plan)
SQG	Small Quantity Generator	RCRA (category of hazardous waste generating facility)
SSM	Startup, Shutdown or Malfunction	N/A
SWPP	Storm Water Pollution Prevention	NPDES (plan for control of storm water discharges)
TADP	Tons of Air Dried Pulp	N/A (unit of measurement)
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin	NPDES (pollutant)
TCDF	2,3,7,8-tetrachlorodibenzo-p-furan	NPDES (pollutant)
TCF	Totally Chlorine Free	N/A (pulp bleaching method)

List of Acronyms (cont.)

Acronym	Term	Regulatory Program (Context)
TCLP	Toxicity Characteristics Leaching Procedure	RCRA (method for determining hazardous waste characteristic)
TMDL	Total Maximum Daily Load	NPDES (method of quantifying allowable pollutant loadings)
TOC	Total Organic Carbon	NPDES (pollutant)
T-R	Transformer-rectifier	CAA (electrostatic precipitator component)
TRI	Toxic Release Inventory	EPCRA
TRS	Total Reduced Sulfur	CAA (pollutant)
TSD/TSDF	Treatment, Storage or Disposal/Treatment, Storage or Disposal Facility	RCRA (hazardous waste facility type)
TSI	Toxics Sampling Inspection	NPDES (inspection type)
TSP	Total Suspended Particulates	CAA (pollutant)
TSS	Total Suspended Solids	NPDES (pollutant)
UST	Underground Storage Tank	RCRA
VATIP	Voluntary Advanced Incentives Program	CWA (Cluster Rules pollution prevention program)
VEO	Visible Emission Observation	CAA (opacity inspection technique)
VOC	Volatile Organic Compound	CAA/NPDES (pollutant)
WBL	Weak Black Liquor	N/A (pulping process chemical)
W.C.	Water in Column	N/A (unit of measurement for air pressure)
WQBEL	Water Quality-based Effluent Limits	NPDES

INTRODUCTION

The Office of Compliance (OC) of the U.S. Environmental Protection Agency (EPA) was created in 1994 as a multi-media office organized around various industry sectors. Among other responsibilities, OC is charged with assisting State, local and federal agency personnel carry out their compliance oversight functions, as well as with providing compliance assistance to the regulated industry. To help accomplish its mission, OC developed a series of 18 profiles on various industry sectors (as defined by two digit Standard Industrial Classification (SIC) codes). Each profile (or sector notebook) provides an overview of the types of production processes within a sector, the associated environmental discharges, and the types of compliance requirements that apply generally to facilities within each sector. The EPA published the *Profile of the Pulp and Paper Industry* in September 1995.

Building upon this initial effort, this manual has been developed to assist both agency and plant personnel in conducting compliance assessments of kraft pulp mill facilities. The Office of Compliance has selected this type of facility for several reasons. First, the pulp and paper industry sector ranks as one of the most heavily inspected industry sectors by State and EPA inspectors. Second, within the pulp and paper sector, the kraft process represents the single largest portion of the pulp production in the U.S. (approximately 80%). Third, the pulp and paper sector has recently become subject to new requirements under a combined air and water pollution regulation commonly referred to as the "Cluster Rules." The Cluster Rules were promulgated at 63 FR 18504, April 15, 1998. Since then, EPA has released clarifications and technical amendments (see 63 FR 42238, August 7, 1998; 63 FR 49455, September 16, 1998; 63 FR 71385, December 28, 1998; and 64 FR 17555, April 12, 1999). If the Agency releases any further amendments to the Cluster Rules, EPA will post information on the amendments on the EPA website (see page 1-4 of this manual for specific website addresses for Cluster Rules information).

Although this document includes summaries of various regulatory provisions and requirements, it does not change existing regulations and should not be interpreted to affect in any manner the responsibilities of affected regulated sources to comply with applicable statutes and regulations. It is intended only to outline regulatory requirements that apply to kraft pulp mills and suggest various techniques of assessing compliance with those requirements. It is not a substitute for regulations published by EPA in the Code of Federal Regulations (CFR), any regulations promulgated by State and local governments, or any specific permit requirements.

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SECTION 1: OVERVIEW

1.1 Regulatory Programs Covered

This manual assists agency and industry personnel in conducting assessments of compliance at kraft pulp mills with environmental requirements developed under the following federal statutes: the Clean Air Act (CAA), Clean Water Act (CWA), and Resource Conservation and Recovery Act (RCRA). The manual also briefly covers reporting and notification requirements under the Emergency Planning and Community Right-to-Know Act (EPCRA) and section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (a parallel reporting section to EPCRA section 304). Although individual State requirements are not evaluated or outlined in detail, the manual does present general information on the types of State requirements that may apply under regulations or in specific permits.

1.2 Multi-media Components

As noted above, the manual addresses multiple pollutant media. Because many agency inspection programs are not organized in a multi-media fashion, the manual is formatted to allow for multi-media or single media inspections. Consistent with existing EPA guidance, the manual suggests specific opportunities for conducting multi-media screening efforts as part of a single media inspection. In particular, the manual highlights various opportunities for screening inspections involving hazardous waste concerns under RCRA, and reporting and notification requirements under EPCRA/CERCLA. The *Profile of the Pulp and Paper Industry* indicates that 10 percent or less of agency inspections of pulp mills are RCRA-oriented inspections. For most other major industries, the level of RCRA inspections ranges from 35-60 percent of total inspections.[1] This relatively low level of inspections in part reflects that most kraft pulp mills are subject to RCRA only as generators of hazardous waste because they do not operate RCRA-regulated treatment, storage or disposal (TSD) facilities. In fact, some large kraft mills may qualify as small quantity generators of hazardous waste. Because of this status, there is an increased value in conducting screening inspections by other media inspectors. Similarly, EPCRA/CERCLA requirements present a multi-media opportunity where the resources to conduct a media-specific inspection by an agency are limited.

Based on generally applicable multi-media screening checklists developed by EPA,[2] this manual develops some specific multi-media assessment techniques appropriate for RCRA and EPCRA/CERCLA assessments at kraft pulp mills. However, this manual is not intended to establish a presumption or requirement that State and local agency inspectors must conduct multi-media screening inspections.

1.3 Process-based Approach

This manual focuses on the individual processes at a kraft mill. For each process, the manual describes the:

- Basic production cycle,
- Emissions effluents and other discharges that are generated,
- Regulations that limit and require monitoring of those various discharges, and
- Procedures for how to evaluate the process and controls in order to evaluate compliance with those regulations.

The manual breaks the typical kraft mill down into the following processes: (1) pulping operations; (2) chemical recovery; (3) bleach plant operations; (4) wastewater treatment operations; (5) power facilities; and (6) woodyard, papermaking, and other general mill operations. Special operations that may occur at kraft pulp mills, such as hazardous waste cleanup efforts, are not covered by this manual. Also, because most kraft mills are direct water dischargers, the discussion of water discharge issues in this manual focuses on mills with direct discharge National Pollution Discharge Elimination System (NPDES) permits rather than mills that are indirect dischargers to a publicly owned treatment works (POTW). However, indirect discharger requirements are discussed where appropriate.

1.4 Pollution Prevention Issues

There are circumstances in which the likelihood that a process may cause compliance problems will decrease based on various process and design characteristics. For instance, total reduced sulfur (TRS) emissions from a recovery boiler may be more of a concern where a source relies on a direct contact evaporator process as opposed to a non-direct contact evaporator process. In attempting to prioritize limited agency inspection resources, an agency inspector may want to consider these types of process issues in defining the scope and depth of inspections of various processes at a plant. The EPA notes, however, that this manual is not intended to serve as a guide to conducting pollution prevention opportunity assessments or as a resource on pollution prevention measures in the pulp and paper sector. The EPA has developed such materials in the past specifically for the pulp and paper sector (see the Sector Information Resources section below for relevant materials). Pollution prevention measures are discussed in this manual as relevant to conducting inspections under the various media.

1.5 Scope Limitations

This manual does not focus on features of certain procedures and issues associated with conducting compliance inspections. First, safety considerations and precautions are of paramount importance in conducting assessments of any facility, including kraft pulp mills.

The basic inspection manuals for the air, water and waste programs (see the References for Section 2) cover these concerns in detail, and those or similar materials should be reviewed by anyone that may be considering conducting an on-site compliance assessment. Other general features of agency inspections are not covered in detail in this manual but are covered in the general media-specific manuals. These include topics such as: obtaining the right to enter onto a facility or obtaining a warrant if entry is refused; and specific documentation procedures for supporting enforcement proceedings. Although these issues are important concerns for an agency inspector, they are addressed at length in basic inspection technique guidance materials. An agency inspector should consult those other sources for a discussion of these topics.

1.6 Sector Information Resources

This manual is one element in a broad spectrum of materials that are available related to environmental compliance and compliance assessment at kraft pulp mills. The following Figure 1-1 illustrates some of the information currently available, as well as other information resources the agency plans to develop in connection with the Cluster Rules. Following Figure 1-1, the manual provides a summary of each resource and how to obtain the resource or more information on the resource.

Figure 1-1
Information Resources Map

General Information

- Profile of the Pulp and Paper Industry
- Cluster Rules Supporting Documents
- Spent Pulping Liquor BMP Support Document
- Handbook for Pulp and Paper Technologists

Regulatory Information

- Cluster Rules Enabling Documents
- EPA Internet Homepage
- State Regulatory Websites
- Applicability Determination Index

Inspection Manuals

- Baseline Inspection Techniques
- ESP O&M Manual
- Air Compliance Inspection Manual
- 1983 Kraft Pulp Mill Inspection Guide
- NPDES Compliance Inspection Manual
- Revised RCRA Inspection Manual
- Program Audit Protocols

Figure 1-1 (cont.)
Information Resources Map

Compliance/Emissions Data	! SFIP ! AIRS ! RCRIS ! Envirofacts ! IDEA ! PCS ! TRI Data ! ERNS
Pollution Prevention	! Pollution Prevention Technologies for Bleached Kraft Mills (1993) ! Model Pollution Prevention Plan for Kraft Pulp Mills (1992) ! Simpson Tacoma Pollution Prevention Plan (1992) ! Industry Websites

! **Profile of the Pulp and Paper Industry.** The EPA Office of Compliance developed this document (EPA/310-R-95-015) in 1995 as part of EPA's sector notebook project. This notebook provides a sector-based profile of air, water, and land pollution regulations for the pulp and paper industry. The notebook reflects EPA's desire to move toward comprehensive sector-based compliance programs for all industrial sectors. The notebook includes a detailed discussion of pulp and paper industrial processes, chemical profiles, and pollution prevention opportunities; a summary of applicable federal statutes and regulations, compliance history and initiatives; and resource lists. *See http://www.epa.gov/oeca/sector.*

! **Cluster Rules Supporting Documents.** In support of the proposed and final cluster rules, EPA developed technical support documents for both the water and air issues involved in the rulemaking. These documents present the information and rationale supporting the maximum available control technology (MACT) standards and the effluent limitations guidelines and standards for the cluster rules. The documents provide background information on industrial processes and regulatory requirements; summarize data collection methods; provide a detailed overview of air emission and wastewater characteristics, and the selection of pollutant parameters; and discuss pollution prevention and control standards and technologies, including cost estimates. *See http://www.epa.gov/ost/pulppaper for water documents, and http://www.epa.gov/ttn/oarpg and www.epa.gov/ttn/uatw/pulp/pulppg.html for air documents. The preamble and rules themselves are available electronically from the Government Printing Office website, http://www.gpo.gov/su_docs/aces/aces140.html.*

- **Spent Pulping Liquor BMP Support Document.** This 1997 document (*Technical Support Document for Best Management Practices for Spent Pulping Liquor Management, Spill Prevention and Control* (EPA-821-R-97-011, 10/97)) was prepared during the development of the final Cluster Rules and provides the technical background for BMP programs applicable to spent pulping liquor management, spill prevention, and control at pulp and paper facilities. The document includes chapters discussing wood pulping processes and chemical recovery systems; the composition, toxicity, and source of spent pulping liquor; current industry pollution control practices; and BMP implementation, with estimated costs and effluent reduction benefits. *See http://www.epa.gov/ost/rules/#final.*

- **Handbook for Pulp & Paper Technologists (2d ed. 1992).** This handbook, written by pulp and paper expert G.A. Smook, provides technical information relevant to pulp and paper processes, and includes information on the economic and environmental benefits of various pollution minimization efforts. *See http://www.tappi.org for information on obtaining a copy of this handbook.*

- **Cluster Rules Enabling Documents.** The EPA is in the process of developing a variety of documents to assist in the implementation of the Cluster Rules, including the *Pulp and Paper NESHAP: A Plain English Description* (EPA-456/R-98-008, 11/98). Other documents being prepared include an NPDES permit writers guide and a question and answer document on the NESHAP. These documents are expected to be available through the EPA Internet Homepage *(http://www.epa.gov),* at the locations noted previously for the Cluster Rules Supporting Documents.

- **EPA Internet Homepage.** The EPA Homepage *(http://www.epa.gov)* provides a wealth of information relevant to environmental compliance issues and provides links to other important website locations, such as the online version of the daily Federal Register and the Enviroene website *(http://es.epa.gov),* which includes materials developed by EPA's Office of Enforcement and Compliance Assurance.

- **State Regulatory Websites.** Many States have made their regulations and other relevant materials available on the Internet. Even if the regulations are not available, the Internet websites generally provide appropriate contact information to obtain regulatory updates. Figure 1-2 lists the website addresses for the relevant States that either have kraft pulp mills or have promulgated specific kraft pulp mill regulations. For links to various State regulatory resources on-line, *see http://www.paintcenter.org,* a website resource developed by the National Center for Manufacturing Sciences that was made possible by funding from EPA.

Figure 1-2
Website Addresses for State Agency/Regulatory Information

State/Local Agency	Website Address (http:// prefix unless noted)	Rules Available? (as of 4/99)
Alabama	www.adem.state.al.us	Yes
California Districts (air and water)	www.arb.ca.gov/homepage.htm, www.swrcb.ca.gov	Yes
Florida	www.dep.state.fl.us	Yes
Georgia	www.ganet.org/dnr	Yes
Idaho	www2.state.id.us/adm/adminrules/index.htm	No
Kentucky	www.state.ky.us/agencies/nrepc/dep/dep2.htm	Yes
Maine	www.state.me.us/dep	Yes
Maryland	www.mde.state.md.us	No
Michigan	www.deq.state.mi.us	Yes
Mississippi	www.deq.state.ms.us	Yes
Montana	www.deq.state.mt.us	No
New Hampshire	www.state.nh.us/des	Partial
North Carolina	www.ehnr.state.nc.us/ehnr	Yes
Ohio	www.epa.ohio.gov	Yes
Oregon	www.deq.state.or.us	Yes
Pennsylvania	www.dep.state.pa.us	No
South Carolina	www.state.sc.us/dhec/division2.htm	No
Tennessee	www.state.tn.us/environment	Partial
Texas	www.tnrcc.state.tx.us	Yes
Virginia	www.deq.state.va.us	Yes
Washington	www.wa.gov/ecology	Yes
Wisconsin	www.dnr.state.wi.us	Yes

- **Applicability Determination Index (ADI).** This database contains EPA determinations related to the applicability of most federal air regulatory programs, including NSPS and MACT determinations relevant to the kraft pulp mill sector. *See http://www.epa.gov/oeca for electronic access and further details.*

- **Baseline Inspection Techniques.** This student manual (1996, 2d ed.) was designed to be used as instructional material in EPA's Air Pollution Training

Institute (APTI) Course 445, *Baseline Inspection Techniques*. The manual covers use of baseline techniques in lieu of direct measurement to evaluate the performance of air pollution control systems controlling various emission sources. The manual contains chapters that provide recommended inspection procedures for each of the major types of air pollution control devices and processes. *See http://www.epa.gov/airprogm/oar/oaqps/eog/obtain.html for further details on obtaining APTI course materials.*

- **ESP O&M Manual.** This EPA manual (*Operation and Maintenance Manual for Electrostatic Precipitators* (EPA/625/1-85/017)) summarizes available information on ESP theory and design, discusses performance monitoring and the evaluation of control system performance, summarizes methods and procedures for inspection of ESP systems, presents guidelines for general O&M practices and procedures, and outlines a model O&M plan. The manual is designed as an educational tool for plant engineers, O&M personnel, and agency inspectors. Appendix B of the manual addresses ESP applications for kraft recovery furnaces. *Contact NTIS (1-800-553-NTIS) to order a hardcopy version of this report.*

- **Air Compliance Inspection Manual.** This manual (EPA-340/1-85-020) was published by EPA's Office of Air Quality Planning and Standards in 1985 to support inspectors in conducting field inspections necessary to promote stationary source compliance with air quality standards. The manual provides standard inspection procedures, with an emphasis on the evaluation of particulate emission sources, and also provides a discussion of applicable regulations and inspector responsibilities and liabilities. *Contact NTIS (1-800-553-NTIS) to order a hardcopy version of this report.*

- **1983 Kraft Pulp Mill Inspection Guide.** This guide, published in 1983 by EPA's Division of Stationary Source Enforcement (refer to Work Assignment No. 65, Contract No. 68-01-6310), provides technical information and data to support State and local inspectors in the evaluation of both new and existing kraft pulp mills. The guide is divided into three substantive sections. Those sections outline pre-inspection activities and necessary safety precautions; provide a detailed discussion of six major processes or systems within kraft pulp mills (woodhandling, pulping, chemical recovery, causticizing, power boilers, and other sources), noting applicable inspection procedures; and provide compliance determination guidance. *Contact NTIS (1-800-553-NTIS) to order a copy of this report.*

- **NPDES Compliance Inspection Manual.** This 1994 EPA manual (EPA-300-B-94-014) was developed to support wastewater inspection personnel in conducting NPDES field inspections, and to provide standardized inspection procedures. The manual encourages a consolidated inspection approach, and is organized in two parts. The first part addresses basic inspection components, including technical information on documentation, recordkeeping and reporting, sampling, and laboratory procedures. The second part provides information on specific types of inspections, concluding with a discussion of multi-media concerns. *Contact NTIS (1-800-553-NTIS) to order a copy of this report.*

- **Revised RCRA Inspection Manual.** This 1993 manual (Order No. EPA 530R94007) was developed by the RCRA Enforcement Division for use by agency inspectors. The manual describes the scope of inspector authorities and responsibilities, provides a detailed overview of the elements of RCRA compliance inspections (including checklists), establishes standard inspection procedures, and presents essential regulatory information. The EPA has also developed additional RCRA inspection training materials that can be accessed electronically. *Contact NTIS (1-800-553-NTIS) for a copy of the manual, and see http://www.epa.gov/oeca/polguid for other RCRA inspection materials.*

- **Program Audit Protocols.** The Office of Enforcement and Compliance Assurance has developed audit protocols for some of the primary EPA regulatory programs, including CERCLA, RCRA-Generators, and EPCRA. Protocols for the CAA and CWA are scheduled for completion in December 1999. *See http://www.epa.gov/oeca/ccsmd/profile.html for further details.*

- **Sector Facility Indexing Project (SFIP).** The SFIP is a pilot data integration effort initiated by EPA's Office of Enforcement and Compliance Assurance that synthesizes environmental records from several compliance-related data sources into a system that allows facility-level and sector analysis. The SFIP is currently a pilot project covering five industry sectors, including the pulp mill sector. The SFIP provides the public with better access to compliance-related information and allows for sector-based analyses. *See http://www.epa.gov/oeca for further details.*

- **AIRS.** The Aerometric Information Retrieval System (AIRS) is EPA's primary national database for air quality, emissions, compliance, and enforcement information. The AIRS Facility Subsystem (AFS) contains the emissions and compliance data on regulated air pollution sources. Public access is available by obtaining a mainframe account on EPA's National Computer Center. *See http://www.epa.gov/airs for further details.*

- **RCRIS.** The Resource Conservation and Recovery Information System (RCRIS) contains information that identifies and locates entities that handle hazardous waste, as well as providing compliance-related information. *See http://www.epa.gov/epaoswer/hazwaste/data for further details.*

- **Envirofacts.** The Envirofacts Warehouse provides access to several EPA databases (that would otherwise require a mainframe account to access), and also provides tools for users to easily access the information in these databases. In addition to Program data, Envirofacts includes spatial and demographic databases to enable geo-demographic analyses. *See http://www.epa.gov/enviro/html/ef_overview.html for further details.*

- **IDEA.** The Integrated Data for Enforcement Analysis System (IDEA) is an interactive data retrieval and integration system developed by EPA's Office of Enforcement and Compliance Assurance. Users can retrieve data for performing multimedia analyses of regulated facilities, produce compliance histories of individual facilities, identify a group of facilities that meet user-defined criteria, and produce aggregated data on selected industries. Public access is available by obtaining a mainframe account on EPA's National Computer Center. *See http://www.epa.gov/oeca/idea for further details.*

- **PCS.** The Permit Compliance System (PCS) is a national information system that automates entry, updating, and retrieval of NPDES data, and tracks permit issuance, permit limits, and monitoring data for NPDES facilities. Public access is available by obtaining a mainframe account on EPA's National Computer Center. *See http://www.epa.gov/oeca/datasys for further details.*

- **TRI Data.** The Toxics Release Inventory (TRI) provides the public with information on toxic chemicals being used, manufactured, transported, or released into the environment. See *http://www.epa.gov/opptintr/tri* for access to numerous TRI topics, including: "What is TRI," "Accessing and Using TRI Data," "Tri Forms and Reporting Requirements," "TRI chemicals," "TRI Program Development," "TRI National and International Programs," "TRI Contacts," and "What's New with TRI." *See http://www.epa.gov/opptintr/tri/ttpubacc.htm to learn more about TRI information found on CD-ROM, the Right-to-Know Network (RTK NET), Envirofacts, TOXNET (user fee), and TRI User Support (TRI-US).*

- **ERNS.** Through The Emergency Response Notification System, EPA maintains a database of reported spills of oil and other materials. *See http://www.epa.gov/docs/ernsacct for further details.*

- **Pollution Prevention Technologies for the Bleached Kraft Segment of the U.S. Pulp and Paper Industry (1993).** This report, published in 1993 by EPA's Office of Pollution Prevention and Toxics (EPA/600/R-93/110), provides a detailed description of pollution prevention techniques for kraft pulp and paper facilities. *Contact NTIS (1-800-553-NTIS) to order a hardcopy version of this report.*

- **Model Pollution Prevention Plan for the Kraft Segment of the Pulp and Paper Industry (1992).** This document, a product of EPA's Industrial Pollution Prevention Project (EPA 910/9-92-030), provides a model pollution prevention plan for the kraft segment of the pulp and paper industry as a whole. The model plan was developed after implementation of a specific plan for the Simpson Tacoma Kraft Mill. *Contact NTIS (1-800-553-NTIS) to order a hardcopy version of this report.*

- **Simpson Tacoma Pollution Prevention Plan (1992).** This report (*Pollution Prevention Opportunity Assessment and Implementation Plan for Simpson Tacoma Kraft Company, Tacoma, Washington* (EPA 910/9-92-027)) reflects a specific pollution prevention opportunity assessment and voluntary implementation plan for a single kraft pulp mill that was used as a model for developing other plans. *Contact NTIS (1-800-553-NTIS) to order a hardcopy version of this report.*

- **Other Pulp & Paper Websites.** The Technical Association of the Pulp and Paper Industry maintains a website on the Internet *(http://www.tappi.org)* that provides references to available pollution prevention materials as well as links to other related websites, such as the sites maintained by the National Council of the Paper Industry for Air and Stream Improvement *(http://www.ncasi.org)* and the American Forest and Paper Association *(http://www.afandpa.org)*.

References:

1. *Profile of the Pulp and Paper Industry* (EPA/310-R-95-015), EPA Office of Compliance Sector Notebook Project, U.S. Environmental Protection Agency, September 1995.

2. Memorandum, S.A. Herman, Office of Enforcement, Assistant Administrator, to Regional Administrators and Headquarters Compliance Program Directors, May 1993, attaching Multimedia Screening Inspection Program Guidance and National Checklist (5/12/93). Reproduced as Appendix T in NPDES Compliance Inspection Manual (EPA 300-B-94-014).

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SECTION 2: ASSESSMENT OBJECTIVES AND TYPES

2.1 Objectives

The appropriate tasks to perform in conducting a compliance assessment will depend on the goal(s) of the assessment. The three primary goals that may apply which are discussed in this manual are:

! **Permit verification.** Determine that the permit appropriately reflects current process operations and includes all necessary components. Check to ensure that the permit reflects all applicable regulatory requirements. Evaluate whether the mill has applied for all necessary permits or permit revisions associated with source modifications.

! **Compliance assessment.** Conduct general assessment of compliance with applicable requirements. May include direct compliance assessments (sampling or testing for emission limitations and verification of proper implementation of work practice/operating requirements) or indirect compliance assessments (control device/process operation and maintenance, observation of general housekeeping practices, laboratory QA/QC checks, etc.).

! **Root cause evaluations.** Perform follow-up investigation after a problem is identified to determine cause (such as follow-up to wastewater treatment plant upset or to increased emissions levels reported from a CEMS).

Other objectives of an inspection may apply, but are generally considered beyond the scope of this manual. These include:

! Observing compliance tests or certification tests for self-monitoring equipment.
! Conducting assessments in support of/response to specific enforcement actions.
! Gathering data to support development of new/revised regulations or permit renewals.

2.2 Available Techniques

There are four basic methods of conducting an inspection: visual (or odor) observation, record reviews, interviews with facility personnel, and sampling/testing activities.

- **Visual and odor observations.** Visual (and odor) observations serve two important functions. In many situations, visual observations can serve as a direct determination of compliance. For instance, compliance with work practice requirements under RCRA or the air program can be determined in many cases based on visual observations alone. The second use of visual or odor observations is as an indirect screening tool. By observing general plant conditions, detecting odor problems, or observing specific conditions of key discharge points and controls, an inspector can identify indications of potential problems at the facility. Generally, this type of assessment should be linked with other techniques, such as record reviews, to provide a more complete assessment of compliance. Photo or video documentation should be used when appropriate or necessary.

- **Record reviews.** Review of records is an important element of most inspections. Appropriate file records, including permits, monitoring reports and previous inspection reports, should all be evaluated prior to conducting the inspection. On-site records should be reviewed during the inspection to assess current operations and to verify that recordkeeping obligations are met. For both the RCRA and NPDES programs, records, including monitoring reports, often allow for direct compliance determinations without further analysis. For the air program, continuous monitoring data has been more limited, and visual observations, especially for particulate matter emissions, have played an increased role in compliance assessments. As the air program moves toward the NPDES model with expanded monitoring and compliance certification in Title V operating permits, record reviews will continue to increase in importance.

- **Interviews.** An initial step in the assessment process might involve in-depth interviews with facility staff in the target process areas. Interviews should cover what discharges and waste streams are associated with the process and how these discharges and waste streams are managed to stay within compliance. To the extent process conditions are important to maintaining compliance, interviews should elicit detailed information about expected normal operating conditions and how potential process upset conditions are monitored, prevented and, if necessary, corrected. For an agency inspection, the opening conference is an appropriate time to discuss what types of interviews are expected during the inspection.

NOTE! Distributed control systems (DCS) in pulp mill operations provide an excellent opportunity to merge effective plant interviews with record reviews. In the control rooms for various processes, a DCS can provide real-time and trend data analyses during an inspection. Interviews with plant operators can enhance the use of the DCS to obtain relevant information and to analyze the information provided by the DCS.

- **Sampling/testing.** In all three main program areas, actual sampling or testing in the conduct of a typical compliance assessment is limited. However, sampling or testing methods usually serve as the benchmark for determining compliance and, where necessary, should be performed where an accurate assessment is difficult to perform and a significant risk of noncompliance or other problem exists.

Each of the three basic media programs -- air, water and hazardous waste -- has developed general, media-specific inspection procedures that incorporate all of these techniques to some degree. In each case, the media programs use standardized nomenclature for various types and degrees of inspections. In addition, multi-media inspection guidance developed by EPA has established additional standard elements of different types of multi-media inspections. The following sections provide a brief overview of these various existing inspection types and identify several common elements and some unique characteristics.

2.3 Air Inspections

The EPA's 1985 Compliance Inspection Manual[1] identifies four categories of air compliance inspections (Levels 1 through 4). As summarized in Figure 2-1, these categories represent increasing levels of effort associated with conducting a compliance assessment for air pollution regulations.

Figure 2-1
Air Compliance Inspection Types

Inspection Level	Scope
Level 1	! Visible emission observations (VEOs) without plant entry ! Upwind/downwind odor assessment ! General observation of operations to check for consistency with permit ! Use as a screening tool for future inspections, and possibly for direct enforcement of opacity requirements ! Potential response to citizen complaints
Level 2	! "Walk through" of the facility ! Limited review of data from on-site monitoring equipment ! Internal checks of air pollution control equipment (if not in service) -- visually from access hatches ! Used to identify potential problems warranting follow-up investigation ! Useful for verifying accuracy/completeness of emission points identified in a permit
Level 3	! Same as Level 2, plus detailed review of available monitoring data for processes/equipment with expected problems ! Use of portable instrumentation to check emission levels/operating conditions ! Comparison of observed data with specified baseline conditions ! Usually narrow in scope and targeted to specific units

Figure 2-1 (cont.)
Air Compliance Inspection Types

Inspection Level	Scope
Level 4	! Used to establish baseline conditions ! For large units, done in conjunction with performance tests ! For small units that are not generally tested, done during periods of documented proper operation ! Also includes development of process/control device flowcharts to aid future inspections

In addition, an important feature of EPA's air inspection guidance is the concept of baseline inspection techniques.[1,2] For many air pollution requirements, a direct compliance comparison during an inspection is impractical. The regulations are often expressed in lb/hr or lb/ton of product, and portable or permanent monitoring equipment generally will not read out directly in these regulatory formats. Instead, shifts from baseline conditions are used to reveal potential compliance concerns. Baseline inspections are based on the principle that control device performance can be evaluated by comparing present operating conditions with specific baseline data. Baseline data are usually generated during a performance test that establishes the ability of the control equipment to achieve compliance with the emission limit. Baseline inspections rely on indications of control device performance as an indirect means of assessing compliance.

Generally, each control device should be approached with the assumption that its operating characteristics and performance levels are unique, given the myriad of site-specific process and control variables that can influence the performance of a particular piece of control technology when applied to a specific emissions source. In addition, evaluations of control performance generally should consider multiple variables because usually no one variable has a dominating effect on overall performance. Therefore, this technique relies on the assessment of shifts in performance of more than one parameter to document the possibility of reduced control performance. In addition, other signs of potential reduced control performance, such as corrosion, solids discharge rate, and fan conditions, can be used to support initial indications of reduced control performance.[1,2] Figure 2-2 identifies several key principles for conducting baseline inspection techniques.

Figure 2-2
Baseline Inspection Concepts[2]

Principle	Rationale
Evaluate changes over time on an individual unit basis	! Numerous site-specific factors vary from unit to unit and impact performance
Evaluate sets of data as opposed to relying on single measurements	! Reduces chance that baseline shifts represent measurements, not emission, problems ! Increases strength of indication that indirect measures of compliance represent actual increases in emissions
Scope should include component failure information and general observations, not just operating data	! Increases in component failure rates or obvious housekeeping problems are important to assess cause of potential compliance problems
The inspector must organize the data and observations effectively and evaluate the basic information while on site	! The inspection should include basic inspection points that definitely are to be covered and follow-up inspection points that are to be covered only if evaluation of basic information indicates a potential problem
Inspectors should be flexible and exercise professional judgement during the assessment	! The baseline concept is designed as a screening test in which more in-depth follow-up is reserved for points at which initial evaluations indicate problems ! Rigid checklists may be incompatible with site conditions, including health and safety concerns

Obviously, a key element of the baseline inspection technique is to have adequate monitoring of process and control performance indicators. The 1985 *Air Compliance Inspection Manual* notes that existing monitoring may be inadequate or insufficiently reliable to perform this function properly. The manual suggests the use of portable analyzers as an additional diagnostic tool to supplement in-place monitors. For most modern pulp mill facilities, the use of DCS provides an effective tool to evaluate process and control performance. To the extent an agency inspector intends to seek access to DCS data, this issue should be discussed at the opening conference to address any confidential business information (CBI) concerns. In addition, the Agency has promulgated the compliance assurance monitoring (CAM) rule at 40 CFR Part 64. The basic concept of the CAM rule is analogous to the baseline inspection technique and, as facilities implement the rule, CAM data will increase the availability and reliability of control device performance monitoring data. In addition, CAM data will have to be reported. These reports can be evaluated prior to the actual on-site assessment activities to prioritize which control equipment within the plant to evaluate during the on-site portion of the assessment. Note that for many mills, CAM data may not be available until the first renewal of a Title V permit, given the implementation schedule in the CAM rule.

In addition to the four basic compliance inspection types, compliance assessment activities under the air program also include specific procedures for conducting compliance tests and for conducting audits of continuous emission monitoring systems (CEMS).

These types of compliance assessment tools are not discussed at length in this manual. For further information, see the 1985 *Air Compliance Inspection Manual*, as well as other EPA guidance related to CEM audits.

2.4 Water Inspections

Under the CWA NPDES program, EPA has developed the *NPDES Compliance Inspection Manual*.[3] As with the manual for the air program, the water manual differentiates between varying degrees of inspections, as shown in Figure 2-3. These various inspection types include a varying mix of records reviews, on-site sampling activities, monitoring audits, and visual (and odor) observations. Unlike the air inspection program, the baseline concept is not a critical component of the water inspection process.

NOTE! The Cluster Rules will require water inspectors to focus on bleach plant, pulping, and chemical recovery operations in addition to traditional focus on wastewater treatment plant operations.

Historically, NPDES compliance inspection procedures have focused generally on wastewater treatment facility operations and discharge characteristics. Often, the wastewater from all processes at a pulp mill will be combined, treated at a single on-site treatment facility, and then discharged from an outfall. The water inspector then can focus the inspection on the wastewater treatment plant operations and evaluate other areas only if problems are discovered and the upstream production processes need to be evaluated to identify the source of the problem. The Cluster Rules add requirements for the bleach plant effluent that will require a water inspector to evaluate bleach plant operations (see Section 6). The Cluster Rules also add best management practices (BMPs) for spent pulping liquor, soap and turpentine that will require the inspector to evaluate operations in the pulping and chemical recovery areas (see Section 4.6 for a discussion of these requirements). Another reason to assess the upstream production processes would be to evaluate compliance with general requirements such as storm water or spill prevention plans (see Sections 8 and 9 for relevant discussions).

Figure 2-3
NPDES Inspection Types

Type	Scope
Compliance Evaluation Inspection (CEI)	! Nonsampling inspection designed to verify compliance ! Records reviews, visual observations, and evaluation of treatment facilities, laboratories, effluents and receiving waters ! Consider data from both biological and chemical self-monitoring

Figure 2-3 (cont.)
NPDES Inspection Types

Type	Scope
Compliance Sampling Inspection (CSI)	! Same elements as CEI ! Obtain representative samples (chemical and bacteriological analyses) ! Verify accuracy of self-monitoring ! Determine compliance with permit limits ! Can be used to determine effluent characteristics and support permit development
Performance Audit Inspection (PAI)	! Used to evaluate self-monitoring program ! Uses CEI records check to verify compliance ! Includes actual observations of permittee's monitoring program from sampling through reporting ! May require permittee to analyze performance samples to assess laboratory's accuracy
Compliance Biomonitoring Inspection	! Same as a CSI, except focus on toxicity bioassay sampling and chronic toxicity testing ! Assess biological effect of effluent on test organisms
Toxics Sampling Inspection (TSI)	! Same as a CSI, except focus on toxic effluent parameters (other than heavy metals, phenols, and cyanide generally analyzed during a CSI)
Diagnostic Inspection (DI)	! Troubleshooting inspection to assist POTWs that are not able to achieve permit compliance
Reconnaissance Inspection (RI)	! Used to obtain preliminary overview ! Quick visual inspection as a screening tool to identify potential problems
Pretreatment Compliance Inspection (PCI)	! Evaluation of municipal authority's pretreatment program ! Record reviews of industrial user activities (monitoring, inspections, and enforcement) ! May be supplemented with inspection of industrial users
Legal Support Inspection (LSI)	! Resource intensive inspection ! Designed to support specific enforcement action

2.5 Hazardous Waste Inspections

Under RCRA, EPA has developed the *RCRA Inspection Manual*.[4] There are many types of RCRA inspections, as shown in Figure 2-4. However, the compliance evaluation inspection (CEI) is the primary mechanism for assessing RCRA compliance by hazardous waste generators, transporters, and TSD facilities. The types of RCRA inspections differ based upon the purpose, facility status, and probable use of inspection results.

Figure 2-4
RCRA Inspection Types

Type of Inspection	Description
Compliance Evaluation Inspection (CEI)	! Routine inspection of hazardous waste generators, transporters, and TSDFs ! Encompasses file review prior to the site visit, on-site examination of generation, treatment, storage or disposal areas, and a review of records ! May include inspections of facilities with delisted waste (not typical to pulp mills) ! If corrective action involved, this includes assessment of compliance with consent and permit orders
Case Development Inspection (CDI)	! Conducted when RCRA violations are suspected or revealed during a CEI ! Specific purpose is to gather data in support of an enforcement action
Comprehensive Ground-Water Monitoring Evaluation (CME)	! Conducted to ensure that groundwater monitoring systems are designed and functioning properly at RCRA land disposal facilities (not typical to pulp mills) ! Includes activities, plus sampling and analysis of groundwater monitoring system and hydrogeological conditions
Compliance Sampling Inspection (CSI)	! Focus is on collecting samples for laboratory analysis ! May be conducted in conjunction with a CEI or any other type of inspection, except a CDI
Operation and Maintenance Inspection (O&M)	! Conducted at closed land disposal facilities (not typical to pulp mills) to determine the adequacy of the operation and maintenance of groundwater monitoring systems ! Usually conducted at facilities that have already received a thorough evaluation of the groundwater monitoring system under a CME inspection
Laboratory Audit	! Inspection of laboratories performing sample analyses ! Ensures that laboratories are using proper sample handling and analysis protocols
State Oversight Inspection	! Conducted by U.S. EPA personnel to determine the effectiveness of State hazardous waste management programs and to determine facility compliance

Pulp and paper facilities generally will be subject to RCRA requirements as a generator of hazardous waste, not as a TSD facility. Particular mills may have on-site remediation or other corrective action activities subject to RCRA requirements, but those activities are outside the scope of this manual. To the extent underground storage tanks (USTs) are present, UST requirements under RCRA will apply. Consistent with the *RCRA Inspection Manual*, waste sampling generally will not be part of a standard agency inspection of a hazardous waste generator or for UST assessment purposes. Industry self-assessments may be more likely to include waste sampling activities to verify the status of various waste streams. The two primary inspection tools covered in this manual for RCRA purposes are record reviews (e.g., reviewing waste manifests or personnel training records) and visual inspection of waste storage areas.

2.6 Multi-media Inspections

The EPA's National Enforcement Investigations Center (NEIC) published a *Multimedia Investigation Manual* in March 1992.[5] Although the manual is no longer considered a reference for current agency procedures and standards, much of the information in the manual is still applicable.

The NEIC manual specifies four categories of inspections, with increasing complexity and multimedia aspects:

- **Category A:** Program-specific compliance inspections that are conducted to determine compliance status for program-specific regulations.

- **Category B:** Program-specific compliance inspections in which the inspector(s) screens for and reports on obvious, key indicators of possible non-compliance in other environmental program areas.

- **Category C:** Several concurrent and coordinated program-specific compliance investigations conducted by a team of investigators from two or more program offices. The team conducts a detailed compliance evaluation for each target program area.

- **Category D:** Resource-intensive, comprehensive facility evaluations that address compliance in targeted program-specific regulations and attempt to identify environmental problems that might otherwise be overlooked. Identify waste streams by process and trace to final disposition. Requires a team of inspectors who have been thoroughly cross-trained in different program areas.

The NEIC manual identifies several benefits to conducting Category C or D multi-media inspection. These benefits include:

- More comprehensive and reliable compliance assessment
- Higher probability of uncovering/preventing problems before they occur or before they create an environmental/public health risk
- Improved ability to respond to non-program specific complaints or issues and to understand cross-media problems
- Improved enforcement

This kraft pulp mill compliance assessment manual is designed to support any assessment from Category A through Category D. This manual does not, however, focus on Category D inspections. Instead, the manual is organized generally by program type within each process area of the kraft pulp mill. This organization is consistent with preparing for a Category A, B or C assessment. In addition, because of the relatively limited nature of RCRA waste and EPCRA issues at most kraft pulp mills, the manual focuses on specific ideas for screening analyses (Category B) to assess compliance with RCRA and EPCRA issues.

2.7 Summary

Inspections under the three media programs will have several elements in common. First, both pre-inspection and on-site inspection activities in all three programs should include a review of facility records, including the permit (not applicable to hazardous waste), required monitoring data submissions, incident reports such as malfunction/upset reports, and previous inspection/enforcement records. In addition, records required to be maintained on site but not submitted to an agency (such as waste manifests, equipment maintenance records, monitor quality assurance activities, etc.) can be reviewed during the on-site inspection for all three media programs.

Visual and odor observations of facility operations will be a critical component of an inspection for any of the media. Visual and odor observations can be used to provide a quick indication of obvious potential problems or poor housekeeping practices. Based on the observations, the inspector can prioritize which elements of the process deserve more detailed attention within the time available. In addition, visual observations can be used as a direct determination of compliance in many contexts. For instance, under the air program, visible emission observations (VEOs) using Method 9 in Appendix A of 40 CFR Part 60 is a method for determining compliance with opacity regulations. Compliance with some work practice standards can also be assessed visually. For water, visual observation can be used to assess compliance with certain effluent limitations, such as prohibitions against excessive sheen. Under RCRA, numerous requirements can be assessed visually because many of the standards are specific work practice standards. Examples include appropriate labeling practices and aisle space between containers.

At this point, the appropriate assessment techniques for the various media will begin to diverge. For waste inspections, no further assessment generally will be conducted unless particular circumstances require sampling of specific wastes. For water, the next level of assessment is likely to involve actual sampling activities aimed at developing a direct determination of compliance with effluent limits and as a check on the source's compliance monitoring program. For air, the next step toward a more in-depth analysis involves evaluating baseline parameters to detect potential decreases in control performance without having to conduct actual direct compliance determinations using specified compliance test methods. Because of the diffuse nature of air pollutant emission points, the compliance assessment for air also is likely to cover more separate process units than an assessment related to water effluents.

References:

1. *Air Compliance Inspection Manual* (EPA-340/1-85-020), U.S. Environmental Protection Agency, September 1985.

2. Richards, J., *Baseline Inspection Techniques*, Student Manual, Air Pollution Training Institute Course 445, 2nd edition, 1996.

3. *NPDES Compliance Inspection Manual* (EPA-300-B-94-014), U.S. Environmental Protection Agency, September 1994.

4. *Revised RCRA Inspection Manual* (OSWER Directive 9938.02b), U.S. Environmental Protection Agency, October 1993.

5. *Multi-media Investigation Manual* (EPA-330/9-89-003-R), U.S. Environmental Protection Agency, Rev. March 1992.

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SECTION 3: GENERAL INSPECTION STEPS

The basic steps to conducting a successful compliance inspection are generally similar across the various media. Each assessment requires (1) upfront planning, (2) accurate recording and documentation of findings, and (3) effective follow-up action to problems discovered during the inspection.

3.1 Planning the Inspection

Without successful planning before the inspection, compliance assessment is unlikely to provide complete and accurate results. In addition, agency inspectors usually will have only a relatively brief time to conduct on-site assessments for individual facilities. Proper preparation is therefore essential to maximize the benefits of conducting the assessment. Recommended steps include:

Define objectives. In order to plan the appropriate scope of an assessment, the inspector first must define the objectives. Often, the basic objective of an assessment will be to evaluate general compliance with regulatory requirements. In some cases, however, more specific objectives may play a role, including:

- Verifying accuracy/completeness of a permit
- Responding to citizen complaints
- Identifying the root cause of a discovered problem and/or evaluating effectiveness of corrective actions taken
- Developing information to support/respond to enforcement action
- Observing required sampling/testing
- Auditing of compliance monitoring systems

This manual will focus primarily on basic compliance assessments (including response to citizen complaints), permit verifications, and root cause assessments.

Identify assessment team/critical participants. Assembling the appropriate team of individuals that will be involved in the assessment will be critical to its overall success. It is important to identify not only the direct participants but also the critical process operators and other staff that may be needed to answer questions and assist with immediate follow-up issues. For instance, if a review of continuous emission monitoring system (CEMS) data is planned as a component of the assessment, coordinating in advance to make sure that the key CEMS operators are available for questions on monitor maintenance/downtime activities will be important.

At this stage, the agency inspector should also coordinate with other offices and the facility to the extent appropriate. For agency inspections, a key issue to resolve at the outset is whether the inspection will be an announced or unannounced inspection. Often, an agency will want to conduct an unannounced inspection to obtain as realistic a view as possible of source operating practices. If the inspection will be announced, the agency inspector should coordinate with plant personnel to ensure that the appropriate staff are available, that the schedule does not conflict with planned activities at the facility that could interfere with the inspection, and that the inspector satisfies any special safety requirements established by the facility. Examples of coordination activities include:

Figure 3-1
Pre-Assessment Coordination

Potential Coordination Activities
! Scheduling joint inspections with other agencies/offices ! Scheduling inspections to avoid conflicts with planned activities of other agencies/offices or the facility ! Conferring with other agencies/offices on their information needs if multi-media screening planned ! Obtaining relevant information on the facility and its compliance status ! Discussing permit-related issues with the appropriate permit writer ! Identifying all necessary safety and inspection equipment

Develop background information. Before conducting the on-site assessment, the inspector should review existing information that describes the plant, processes, and previous compliance assessments. At a minimum, existing permits, applicable regulations, recent monitoring reports, and the most recent inspection report should all be evaluated for matters within the scope of the assessment. If recent enforcement actions have occurred at a facility, the relevant enforcement documents, especially any compliance plans or corrective action obligations, should be reviewed so that compliance is assessed with those obligations that may apply above and beyond the basic permit requirements. Agency air or water inspectors that may be considering multi-media screening efforts for waste or toxic release reporting issues may want to review available information from agency databases.

It is important to note that self-monitoring and self-certification data are increasingly required and available under federal regulations. This availability increases the need to review available data thoroughly and to integrate that information into deciding which facilities and processes within a facility to evaluate. The following Figure 3-2 provides a list of various records and information sources that should be reviewed prior to conducting the assessment.

Figure 3-2
Pre-Assessment Records Review

Information Needs	Information Sources
Basic Facility Information ! Plant name, location, ID#s ! Contact information (name, title, phone/fax#) ! Flow diagrams/general schematics of production processes, and associated control/waste handling equipment ! Production rate data ! Safety equipment requirements	! Prior inspection reports ! Permit files ! Contact with facility
Regulatory Information ! Permits required ! Standards applicable ! Required reports	! Regulations ! Permits
Compliance Status/History	! Enforcement files ! Prior inspection reports ! Computer databases (IDEA, AIRS, PCS, RCRIS)
Emissions Data	! MSDS Sheets ! TRI reports ! DMRs ! TRS, opacity, other CEMS ! Material balance calculations ! Engineering calculations used to prepare TRI reports
Control Method Data ! Description/design data for control equipment ! Upsets/malfunctions	! Permit files ! Prior inspection reports ! Baseline test results ! Malfunction/upset/bypass reports ! Reported control device parameter data

Prepare inspection plan/strategy. To assure that the objectives of the assessment are achieved, the inspector should develop a specific plan for conducting the on-site assessment. The plan should include the objectives, a list of specific tasks to be performed, the procedures to use to complete the tasks, a list of required resources, and the schedule. The plan should include priorities, and should address shifts in tasks and schedule that may be necessary if initial screening evaluations indicate the need for detailed follow-up. For instance, if a screening check of certain operating parameters documents a shift from baseline expected conditions that could lead to emission increases, following up on that information may take precedence over assessing another process. Figure 3-3 lists key elements of an inspection plan.

Figure 3-3
Inspection Plan

Issues to Cover	Potential Components
Objectives	! General compliance assessment ! Root cause evaluation ! Permit preparation/verification
Scope	! Full facility ! Targeted processes
Tasks	! Visual observation ! Record reviews ! Sampling/measurements ! Interviews with plant operators
Procedures	! Identification of which records to look at and timeframe ! Link issues raised in records reviewed prior to inspection to items to be investigated on site ! Checklists to use ! Measurement procedures, including chain-of-custody considerations ! Identify what follow-up procedures may be needed
Resources	! Identify necessary equipment ! Identify what background information needed during assessment (e.g., baseline data for comparison purposes)
Schedule	! Allocation of time per task, with potential adjustments if follow-up procedures needed for particular tasks

Equipment/resource preparation. The final key aspect of planning the assessment is to identity what equipment and resources to bring to the assessment. Safety equipment is of paramount concern. In addition, inspection equipment, including sampling or measurement equipment, should be identified. Finally, it is important to bring information collected during the background review phase that may need to be verified or compared against during the inspection.

3.2 Conducting the Inspection

Once these initial preparation activities are completed, the actual assessment can be conducted. The remainder of this document focuses primarily on this phase of the assessment process, although the manual also identifies, where applicable, critical monitoring and similar information that should be evaluated prior to or after the on-site phase to supplement on-site findings. The following discussion highlights key procedural steps for conducting the on-site phase of the assessment.

Opening conference/meeting. For agency inspections, the opening conference serves an important function, especially in the case of an unannounced inspection. At this point, the agency staff should identify the purpose of the inspection, the legal authority, and the procedures to be followed. The conference also presents the opportunity to provide general compliance assistance and answer relevant questions. Effective communication at this stage will facilitate the subsequent stages of the inspection. A list of appropriate topics to cover in the opening conference includes:

Figure 3-4
Opening Conference Topics

Topic	Purpose
Outline Objectives	! Inform facility of purpose and scope ! Avoid misunderstandings
Discuss Agenda/Schedule	! Streamline subsequent activities ! Identify possible conflicts ! Allow for scheduling meetings with facility personnel
Verify Facility Information ! Basic data (correct names, etc.) ! Production data ! Emission sources	! Update existing facility information ! Identify possible changes that create new compliance issues
Provide List of Records to be Reviewed	! Streamline subsequent activities ! Provide source opportunity to collect information during initial phase of on-site assessment ! Identify confidential business information (CBI)
Arrange for Accompaniment	! Identify safety constraints ! Identify CBI ! Explain operations/answer questions ! Arrange for discussions/questions with plant operational staff
Photographs/Videos	! Notify plant personnel of intent to take photographs or videos to document observed conditions
Schedule Closing Conference	! Provide opportunity for follow-up questions ! Confirm confidentiality claims
Duplicate Sampling/ Measurement	! Advise facility of right to obtain duplicate samples or to conduct simultaneous measurements
Confidentiality	! Advise facility of right to request that documents be handled as CBI
Compliance Assistance	! Respond to inquiries about new/proposed regulations

The opening conference provides an excellent opportunity, along with the closing conference, for an agency inspector to provide compliance assistance to facility representatives. For instance, the inspector can provide information about new or proposed regulations that could affect the facility. The agency inspector, however, should not attempt to provide interpretations of the finer points of regulatory requirements, provide unwritten policy interpretations or provide detailed design information on a facility's particular problem. The EPA has recently prepared a report[1] on this issue that identifies three tiers of compliance assistance activities, shown in Figure 3-5. Generally, Tier I represents appropriate activities for inspection personnel, while Tier III represents generally inappropriate activities. Tier II activities should be approached cautiously and may be more appropriate for separate agency personnel or as part of a separate site visit.

Figure 3-5
Compliance Assistance Activities

Tier I (Appropriate Assistance): Sharing Standardized Information and References	Tier II (Potentially Appropriate Assistance): More Technically Complex and Site-Specific	Tier III (Generally Inappropriate Assistance): Most Technically Complex and Site-Specific
! Providing physical copies of requirements ! Conveying an understanding of requirements ! Providing information including prepared guidance, manuals, and technology transfer documents ! Providing information on what assistance can be gained from EPA, State, and local programs ! Providing information on what assistance can be gained from trade and other (i.e. public) organizations ! Sharing information on control practices and equipment used within a specific sector to comply with environmental regulations ! Providing published technical information and/or advice for simple solutions that do not require a significant amount of resources or liability to the source/facility or regulatory agency ! Providing prepared literature on pollution prevention techniques and opportunities ! Providing suggestions on simple techniques and concepts to reduce or eliminate pollution (e.g., housekeeping tips)	! Sharing information on compliance status ! Providing review of compliance status ! Sharing information and insight into their particular problem and what might be evaluated to remedy the problem ! Providing technical assistance on recognized industry or sector-based practices and concepts to reduce or eliminate pollution (e.g., chemical substitution, equipment changes)	! Providing information on specific commercial consultant services ! Providing interpretations of the finer points of regulatory requirements ! Providing detailed design information on a source/facility's particular problem ! Providing unwritten policy interpretations on regulatory requirements ! Providing detailed facility-specific engineering design and materials management information that advances pollution prevention

Recording assessment findings. Complete and accurate recordation of findings is critical to the success of any compliance assessment activity. From an agency inspector's viewpoint, maintaining complete and accurate information is essential as the information may be used subsequently in an enforcement, permitting or similar context. Even if potential enforcement concerns are not present, full documentation will be important so that subsequent assessments build upon prior activities. Examples of documentation that may be produced during the assessment include:

Figure 3-6
Documentation of Findings

Document Type	Purpose and Contents
Field Notebook/Notes	! Most critical component ! Include all observations made, list/reference all procedures used, note unusual conditions, reference all documents/photographs reviewed, copied or produced
Forms and Checklists	! Concise uniform method of collecting information ! May serve as template for entering data into tracking system (e.g., use of standard NPDES Inspection Form for entering data into PCS)
Sampling/Measurement Documentation	! Chain of custody procedures must be followed and documented to use samples/measurements as evidence
Drawings and Maps	! Useful for cross-referencing in notes, checklists, etc.
Records Reviewed	! Copies may be necessary to document potential problems discovered or to verify compliance status ! Copies should be numbered and initialed, with appropriate referencing in field notes, to allow for substantiating authenticity at later date
Photographs	! Provide objective record of observed conditions ! Because of proprietary/confidentiality concerns, the use of photographs to document findings should be discussed with facility personnel ! Duplicates should be offered to facility personnel ! Log photographs/video segments in field notebook. After film is developed, mark all photographs to allow for proper identification at a later date. Make sure you can identify from each photo or inspection report the film type, lens type, shutter speed, lighting, time of day, weather conditions, date and location, and description of subject

The issue of confidential business information (CBI) is likely to arise during an inspection. The facility is responsible for making a claim of confidentiality. However, a claim of confidentiality is not grounds to refuse access to the information by an agency inspector -- rather, it safeguards the release of the CBI by the inspector to the public at large. The EPA has developed specific regulatory procedures for handling claims of confidentiality (see 40 CFR part 2). The inspector must assure that the facility is given the opportunity to make the claim and that the inspector clearly acknowledges any information received by the inspector which the facility claims is protected as CBI.

In addition, the inspector must follow all prescribed chain of custody procedures for any samples collected during an inspection. See the discussion of this topic in the media-specific inspection manuals for the air, water and hazardous waste programs.

Closing conference. The closing conference allows the assessment team and facility staff to wrap up remaining issues following the data collection stage. The main components of the closing conference include:

- **Review findings.** Allows for filling in gaps, clarifying ambiguous findings, and resolving technical disagreements over what was found

- **Answer questions.** Provides a chance for factual questions. Legal conclusions, opinions about compliance status, and enforcement consequences should be avoided, except for circumstances where the inspector exercises field citation authority

- **Confidentiality claims.** A final opportunity to claim CBI protection for information collected during the inspection

3.3 Inspection Follow-up

The appropriate follow-up to an inspection clearly will vary depending on: (1) who is conducting the inspection and (2) what is found during the inspection. However, two fundamental aspects will be appropriate in nearly all circumstances:

- Develop a concise, clear report of what was found
- Communicate effectively what was found so that, if necessary, further action may be taken

The critical elements of a successful report, for either an agency or industry inspection, are to address the following issues:

- Why the inspection was performed
- What was covered
- What was found
- What issues should be followed up on and when
- What are the priorities for any further assessments

For an agency inspection report, the findings may eventually be used as part of an enforcement action. Therefore, it is essential that inspection reports are well-written and document all key facts. Appropriate references to documentary support collected during the inspection must be included. If CBI is included in the report, the material should be referenced in a manner that preserves confidentiality (for instance, refer to a document control number assigned by the agency and provide a general description of the information). If the confidential information is referred to directly, then the entire report must be treated as confidential. The inspector should refer to the media-specific inspection manuals for further discussion of these CBI concerns, as well as further suggestions on the style and format of an inspection report.

For a self-assessment inspection, the report should address many of the same factual items as would be included in an agency inspector's report. However, a self-assessment may be more likely to identify the root cause of any problems discovered and what specific corrective actions will be taken to address the problems. The ability of facility personnel to provide an explanation of the cause of any problem and the corrective actions taken may help avert enforcement action by the regulatory agency. The facility should document all corrective actions taken. The facility also should consider prompt disclosure of any problems discovered and the actions taken to correct the problems. The EPA has established a policy that substantially reduces or eliminates civil penalties for violations that are addressed in this manner. (See 60 FR 66706, December 22, 1995)

References:

1. *Role of the EPA Inspector in Providing Compliance Assistance*, Final Report, U.S. Environmental Protection Agency, July 1, 1997.

SECTION 4: ASSESSMENT MODULE FOR KRAFT PULPING OPERATIONS

4.1 Introduction

In the past, the pulping process area was less likely to be a priority area for many compliance evaluations. However, as a result of the Cluster Rules, the pulping process area is subject to significant new regulatory requirements for both air emissions and water discharges. Therefore, this area will be a critical process for compliance evaluation as the Cluster Rules are implemented.

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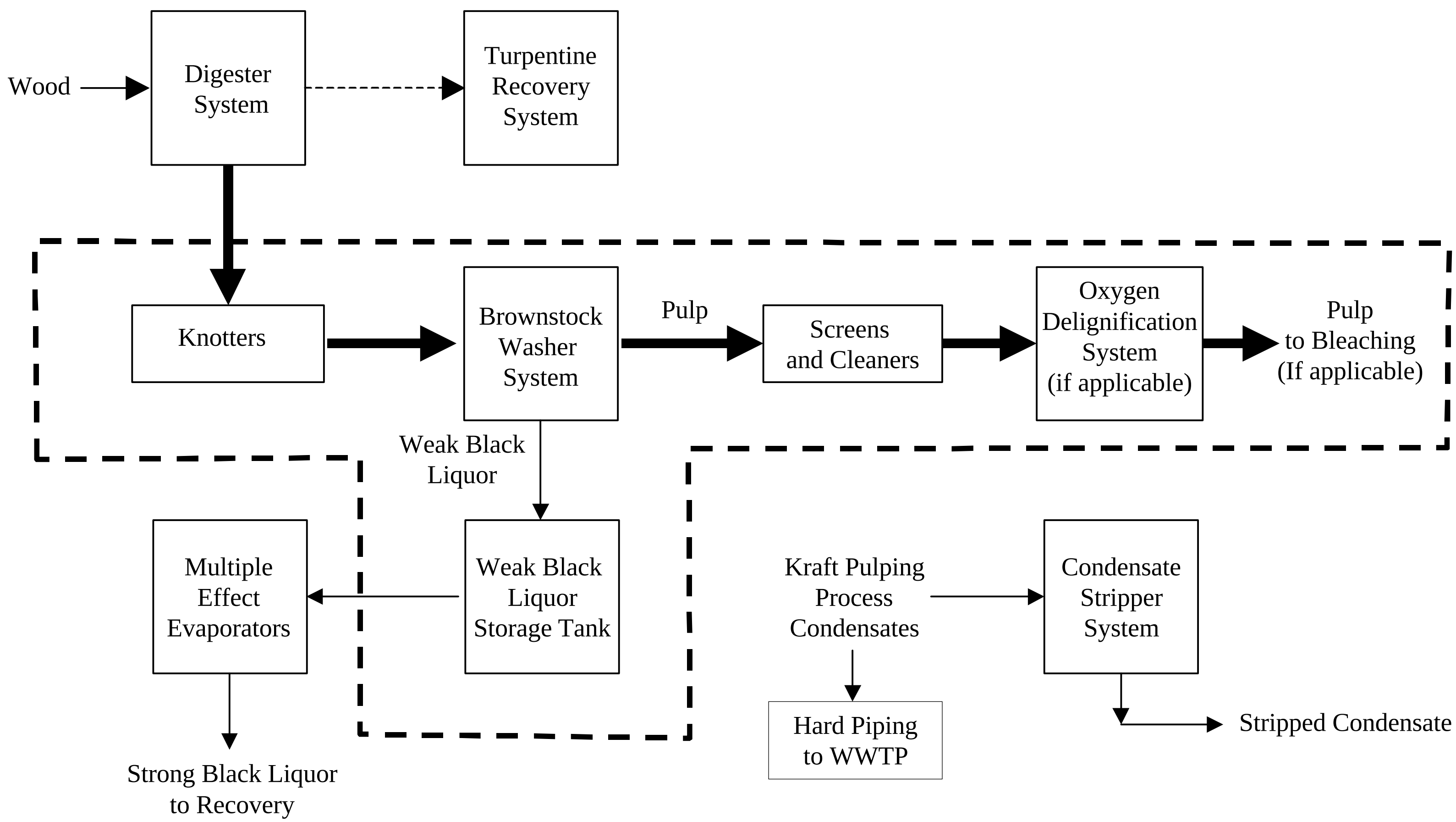
To address these compliance assessment issues, this section provides a thorough overview of the applicable processes, regulatory requirements, and inspection procedures. After a short description of the pulping process as a whole, this section breaks down the pulping processes into four main activities of regulatory concern: low volume, high concentration (LVHC) gas collection; high volume, low concentration (HVLC) gas collection; condensates; and spent pulping liquor, turpentine and soap management. In addition, Appendix E contains an example assessment form specifically designed to address the issues raised in this process area.

4.2 Overview of Process and Discharges

4.2.1 Description of the Process

The pulping process converts raw materials (e.g., wood, plants) into fibers that can be formed into paper or paperboard. There are three main functions performed by the pulping department: producing pulp (digestion), pulp processing to remove impurities from the pulp and recover spent cooking chemicals, and weak black liquor processing to concentrate spent liquor for chemical recovery. Figure 4-1 depicts a typical sequence of the major equipment systems in the pulping process. The function of each of these systems is described below.

Figure 4-1
Flow Diagram of Typical Kraft Pulping Systems



Equipment enclosed by the dashed line are part of the HVLC system. The remaining equipment are components of the LVHC system.

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

Pulp processing steps. The raw pulp is cleaned of impurities prior to bleaching (if performed) or papermaking. The primary cleaning operations include deknotting, brown stock washing, and pulp screening and cleaning.

> *Deknotting* removes knots and other portions of uncooked wood from the pulp slurry. The knots and uncooked wood are either burned for energy recovery, disposed of as waste, or recycled for repulping.
>
> *Brown stock washers* recover spent cooking liquor (weak black liquor) for re-use in the pulping process. Weak black liquor consists of dissolved wood compounds and cooking chemicals. Efficient washing is critical to maximize return of spent cooking liquor to chemical recovery and to minimize carryover of spent cooking liquor (known as brown stock washing loss) into the bleach plant. Excess spent cooking liquor carried over in the pulp increases consumption of bleaching chemicals and can lead to high pollutant loads in wastewater treatment. 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 spent 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.
>
> *Pulp screening* removes the remaining oversized particles from washed pulp. The pulp is diluted to low percent solids and passed through a perforated screen and rejects are removed from the screen continuously. 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.[1] 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. Typically, a decker is used to thicken the pulp for storage after screening.
>
> *Pulp cleaning* in centrifugal cleaners is used to remove high specific gravity contaminants such as dirt and sand from the screened pulp. Centrifugal cleaners, also known as liquid cyclone, hydro cyclone, or centricleaners, consist of a conical or cylindrical-conical pressure vessel with a tangential inlet at the largest diameter of the cone. Centrifugal force and fluid sheer generated from fluid rotation cause

the more dense contaminants to concentrate at the narrow end of the cone where they are removed. Cleaners are typically employed in a cascade of three or more units, with the rejects stream directed to subsequent cleaners to concentrate the dirt in the reject stream and return good fiber to the process.

Weak black liquor processing. Weak black liquor collected from the pulp washers will usually go into a weak black liquor (WBL) storage tank. The WBL is sent to the multiple effect evaporator (MEE) to evaporate water and concentrate the WBL in order to increase solids content. Typically, weak black liquor from the brown stock washers contains 13 to 17% solids.[2] The WBL is then concentrated to 60 to 80% solids, which is required for efficient combustion in the recovery boiler. A MEE will include four to seven effects, or bodies, arranged in series.[4] At pulp mills using pine wood, a tall oil recovery system is generally incorporated into the evaporator system to recover tall oil or "soap" from the black liquor.

Condensate stripping. The pulping process system may also include a condensate stripper system to remove organics and total reduced sulfur (TRS) compounds from various pulping process condensates. These condensates are wastewater streams produced from condensed gases from digester systems, turpentine recovery systems, and evaporator systems. Generally, the streams that are stripped are the turpentine decanter underflow, blow steam condensates, and evaporator condensates. The stripped condensates may then be used as hot process water and the off gases are typically combusted.

Gas collection systems. Vent gas collection systems, or non-condensible gas (NCG) systems, are used to collect gases from the various pulping processes and transport them to an appropriate incineration device for air pollution control purposes. For safety purposes, the NCGs are segregated into two categories[5]: low volume, high concentration (LVHC) and high volume, low concentration (HVLC). A number of mills will use a dedicated incinerator to control these emissions, but most often the facility will use process combustion sources such as the lime kiln, power boilers or recovery boiler. Historically, most LVHC gases have been controlled, while a smaller portion of the HVLC gases have been controlled.[3]

Oxygen delignification. Some mills may also have an oxygen delignification stage either in the pulping area or as a prebleaching stage. At present, oxygen delignification is used at only a relatively small number of mills, but is expected to become more widely used over time. 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.[4] 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. Two-stage oxygen delignification systems are becoming more widely used in the United States.

4.2.2 Air Pollutant Emissions

NOTE! MACT summaries in this Section 4 are based on 4/15/98 Final Rule and subsequent regulatory notices published through 4/30/99. Check website for possible updates to this section that will reflect any subsequent regulatory notices.

As discussed above, air emissions from the above process equipment systems generally fall into two categories: low volume high concentration (LVHC) noncondensible gas (NCG) streams, and high volume low concentration (HVLC) NCG streams. Critical characteristics of these emissions are:

- ! The primary air pollutants of interest are TRS and organic HAPs, primarily methanol. Typical emission rates for various equipment systems are shown in Figure 4-2.

- ! TRS emissions may be subject to NSPS and/or State standards, and HAP emissions are subject to MACT requirements under the Cluster Rules.

- ! LVHC emissions in the past have generally been subject to greater control than HVLC emissions, and HVLC emission points are generally more likely to be unenclosed than LVHC points.

- ! For safety reasons, the LVHC and HVLC gas streams also generally use different gas collection systems and are often sent to separate combustion units for control.

Because of their different regulatory treatment, Sections 4.3 and 4.4 treat these two gas streams separately.

In addition, Section 4.5 contains a separate discussion of HAP air emission concerns for pulping condensates. The Cluster Rules include requirements to control air emissions from the liquid pulping process condensates in addition to LVHC system-based requirements for condensate stripper system overhead gases. Section 4.5 addresses these new regulatory provisions.

Figure 4-2
Typical Air Emissions from the Pulping Processes at a 1000 Ton Per Day Kraft Mill[a]

Pulping System Components (Type of NCG)	Typical Emissions (Tons/yr)		
	Methanol	Total HAP	TRS
Digester and Evaporator[b] (LVHC)	0.5	2.3	5.1
Knotter[c] (HVLC)	2.6	2.9	Not Available
Screen[d] (HVLC)	1.4	1.5	Not Available
Brown Stock Washer (HVLC)[e]	210.0	249.0	73.5
Decker (HVLC)	12.1	21.7	Not Available
Oxygen Delignification (HVLC)	210.0	244.5	Not Available
Pulp Storage (HVLC)	7.0	18.0	Not Available
Weak Black Liquor Storage (HVLC)	12.1	12.9	Not Available
Steam Stripper Overhead Gases[b]	0.4	0.4	1.9
Miscellaneous Sources[f]	Not Available		87.5

a Based on average AP-42 Emission Factors (TRS), Air Pollution Engineering Manual[9] (steam stripper gases TRS value) and 1997 EPA Chemical Pulping Emission Factor Development Document[13] (Methanol and Total HAP), with 350 operating days/year.
b Assumes controlled system (99% control efficiency). Digester system includes an assumed turpentine condenser. All other points assume no control device is used.
c Assumes pressure/open type configuration.
d Assumes closed screens.
e Assumes open rotary vacuum drum washer, using average of data from system with high and low HAP concentration in recycled water.
f AP-42 identifies miscellaneous sources as "knotter vents, brownstock seal tanks, etc." Thus, includes TRS emissions from smaller equipment systems in pulping area, likely including many of the individual systems the table identifies as "Not Available" for TRS data.

4.2.3 Water Pollutant Discharges

Most of the equipment systems in the pulping process area have some associated wastewater either in the form of foul condensates, black liquor spills or other discharges. With proper management practices -- with the exception of condensates and a reject purge from screening and cleaning -- planned discharges from the pulping area can be eliminated.

The high HAP/TRS concentration (or foul) condensates generally are steam stripped prior to being sewered to wastewater treatment. The applicable effluent limitations and other requirements apply at the wastewater treatment plant -- after these pulping condensates are combined with other process wastewaters. Thus, no CWA effluent limitations guidelines or standards will apply specifically to these condensates.

However, best management practices (BMPs) promulgated as part of the Cluster Rules do apply. These BMPs require certain practices for control of leaks, spills and intentional diversions of spent black liquor, turpentine and soap, and are discussed in more detail in Section 4.6.

4.2.4 Solid/Hazardous Waste Releases

The pulping process generally does not generate significant RCRA-related hazardous waste streams. However, handling of spent black liquor can create RCRA-related concerns. Black liquor is not a listed RCRA waste and is excluded from regulation as a solid waste under 40 CFR 261.4(a)(6) 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 -- may be an issue for RCRA compliance assessment if the spilled liquor exhibits one of the four hazardous waste characteristics (toxicity, corrosiveness, reactivity, or ignitability). The RCRA regulatory and inspection procedures are discussed in Section 4.6, which covers spent liquor management.

To the extent other hazardous waste is generated in the pulping area, those issues are addressed in Appendix C through the general discussion of RCRA regulatory and inspection procedures for generators of hazardous waste.

4.2.5 EPCRA Chemicals and Reportable Releases

Facilities will have to provide information on chemicals used in the pulping process area to meet EPCRA's emergency preparedness requirements. Appendix D contains a process-based list of the types of hazardous chemicals that typically could be included in an EPCRA inventory for a kraft pulp mill.

On-site air, water and land releases, including land disposals, of toxic chemicals associated with pulping processes, as well as off-site waste transfers of these toxic chemicals, may have to be accounted for in TRI Form R reports. These Form R reporting requirements apply to each of Sections 4.3 through 4.6 and are discussed briefly in each section.

In addition, EPCRA/CERCLA emergency release reporting could apply to off-site releases that are not federally permitted. These releases potentially could include abnormal air emissions or spills of black liquor or turpentine released off-site. These reporting issues also are discussed briefly in Sections 4.3 through 4.6.

4.3 LVHC Gas Collection System

Key Features for LVHC Gas Collection

- **TRS (NSPS and State) and HAP (Cluster Rules) requirements may apply**
- **Thermal incineration nearly exclusive control option used**
- **Combustion units in other areas of the mill often used to control emissions**
- **Cluster Rules add recordkeeping for collection system inspections and uncontrolled venting**
- **EPCRA obligations include TRI Form R and the potential for emergency reporting for abnormal air releases**

As discussed above, LVHC gas collection is a critical element of controlling air emissions from the pulping process area. These air emissions are subject to significant CAA and State regulation, including new Cluster Rules requirements, and may also raise EPCRA reporting obligations as well. This section describes the:

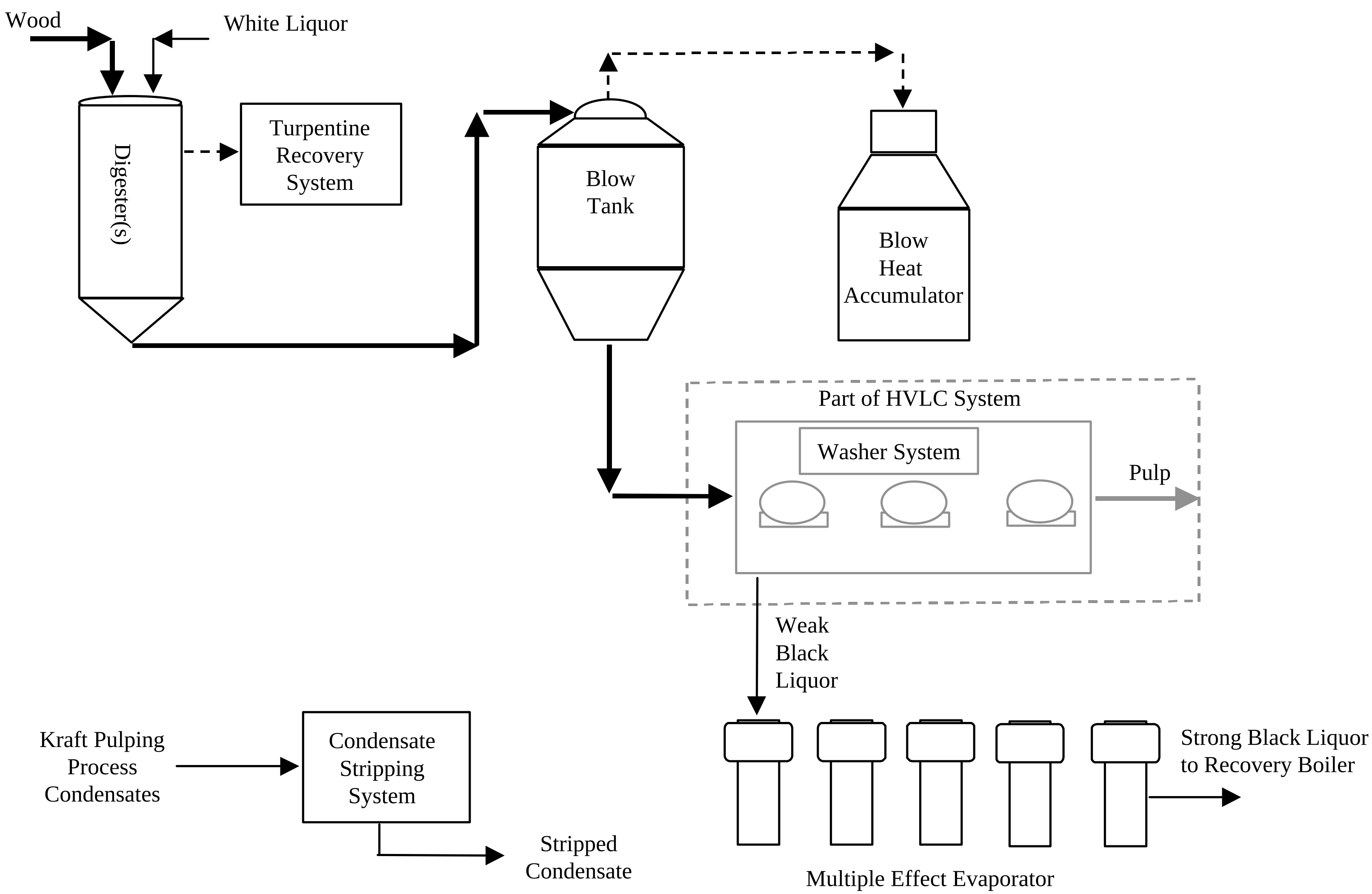
- Emission points involved, including the nature and amounts of their emissions
- Air regulations that apply and air compliance inspection procedures
- EPCRA reporting obligations and EPCRA inspection procedures

4.3.1 LVHC Emission Points

The primary LVHC emission points are the digester system (including associated flash and blow tanks, chip steamer(s), and condensers), turpentine recovery system, multiple effect evaporators (including associated hotwells and condensers), and condensate steam stripping system. These points are identified in Figure 4-3. The primary emissions of concern are total reduced sulfur (TRS) compounds and organic HAPs, primarily methanol.

These points generally are addressed consistently under the applicable regulations (NSPS and State regulations for TRS, and Cluster Rules MACT requirement for HAPs). However, the NSPS (and comparable State regulations) do not apply to emission points associated with the turpentine recovery system except the condenser prior to the turpentine decanter. In contrast, the Cluster Rules apply to all emission points associated with the turpentine recovery system (other than turpentine storage tanks following the decanting process). As a result, emissions associated with the turpentine decanter are covered only under the Cluster Rules, not the NSPS.

Figure 4-3
Flow Diagram of LVHC System



4.3.2 LVHC Air Regulations

4.3.2.1 TRS Requirements

Basic emission limits. Prior to the Cluster Rules, TRS was the only compound generally regulated from these LVHC points. The New Source Performance Standards (NSPS) for kraft mills (40 CFR part 60, subpart BB) apply to new or modified (post 9/24/76) pulping process equipment systems with LVHC emission points. Although the NSPS do not require any particular control technology, incineration is used almost exclusively to meet the NSPS limits. Some mills will use stand-alone incinerators, but most mills will take advantage of process combustion sources to incinerate LVHC gases. A lime kiln is the predominant combustion source used for this purpose, although a significant number of mills use on-site power boilers, and a few mills use a recovery boiler.[3]

In addition, many States have developed similar regulations for existing sources not covered by the NSPS. Under section 111(d) of the Clean Air Act, EPA develops emission guidelines for existing sources with respect to non-criteria air pollutants that are subject to regulation under an applicable NSPS -- such as TRS emissions from kraft pulp mills. Several States have adopted these guidelines, which establish a 5 parts per million by volume (ppmv) limit for digesters, multiple effect evaporators, and condensate strippers. In addition, several States have adopted State-only TRS requirements for various LVHC emission points at kraft pulp mills. The following Figure 4-4 summarizes the various NSPS and State regulations.

> **TIP! For a catalog of EPA determinations related to NSPS applicability, see the ADI Website at http://www.epa.gov/oeca**.

General exceptions and alternative standards. As summarized in Figure 4-4, although the NSPS and many State regulations impose a ppmv-based limit on these equipment systems, two general exceptions often will apply:

! If the LVHC gas stream is routed to a lime kiln or recovery boiler that is subject to its own regulatory limit, then that latter limit will apply in place of the limit applicable specifically to the pulping process equipment. For the NSPS, this exception from the 5 ppmv limit only applies if the lime kiln or recovery boiler is subject to the NSPS.

! As an alternative to a ppmv-based limit, regulations allow in many cases for combustion of the LVHC gas stream in an incinerator that meets specific design standards (usually a minimum temperature of 1200^{N} F and a minimum residence time of 0.5 second). This alternative standard is allowed for the NSPS only in situations where NSPS regulated waste gases are combined with other waste gases and sent to either a non-NSPS kiln/recovery boiler, or a power boiler or dedicated incinerator.

Figure 4-4
LVHC Emissions: TRS Federal and State Emission Limits*

Equipment System	TRS Emission Limits	Applicable Regulation
Digester System (includes blow/flash tanks, chip steamers and condensers) and Multiple Effect Evaporators	5 ppmv (dry basis, corrected to a standard O_2 %) (averaging periods vary)	NSPS[1], AL, CA (BAAQMD, SHAAQMD), FL, GA, ME, MS, NH, NC, OH, PA, SC, TN, TX, VA
	0.6 lb/TODP 0.2 lb/TADP 0.5 lb/TADP	MD[2] CA (MENAQMD, NCUAQMD, NSOAPCD), ID[3], NM[4] CA (BUTAPCD, COLAPCD, FRAQMD)
	Incineration in lime kiln or recovery furnace subject to NSPS TRS limits	NSPS
	Incineration at 1200° F for 0.5 sec.	NSPS[5], CA (MENAQMD, NCUAQMD, NSOAPCD), FL, ID, KY[6], MD, MT, OR (0.3 sec.), WA, WI
Condensate Stripper	5 ppmv (dry basis, corrected to a standard O_2) (averaging periods vary)	NSPS, CA (BAAQMD (15 ppm), SHAAQMD), FL, ME, MS, NC, OH, SC, TX, VA
	0.2 lb/TADP 0.5 lb/TADP	CA (MENAQMD, NCUAQMD, NSOAPCD), ID[3], MS, NM[4] CA (BUTAPCD, COLAPCD, FRAQMD)
	Incineration in lime kiln or recovery furnace subject to NSPS TRS limits	NSPS
	Incineration at 1200° F for 0.5 sec.	NSPS[5], CA (MENAQMD, NCUAQMD, NSOAPCD), FL, OR (0.3 sec.), WA

* State regulations updated through August 1997. See Figure 1-2 in Section 1 for information available for updating State information.
[1] Limit not applicable for digesters if uncontrolled TRS rate is less than 0.01 lb/ton ADP from new, modified or reconstructed digester. See other exceptions discussed below.
[2] Limit for combined emissions from digesters, recovery boilers, evaporators, and smelt tanks.
[3] Limit for combined emissions from brown stock washers, black liquor oxidation vents and condensate stripper.
[4] Limit for combined operations at a mill.
[5] Allowed only if gases subject to NSPS combined with other waste gases.
[6] Minimum 98% efficiency. Includes evaporator hot wells.

Back-up control requirements. Various States may require the use of a back-up control system or place limits on the duration of uncontrolled venting. These types of requirements may be imposed through regulation, permit or enforcement-related action. For example, Maine, Georgia and Oregon require that a back-up device or incineration unit be available in the event adequate incineration in the primary device cannot be accomplished due to breakdown, failure, servicing, overload, etc. Maine and Oregon also limit the time frame for venting to the atmosphere during the switch from the primary incineration device to the secondary incineration device (40 minutes for Maine and as soon as possible but no more than 60 minutes for Oregon). Although the NSPS do not have explicit requirements for back-up controls, the only excused excess emission periods under NSPS would be allowable startup, shutdown or malfunction periods.

Monitoring, reporting and recordkeeping (MRR). The NSPS also establish MRR requirements to assure compliance with the emission limits, and many States impose similar requirements. The NSPS require use of Reference Method 16 for all performance tests. In addition, a TRS continuous emission monitoring system (CEMS) may be required to provide ongoing compliance data. If a CEMS is required, it is generally required only downstream of the control device. In many cases, the control device for the TRS emissions from the pulping area will be the lime kiln or power boilers, which are located outside the pulping area.

Figure 4-5
NSPS TRS Monitoring, Reporting and Recordkeeping Requirements for LVHC Units

Applicable Limit	Monitoring	Reporting	Recordkeeping
! If ppmv-based limit applies, then...	! CEMS to monitor and record TRS with span of 30 ppmv, together with a CEMS to monitor and record O_2 by volume on a dry basis with a span of 20%. CEMS located downstream of control devices.	! Semiannual reporting of all 12-hour average TRS concentrations > 5 ppmv by volume, unless gases combusted in an NSPS-affected lime kiln or recovery furnace (in which case NSPS TRS limit for those emission sources applies).	! Record all data and calculate 1-hour averages. Calculate and record 12-hour arithmetic mean average TRS concentrations (corrected to 10% O_2) for the two consecutive periods of each operating day, based on 12 contiguous 1-hour averages.
! If incinerator temp. standard applies, then ...	! Incinerator temperature monitoring applies instead of TRS CEMS. Accuracy specification is within ±1% of temperature being monitored.	! Semiannual reporting of all 5-minute periods when temperature < 1200°F	! Record all combustion temperature monitoring data, if applicable.

4.3.2.2 Cluster Rules Requirements

> **NOTE! Although control options are similar, temperature and residence time for stand alone incinerators are 1600°F and 0.75 seconds for MACT, as compared to 1200°F and 0.5 seconds for NSPS**.

Basic emission limits. With the promulgation of the Cluster Rules, a significant new layer of regulation for the LVHC gases will apply, even though the basic control methods remain the same (i.e. incineration in a stand-alone thermal incinerator or in a lime kiln, power boiler or recovery boiler). Like the NSPS, the MACT requires that a kraft pulp mill control LVHC emission points. However, the MACT standards apply to HAP emissions instead of TRS emissions. Other key features of the basic MACT emission limits are:

Compliance options. The Cluster Rules provide four compliance options for LVHC gases at kraft pulp mills:

- 98 percent reduction by weight (measured as total HAP or methanol),
- Introduce gases with primary fuel or into flame zone of a boiler, lime kiln, or recovery furnace,
- Route to a thermal oxidizer such that gases are subjected to 1600°F for 0.75 seconds, or
- Route to a thermal oxidizer such that the control device outlet concentration does not exceed 20 ppmv (corrected to 10 percent O_2, measured as total HAP or methanol).

These alternatives, and the associated monitoring, reporting, and recordkeeping requirements, are summarized in Figures 4-6 and 4-7, respectively.

Enclosures and closed-vent system. Regardless of the compliance option selected for a particular facility, all LVHC equipment systems need to be enclosed and routed through a closed-vent system to a control device. The basic requirements for these systems and associated monitoring, reporting, and recordkeeping requirements are summarized in Figures 4-8 and 4-9, respectively.

Figure 4-6
MACT Control Options for LVHC System (40 CFR 63.443)

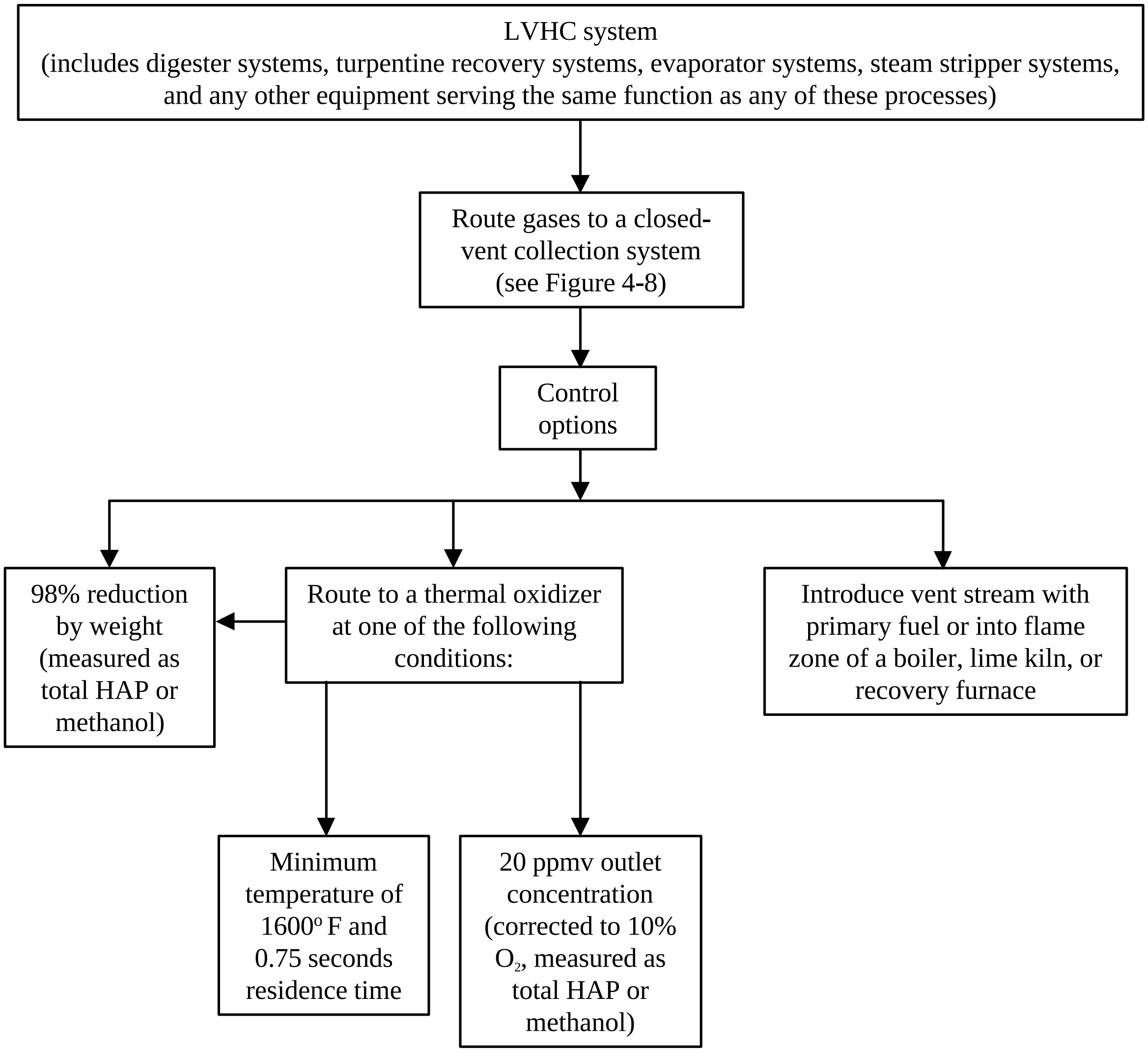


Figure 4-7
LVHC MACT Monitoring and Recordkeeping Requirements

Control Option	Monitoring	Reporting	Recordkeeping
Lime kiln, Recovery furnace, Boiler	None required	N/A	N/A
98% reduction by weight standard (controls other than Thermal Oxidizer)	Continuously record operating parameters from initial or subsequent performance test	Standard Part 63 reporting (i.e., semiannual EER and CMS performance report, except if excess emissions occur, then quarterly reports required)	Standard Part 63 recordkeeping for monitored operating parameters (i.e., both monitor performance data and measured data averages)
Thermal oxidizer used to meet the 20 ppmv outlet HAP concentration standard	Continuously measure total HAP concentration or temperature	Same standard Part 63 reporting as above (for total HAP CMS performance and exceedances)	Same standard Part 63 reqmts. as above (for total HAP CMS)
Thermal Oxidizer used to meet the 98% reduction by weight or a specific design standard (1600 °F and 0.75 seconds residence time)	Continuously measure fire box temperature	! Same standard Part 63 reporting as above (for temp. monitor performance and exceedances) ! If meeting design standard, exceedance value set at 1600°F, with site-specific averaging time; if meeting 98% reduction standard, exceedance value and averaging time are both site-specific (see § 63.453(n))	Same standard Part 63 reqmts. as above (for temp. CMS)

Figure 4-8
MACT Closed-vent System Requirements (40 CFR 63.450)

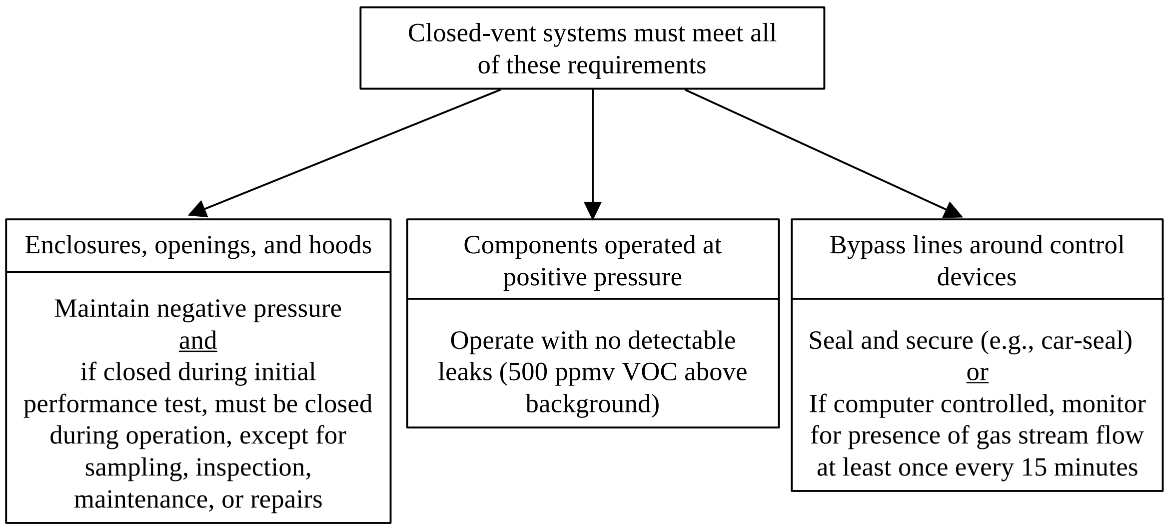


Figure 4-9
Enclosures and Closed-vent System MACT Monitoring and Recordkeeping Requirements

Control Option	Monitoring	Reporting	Recordkeeping
Enclosures and Closed-vent System Requirements apply to all control options (See Figure 4-7)	! *Every 30 days*: Visual inspection of all bypass line valves or closure mechanisms ! *Initially and Annually*: Demonstrate no detectable leaks at positive pressure components. Demonstrate negative pressure at enclosure openings	! None required for 30-day visual inspections ! Initial and annual leak checks/negative pressure demonstrations are subject to general Part 63 performance test reporting requirements	! Prepare and maintain a site specific inspection plan ! Visual check records must be kept because relevant to documenting compliance (§ 63.10(b)(2)(vii)) ! Performance test records must be maintained (§ 63.10(b)(2)(viii))

General exceptions. For the LVHC emission limits, the Cluster Rules also establish an allowable percent of operating time (1%) 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 could include uncontrolled venting to the atmosphere or a monitored fire box temperature lower than the temperature established during the initial performance test (or <1600° if the source is complying with the incinerator design standard). The 1% 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 semiannual reporting period. Examples of combustion unit downtime are listed in Figure 4-10. Note that these excess emissions must be evaluated in light of overlapping State TRS requirements, such as the Maine and Oregon examples discussed in Section 4.3.2.1, as well as the NSPS which excludes only allowable startup, shutdown and malfunction periods. Even though 1% of excess HAP emissions may be exempt under the MACT requirements, these periods of excess emissions must still comply with NSPS TRS requirements, and any applicable State requirements.

Figure 4-10
Common Causes of Downtime in Lime Kilns and Power Boilers

Combustion Unit	Cause of Downtime	Typical Duration of Downtime
Lime Kiln	Flame-out	5 to 30 minutes (with backup combustor)
	Calcium oxide ring formation in kiln	Less than 15 minutes (with backup combustor)
	Grate plugging in lime product removal system	Less than 15 minutes (with backup combustor)
	Mud mat formation problems with vacuum drum filter; loss of lime mud feed	20 minutes to 2 hours
Power Boiler	Fuel feeder plugging	15 to 60 minutes
	Rapid decline in steam demand (e.g., paper break on the paper machine) that results in fuel input reduction	15 to 60 minutes

Back-up control requirements. There are no explicit back-up control MACT requirements for the LVHC emission limits. However, the only excused excess emission periods would be those periods that are specifically designated in the startup, shutdown, or malfunction plan developed under § 63.6(e)(3), or those that are less than the allowable excess periods.

Monitoring, reporting, and recordkeeping (MRR). The MACT establishes MRR requirements to assure continuous compliance with the emission limits. All LVHC systems must meet the MRR requirements for enclosures and closed-vent systems (Figure 4-9) and the appropriate MRR for the control option selected (Figure 4-7). The MACT generally relies on parameter monitoring, although a total HAP continuous monitoring system (CMS) is required if the mill elects to meet an outlet concentration HAP limit.

4.3.3 LVHC Air Inspection Techniques

NOTE! Inspection steps for HVLC and LVHC gas collection systems are similar, and this section should be read as generally applicable to both systems.

Because of the significant air emission sources outside of the pulping area (including the lime kiln, recovery boiler and power boilers), the pulping equipment systems in the past often have not been a high priority for committing on-site inspection resources. However, the Cluster Rules requirements can be expected to make the LVHC gas collection systems and other pulping department emission sources a higher priority. For initial compliance, the appropriate steps to follow for coming into compliance with the Cluster Rules are outlined extensively in the OAQPS Cluster Rules Implementation Guideline, including a discussion of applicability and timing issues, as well as initial compliance checklists. This document, therefore, focuses on on-site inspections that will be conducted after initial compliance has been demonstrated and the appropriate permit conditions have been included to address the Cluster Rules.

4.3.3.1 Pre-inspection Steps

As discussed in Chapter 3, there are a number of steps that should be taken routinely prior to conducting an actual on-site inspection, including file (especially permit) reviews. As part of conducting the file review and planning the on-site inspection, the inspector should consider at least the following items:

Process diagrams. Obtain a simplified diagram of the LVHC vent gas collection system(s) and note what control(s) are employed. This type of diagram may be available in the Part 70 operating permits file if submitted with the application.

Use of controls located in other process areas. If the facility combusts the LVHC gases in a lime kiln, power boilers or recovery boiler, the inspection of the pulping area will be abbreviated. However, the inspector will have to check on the continuous use of these combustion process units for TRS/HAP combustion control (or that other permitted backup controls were used during combustion unit downtime periods) when conducting the inspection of the chemical recovery and power boiler areas of the mill. Any downtime will have to be checked against required use of backup controls (if applicable) and/or permitted levels of uncontrolled venting.

Evaluation of periodic monitoring reports. If a dedicated incinerator is used for TRS and/or HAP control, incinerator temperature data will likely be recorded and submitted in a semiannual (or quarterly) excess emission report (EER) of excursions from required minimum temperature requirements. Review reports submitted since the last inspection in order to prioritize the need for follow-up while on-site. If TRS CEMS or total HAP CMS data are available instead of temperature data for the incinerator, evaluate the CEMS data in the same manner.

The inspector should confirm that any periods of excess emissions, including bypass/uncontrolled venting, indicated in the reports are within regulatory limits. If not, the inspector may need to evaluate on-site records that document the reasons for the excess emissions and/or uncontrolled venting. Under the Cluster Rules, records must be kept of all bypass periods. The review will be necessary to evaluate claims of allowable excursions, such as those from startup, shutdown or malfunction periods. For MACT requirements under the Cluster Rules, these types of claims must be evaluated in connection with the facility's startup, shutdown and malfunction plan required under 40 CFR 63.8.

Evaluation of episodic malfunction reports. The inspector should review malfunction/upset reports since the last inspection, if available. If the reports identify corrective actions to be taken by the source, note the need to verify during the on-site inspection that the corrective steps were actually taken and that they resolved the problem.

Also, the inspector can compare claims of malfunction periods on EERs with the duration and timing of malfunction periods indicated on malfunction reports. If a malfunction report is required for all or some specified subset(s) of malfunctions, note any discrepancies between the malfunction reports submitted and the claimed excess emissions in an EER. Significant discrepancies signify either errors in EER or malfunction reporting that should be addressed with the facility either as part of the inspection or by agency compliance staff responsible for processing periodic and episodic reports.

4.3.3.2 On-site Inspection Steps

The appropriate on-site inspection steps must be tailored to the objectives of the inspection and the priority given to the pulping area in a particular inspection. The possible steps for a routine Level 2 inspection include:

Permit verification. One objective of a standard Level 2 air inspection will be to verify that the permit includes all the appropriate equipment. As noted above, the OAQPS Cluster Rules Implementation Guideline contains a detailed discussion of the applicability of the Cluster Rules requirements. Prior to the inspection, the permit should be reviewed to determine what conditions apply to the pulping process. Depending on the nature of the specific permit conditions, the inspector should evaluate a number of potential issues to verify that pulping operations remain consistent with permit requirements, including:

! Are all emissions units properly identified in the permit?

! Have any modifications (including production increases) occurred that could trigger NSPS or NSR? Note that minor modifications in the pulping area may debottleneck downstream processes (such as recovery boiler operations). Evaluate whether the debottlenecking creates potential for a significant emissions increase in other areas of the mill that could trigger PSD/major NSR review. One resource for documenting process modifications that have occurred in the pulping (and chemical recovery area) will be the Best Management Practices (BMP) Plan required under the Clean Water Act -- see Section 4.6.2 and 4.6.3 for further discussion of those requirements.

- Are TRS/HAP control methods properly identified?

- Compare the basic process/design information with conditions in the permit to verify the accuracy of the information in the permit and to support subsequent assessment activities.

- Are permit terms and conditions properly linked to the emissions unit?

Evaluation of limits on uncontrolled releases. Regardless of the control option selected, one key issue is to determine that the source is satisfying the limits on uncontrolled venting of LVHC gases. Because uncontrolled venting will cause even higher emissions than reduced control efficiency, assuring that such episodes are kept to a minimum should be a focal point of the inspection in the pulping area. Uncontrolled venting can occur because either the combustion source/control device for the gases is not operating or because of process upsets that occur within the pulping area. In either case, conduct a review of available records to evaluate that uncontrolled venting meets specific regulatory limits and is also consistent with good air pollution control practices.

NOTE! Consider follow-up assessment if uncontrolled venting or combustion temperature below the excursion level exceed 1% of operating time.

Under the Cluster Rules, the facility will have monitor records indicating the presence of flow through any line that bypasses a control device vent (this does not include safety pressure relief valves). For modern mills, these records likely will be accessible through the facility's distributed control system (DCS) or similar automated data handling system. This information can be used to calculate the total duration of uncontrolled venting to document compliance with restrictions on those events. Although generated for MACT compliance purposes, this information can be used for TRS compliance evaluations as well.

The total duration of uncontrolled venting should be calculated for a period consistent with the reporting period for the facility (quarterly or semiannually) and compared against total operating time for that same period. If the total duration exceeds 1% of the total operating time, further evaluation of the causes of the uncontrolled venting is warranted. Under the Cluster Rules, only uncontrolled venting events caused by allowable startup, shutdown or malfunction (SSM) periods are excluded from calculating compliance with the 1% limit. For TRS control, the NSPS do not include an excess emission allowance (except for recovery furnaces) and State TRS provisions for any excused excess emissions will vary.

If, based on the initial records review, a follow-up investigation appears warranted, the likely root cause concerns will be shutdown of the control device/combustion unit used for control or pulping area process upsets. Where the source relies on a process combustion unit such as the lime kiln for controlling LVHC emissions, excessive downtime of the combustion unit may lead to compliance problems unless the facility has a permitted backup control option. If control device availability is not the cause, then process upsets, such as the following, should be considered:[6]

- Liquor carryover that causes pluggage in the digester relief line. The pressure build-up in the digester could lead to emergency bypass relief.

- Simultaneous digester blows could cause condenser and LVHC gas collection system overload, leading to emergency bypass venting.

The inspector should seek clarification from the facility on the cause of excessive uncontrolled venting and seek appropriate corrective action to address the problem. If uncontrolled venting persists above the 1% Cluster Rules limit as a result of claimed SSM conditions, the inspector should carefully review the facility's SSM plan required by the MACT general provisions (see § 63.6(e)(3)) to assure that the plan is adequate to minimize emissions consistent with good air pollution control practices. For this type of evaluation, consider conducting a comparison of similar mills to determine what additional efforts may be appropriate.

Evaluation of proper operation of control equipment. A Level 2 inspection will focus on assuring that the control equipment is being properly operated and maintained so that the facility continues to achieve compliance with the applicable emission limits. The proper steps for this phase of the inspection will depend on the control measures used for TRS and HAP control, which will generally include enclosures of emissions points and conveyance of the LVHC gases in a closed-vent system that are then incinerated in process combustion units or a dedicated thermal incinerator.

Enclosures and closed-vent system. As part of the Cluster Rules, facilities will have to enclose LVHC emission points and convey the gases through a closed-vent system. The Cluster Rules require the facility to develop a self-inspection plan, including a series of periodic checks, to assure that this system continues to operate properly. Review the records of these activities to assure that the required checks are occurring and that the source has taken any corrective action steps necessary to remain in

Checks of Enclosures/Closed-vent Systems for Suspected Problems with Facility Self-Inspections

- **Visual inspections (ductwork, piping, valves, etc.)**
- **Leak checks using Method 21 analyzer (positive pressure components)**
- **Pressure checks using portable pressure gauge, etc. (negative pressure enclosure/hood openings)**

compliance. If a problem is detected or suspected, the inspector may want to consider conducting the types of checks that the facility is supposed to undertake as part of its self-inspection program.

Process combustion sources. Where the controls used are the lime kiln, power boilers or recovery furnace, the Level 2 inspection within the pulping area is generally inapplicable. See Sections 5 (recovery process) and 8 (power boilers) of this manual for available inspection procedures applicable to these process combustion units. Generally, these combustion units are more than adequately sized and designed for control of TRS or HAP emissions from LVHC gases and thus any increased emission problems likely stem from combustion problems within the combustion unit itself.

Basic Thermal Incinerator Assessment Steps

- **Check monitor for operating condition, including most recent calibration records**
- **Evaluate required monitoring data (temp., TRS, or HAP); check against required limits and for shifts from baseline conditions**
- **As needed, use portable equipment to evaluate temperature and THC outlet concentration against baseline**

Stand-alone incinerator. For a stand-alone thermal incinerator, the evaluation will focus first on the reported monitoring data for monitors required by rule, which may include temperature monitors or a TRS CEMS. The Cluster Rules also provide for use of a total HAP continuous monitoring system, if such a system becomes available in the future. During the on-site inspection, the inspector should:

- *Evaluate the operating condition of the monitor*. For a CEMS or CMS, the daily calibration and periodic QA/QC checks provide a good check. For temperature monitors, there likely will be no QA/QC records or only limited information. Interviews with plant personnel may indicate what procedures the mill uses to verify proper operation of the temperature monitor.

- *Evaluate required monitoring data against permitted levels*. Collect and evaluate current data for the period of the inspection. In addition, if they are readily available, review summaries of recent data such as the past 24 hours or week. The inspector may want to inquire about the ability to analyze data trends using the facility's DCS, especially if there are reasons to believe that the controls may not be functioning effectively.

- *Conduct baseline checks of critical parameter data*. For thermal incinerators, an evaluation of both temperature and outlet total hydrocarbon (THC) concentration data is recommended as part of a Level 2 inspection.[10,11] If these parameters are not covered by required monitoring, a portable gauge or analyzer may be necessary. A comparison of temperature data to prior baseline data allows for an evaluation of whether temperatures are moving in an acceptable range. A comparison of THC outlet concentration at the time of the inspection with previously collected data will allow a baseline comparison to determine if there are increasing organic emissions, even though the temperature data do not indicate a problem. In this case, the THC concentrations would be analyzed to indicate potential control problems, not as a direct surrogate for the regulated HAPs that make up part of the total THC emissions from the equipment systems.

! *Conduct follow-up assessments of incinerator performance as needed.* If the baseline conditions have shifted significantly, then a follow-up assessment of the internal elements of the incinerator may be appropriate. However, the follow-up procedures generally require internal inspections, and thus are generally performed only by mill personnel when the control system is off-line. Internal checks should focus on finding any unusual conditions, such as leakage through the primary heat exchanger, leakage of air into the combustion chamber, or impingement of burner flame on the refractory.[10]

Follow-up assessment for suspected process problems. If the inspection of the closed vent system and control device fails to reveal problems but an emission problem is still suspected, an evaluation of process conditions that could lead to increased emissions may be necessary. Although this type of process-oriented follow-up inspection in the pulping area would be unusual given the nature of the operations and the control methods used, Figures 4-11 through 4-14 outline several examples of process upset conditions that could lead to compliance problems by increasing uncontrolled emission rates.

Figure 4-11
Potential Upsets and Malfunctions in the Digester Relief and Turpentine Recovery System[6]

Upset/Malfunction	Effect	Result
Liquor carryover	Digester relief line pluggage	Pressure build-up in digester which may lead to following events: (1) emergency bypass relief to atmosphere; (2) premature digester blow (may result in overload of blow tank or accumulator)
	Turpentine condenser pluggage or fouling	Reduced condenser heat transfer yielding increased TRS and organics uncontrolled emissions
Low water flow rate to turpentine condenser	Increased condenser water temperature	Increased uncontrolled TRS and organics emissions due to larger portion of gas left un-condensed

Figure 4-11 (cont.)
Potential Upsets and Malfunctions in the Digester Relief and Turpentine Recovery System

Upset/Malfunction	Effect	Result
Failure to close blow valve after blow	Fouling of blow line	Pressure build-up during blowing, increasing digester blow volume and uncontrolled TRS, organics emissions

Figure 4-12
Potential Upsets and Malfunctions in the Blow Tank and Accumulator [6]

Malfunction	Effect	Result
Fiber or liquor carryover and fouling of condensers	Reduced heat transfer and loss of condensate	Increased uncontrolled TRS and organics emissions due to larger blow gas volume
Low water flow rate to condensers or hot water accumulator	Increased condenser water temperature	Increased uncontrolled TRS and organics emissions due to larger portion of gas left un-condensed

Figure 4-13
Potential Upsets and Malfunctions in Multiple Effect Evaporators [6]

Malfunction	Effect	Result
Fouling, scaling, and deposits in evaporator effects	Reduced evaporator efficiency	Results affect recovery boiler emissions **[See Section 5]**
Air leaks in evaporator body	Larger NCG volume	Increased uncontrolled TRS and organics emissions due to increased condenser load
Low condenser water flow rate	Increased condenser outlet water temperature	Increased uncontrolled TRS and organics emissions due to larger portion of gas left un-condensed
High inlet condenser water temperature	Increased condenser outlet water temperature	Increased uncontrolled TRS and organics emissions due to larger portion of gas left un-condensed
Reduced scrubber water flow rate	Reduced liquor-to-gas ratio, lower adsorption rate	Increased uncontrolled TRS and organics emissions due to decreased removal efficiency
Increased scrubber gas volume	Reduced liquor-to-gas ratio, lower adsorption rate	Increased uncontrolled TRS and organics emissions due to decreased removal efficiency

Figure 4-13 (cont.)
Potential Upsets and Malfunctions in Multiple Effect Evaporators

Malfunction	Effect	Result
Scrubber packing flow channeling	Reduced liquor-to-gas contact, reduced adsorption	Increased uncontrolled TRS and organics emissions due to decreased removal efficiency
Liquor foaming	Liquor carryover and reduced evaporator efficiency, lower black liquor solids	Results affect recovery boiler emissions **[See Section 5]**
Entrainment of soap in liquor	Foaming, liquor carryover, and reduced evaporator efficiency, fouling of evaporators, lower black liquor solids	Results affect recovery boiler emissions **[See Section 5]**

Figure 4-14
Potential Upsets and Malfunctions in the Closed-Vent Gas Collection System[6]

Malfunction	Effect	Result
Excessive flow variations	Poor performance of collection system	Fugitive TRS and organics emissions, increased emissions due to incomplete combustion
Operation between lower and upper explosive limits		Potential for explosion
Low gas flow velocity	Operation below flame propagation velocity	Potential for explosion and/or fire
Entrained moisture	Flame blowout, reduced flame temperature, corrosion of gas moving equipment	Increased uncontrolled TRS and organics emissions as a result of incomplete combustion and potential for explosion

4.3.4 LVHC EPCRA Issues

General concerns. The basic regulatory requirements for EPCRA are not process-specific but rather apply on a facility-wide basis. Appendix D to this manual provides an overview of these regulatory requirements.

NOTE! See Appendix D for overview of EPCRA regulations and basic assessment procedures.

For the LVHC air emission points in the pulping area, the key EPCRA issues will be to quantify releases of applicable toxic chemicals in the annual Toxic Release Inventory (TRI) report (known as the "Form R" report), and to comply with emergency reporting requirements. The emergency reporting requirements apply under both EPCRA and CERCLA. The releases subject to these emergency reporting requirements are releases that are not federally permitted and that exceed certain reportable quantities. For certain releases that are "continuous" and "stable in quantity and rate," the mill may be able to use special reporting options so that a notice is not required after each such release. See the discussion of continuous releases in Appendix D for further detail on the differences between standard emergency reporting and reporting of continuous releases.

Air releases from LVHC (or HVLC) points could be subject to EPCRA and CERCLA emergency reporting requirements. Methanol has a reportable quantity threshold of 5,000 pounds per 24-hour period, while the TRS compounds hydrogen sulfide and methyl mercaptan each have a reportable quantity threshold of 100 pounds per 24-hour period.

The determination of what constitutes a "federally permitted release" can be complex. However, it is important to note that if the mill as a matter of normal operations emits an applicable pollutant in amounts that exceed the reportable quantity **and** there is no emission limit established for the pollutant, then the emergency reporting provisions likely apply. For instance, a mill should file appropriate emergency reports if no TRS emission limit currently applies to the LVHC (or HVLC) emission points, and the mill normally emits more than 100 pounds of hydrogen sulfide or methyl mercaptan in a 24-hour period from the unregulated emission points at the mill. In this circumstance, the reduced continuous release reporting options likely are available, as discussed in Appendix D.

Inspection considerations. The EPCRA compliance assessment generally will focus initially on a records review. The inspector should review the following materials:

! *Emergency preparedness information.* These obligations are not process-specific, and thus the basic assessment considerations are covered for all facility operations in Appendix D to this manual.

! *TRI Form R.* Check to ensure that the form is on file and that the source has adequately considered releases associated with the LVHC emission points. Also, ask to see the estimation technique being used. If the estimation technique involves an assumed reduction efficiency for control methods, make sure that the assumed efficiency is consistent with the overall efficiency that the mill is achieving. The overall assumed efficiency should account for any excess emission releases (including uncontrolled venting) in a manner consistent with the actual percent of operating time such releases occur. Uncontrolled emission episodes or periods of reduced control efficiency -- even if allowed under Clean Air Act regulations -- can have a significant impact on the estimate of total releases. This is especially important for LVHC and other pulping process emission points because there are often built-in allowances for anticipated uncontrolled venting for at least some percentage of operating time.

! *Emergency notifications.* Request documentation that the mill has filed all required notices.

If an agency air inspector plans to screen for EPCRA compliance during an air inspection, the inspector should confirm the necessary information with the facility contact during the opening conference or just in advance of the closing conference. For an announced inspection, the inspector should ask the source to have ready EPCRA-related documentation so that this screening check can be performed without interrupting the main focus of the inspection. A screening checklist is included as part of the example inspection form in Appendix E.

In addition to a screening-type records review inspection, an EPCRA inspector may want to conduct further assessments to identify potential compliance concerns with emergency notification requirements. As one technique, the inspector first can check malfunction reports and citizen complaints since the previous inspection. The inspector then should cross-check those incidents with notification records identified in EPA's ERNS database, records on file with State and local emergency officials, or records requested from the mill. If this type of investigation identifies episodes of abnormal emissions in which no notification was provided, further investigation may be required to determine if reportable quantity thresholds were exceeded.

4.4 HVLC Gas Collection System

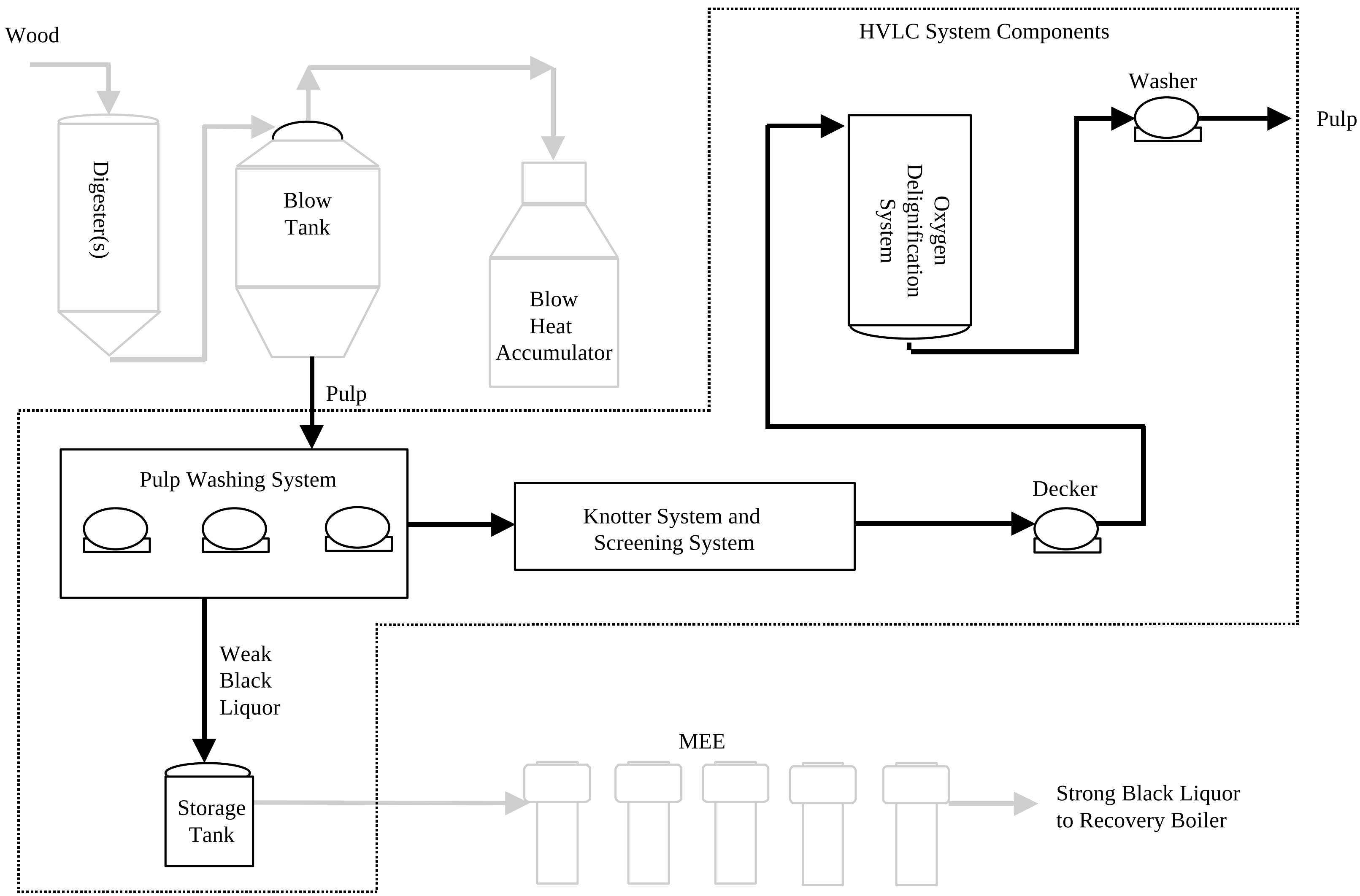
4.4.1 HVLC Emission Points

The primary HVLC emission points are the washing, knotter, screen and decker systems, weak liquor storage tanks, and, where applicable, oxygen delignification systems. These points are identified in Figure 4-15. Because rotary vacuum washers are the most common, Figure 4-15 depicts the use of this washer type. The rotary vacuum washers are hooded and not fully enclosed. Other types, such as a diffusion washer or horizontal belt washer are enclosed or have limited exposure to the ambient air. These more enclosed washer types will tend

Key Features for HVLC Gas Collection

! Similar to LVHC except air emission points historically less regulated
! Cluster Rules add significant new requirements but generally rely on same thermal incineration control options as LVHC gas collection
! Clean Condensate Alternative primary difference for air emission compliance assessments
! EPCRA obligations similar to LVHC gas collection

Figure 4-15
Flow Diagram of HVLC System



Equipment enclosed by the dashed line are part of the HVLC system. The remaining equipment are components of the LVHC system.

to have lower flow rates with higher pollutant concentrations. As with the LVHC emission points, the primary emissions of concern are TRS and methanol, although the HVLC points in most cases have lower emission rates than the LVHC emission points.

4.4.2 HVLC Air Regulations

4.4.2.1 TRS Requirements

NOTE! To the extent the NSPS apply, the same monitoring, reporting and recordkeeping requirements that apply to LVHC emission points also apply to the HVLC emission points.

The TRS requirements for HVLC points are similar to the requirements for LVHC points where the regulations apply. However, many of the HVLC points are not subject to TRS regulations. Figure 4-16 summarizes the basic requirements applicable to the HVLC points. As noted in Figure 4-16, new and modified (post - 9/24/76) brown stock washers (including associated knotters, filtrate tanks and vacuum pumps) are regulated by the NSPS.

Figure 4-16
HVLC Emission Points: Federal and State TRS Emission Limits

Equipment System	TRS Emission Limits	Applicable Regulation
Brown Stock Washers (NSPS definition includes knotters, filtrate tanks, and vacuum pumps)	5 ppm (dry basis)	NSPS[1], CA (BAAQMD (15 ppm), SHAAQMD), ME
	0.156 lb/ton, 24 hour average	OR[2]
	0.2 lb/TADP	CA (MENAQMD, NCUAQMD, NSOAPCD), ID[3], NM[4]
	0.5 lb/TADP	CA (BUTAPCD, COLAPCD, FRAQMD)
	Incineration in lime kiln or recovery furnace subject to NSPS TRS limits	NSPS
	Incineration at 1200° F for 0.5 seconds	NSPS[5], CA (MENAQMD, NCUAQMD, NSOAPCD)

[1] Limit not applicable if Administrator determines, on a case-by-case basis, incineration is technologically/economically unfeasible.
[2] Limit for combined emissions from brown stock washers and black liquor oxidation vents.
[3] Limit for combined emissions from brown stock washers, black liquor oxidation vents and condensate stripper.
[4] Limit for combined operations at a mill.
[5] Allowed only if gases subject to NSPS combined with other waste gases.

The NSPS contain an exception for washers if the mill can document that controlling the emissions is technically or economically infeasible. As an example, an exception was granted by EPA Region IV in 1997 where the lowest estimated control cost was over $14,000/ton of TRS (See ADI Control Number 9700087). The practical effect of this exemption should be minimal in the future, however, because the Cluster Rules (as discussed below) require control of these washers without a similar exception. Because the control options are similar for the TRS and HAP compounds, it appears unlikely that -- once compliance with the Cluster Rules HVLC limits is required -- a facility will be able to document economic or technical infeasibility when the cost and technical burdens of installing and operating the controls are already being incurred to satisfy the Cluster Rules.

Finally, EPA's TRS emission guidelines under section 111(d) of the Clean Air Act do not cover brown stock washers or other HVLC points. Consequently, only a few State or local jurisdictions have TRS requirements for HVLC points. Moreover, screens, deckers, weak black liquor storage tanks, and oxygen delignification points are not covered by the NSPS or generally by these State rules.

4.4.2.2 Cluster Rules Requirements

Basic emission limits. Although the TRS requirements for HVLC emission points apply only to brown stock washer systems, the Cluster Rules HAP requirements apply to additional HVLC emission points. Which points are subject to HAP limits and when compliance is required will depend on whether the units involved are new or existing sources. Once applicability and compliance dates are determined, the HVLC sources generally are subject to the same basic control options as the LVHC sources. These elements of the HVLC requirements are summarized as follows:

> **HVLC System Compliance Dates**
>
> - **Existing sources: April 15, 2006**
> - **New sources: June 15, 1998 or date of startup, whichever is later**

Applicability and compliance dates. The HVLC system is the only part of the mill that has more stringent MACT control requirements for new sources than for existing sources. In this context, a “new source” is an HVLC system at a pulping system or additional pulping line that is constructed or reconstructed after December 17, 1993. The MACT control requirements for new sources apply to additional emission points (see Figure 4-17) and require compliance by an earlier date (see accompanying text box). The compliance options, however, are the same for new and existing sources.

Figure 4-17
HVLC Emission Points that are Subject to the MACT Standard

Existing Sources
! Pulp washing system ! Oxygen delignification system ! Decker systems that use any process water other than fresh water or papermachine whitewater; or any process water with a concentration of HAPs greater than 400 ppm ! Knotter systems with HAP emissions 0.05 kg/Mg oven dry pulp (ODP) ! Screen systems with HAP emissions 0.1 kg/Mg ODP ! Knotter and screen systems with combined HAP emissions 0.15 kg/Mg ODP
New Sources
! Existing sources plus all... ! Decker systems ! Screen systems ! Knotter systems ! Weak liquor storage tank vents

Compliance options. Although the applicability issues are different for HVLC and LVHC sources, the basic compliance options for HVLC sources are the same as those for LVHC sources:

> **NOTE! Basic HVLC compliance options are the same as LVHC compliance options, except for Clean Condensate Alternative option.**

! 98 percent reduction by weight (measured as total HAP or methanol),
! Introduce gases with primary fuel or into flame zone of a boiler, lime kiln, or recovery furnace,
! Route to a thermal oxidizer such that gases are subjected to 1600°F for 0.75 second, or
! Route to a thermal oxidizer such that the control device outlet concentration does not exceed 20 ppmv (corrected to 10 percent O_2, measured as total HAP or methanol)

If the gases are subjected to 1600°F for 0.75 second in a thermal oxidizer, then MACT and NSPS requirements are satisfied simultaneously. For all other MACT compliance options, mills must demonstrate meeting NSPS in addition to the MACT requirements.

Enclosures and closed-vent system. As with LVHC systems, all HVLC equipment systems must be enclosed and routed through a closed-vent system to a control device. Due to concerns about explosion hazards, the HVLC gases are not mixed with LVHC vent gases, although the two vent stream gases could be sent to the same control device (i.e., power boiler). The basic MACT requirements for closed-vent systems are summarized earlier in this section in Figure 4-8. Note that equipment systems that are included in the clean condensate alternative are exempt from the enclosure and closed-vent system requirements.

General exceptions. The MACT standards also establish an allowable percent of operating time during which HVLC HAP emission levels in excess of the established limit shall not be considered to be a violation of the standard. However, for HVLC gases, periods of excess emissions may not exceed 4% of operating time, compared to 1% for LVHC emissions. Also note that when HVLC and LVHC gases are controlled by the same control device, periods of excess emissions may not exceed 4% of operating time. All other provisions about excess HVLC emissions are the same as those for LVHC emissions (see the General Exceptions discussion in Section 4.3.2.2).

Back-up control requirements. As with the LVHC emission limits, there are no explicit back-up control MACT requirements for the HVLC emission limits. Refer to the back-up control requirements discussion in Section 4.3.2.2 for additional information.

Monitoring, reporting, and recordkeeping (MRR). These requirements are the same as those for the LVHC system. All HVLC systems must meet the MRR requirements for enclosures and closed-vent systems (Table 4-9) and the appropriate MRR for the control option selected (Table 4-7), unless the equipment is included in the clean condensate alternative.

NOTE! Clean condensate alternative is available only for HVLC -- not LVHC -- emission points.

Alternative compliance approach: The clean condensate alternative (CCA). The clean condensate alternative (40 CFR 63.447) provides a pollution prevention alternative to control requirements discussed in the *Basic emission limits* section above. In general, the CCA allows facilities to meet HVLC system total HAP reduction requirements by reducing the HAP levels of condensates used as process feed water in the pulping, bleaching, causticizing, and papermaking systems. The CCA has the following key features:

- Any technology can be used to achieve HAP emission reductions. However, the facility must demonstrate that the HAP emission reductions using the CCA are equal to or greater than those emission reductions that would be achieved through compliance with the kraft pulping HVLC system standards (98% by weight of total HAP).

- The CCA may be used either for complete or partial fulfillment of the kraft pulping HVLC system standards. This option may be chosen for individual vents or a subset of HVLC vents, and the remaining HVLC vents can comply with the basic pulping vent control requirements described above.

! LVHC emission points are not eligible for participation in the CCA.

! The control strategy using the CCA will vary between mills, depending on mill configuration and emission points selected. Thus, the monitoring and reporting requirements for the CCA are also mill-specific, and must meet the approval of the Administrator.

4.4.3 HVLC Air Inspection Techniques

NOTE! Follow the inspection steps for LVHC gas collection under Section 4.3.3. Also use this section for NSR concerns and if the CCA option is used for HVLC compliance under the Cluster Rules.

To the extent that the HVLC points are regulated, most of the requirements for these points are similar to the LVHC points. Therefore, for most aspects of the inspection of the HVLC points, the inspection procedures should be the same as for the LVHC points (see Section 4.3.3). In addition, the inspector should consider the following issues:

NSR concerns. The increased control of the HVLC points (and the condensates discussed in Section 4.5) to reduce HAP emissions could increase SO_2 and NO_x emissions from the combustion sources used to control the HVLC gases. These increases could be significant enough to trigger NSR permit requirements. The EPA has indicated that generally these increases should not be subject to major NSR review under EPA's pollution control project guidance, although State minor NSR programs would still apply (see 63 FR 18531-32 for further discussion of this issue). However, it is within the State agency's discretion to require major NSR if the State agency believes that the net effect of the controls is not "environmentally beneficial." For instance, the State agency must consider whether the increases in SO_2 or NO_x will cause or contribute to a NAAQS violation or a violation of a PSD increment, or would adversely affect visibility or other air quality related values in a Class I area.

The facility should check with the State agency as to the NSR permit implications of new controls used to comply with MACT requirements for HVLC emissions. As part of the inspector's permit verification for the HVLC points, the inspector should confirm whether NSR permitting is applicable as a result of controls installed for MACT compliance, and if so whether it has been conducted.

CCA options. If a facility elects to implement the clean condensate alternative to satisfy the MACT requirements, then there may be additional procedures necessary to assess compliance with this option. The CCA option will be implemented on a mill-specific basis, including the appropriate monitoring, reporting and recordkeeping procedures.

Therefore, the inspection procedures to determine compliance will also be highly mill-specific. If this option is selected, careful pre-inspection planning will be essential in order to conduct an accurate assessment. The basic assessment steps should involve:

- ! Careful pre-inspection review of the particular elements of the mill's pollution prevention procedures that comprise its CCA implementation strategy, as well as the MRR procedures required to document compliance with the CCA.

- ! Interviews with mill operators to evaluate awareness of the pollution prevention procedures required and the extent to which the mill's standard operating procedures have incorporated these requirements.

- ! On-site review of process and/or control records that document compliance with the mill-specific requirements for CCA implementation.

4.4.4 HVLC EPCRA Issues

For EPCRA, the same issues generally will be present for HVLC points as were present for LVHC points. See Appendix D for a general discussion of the EPCRA regulatory requirements and basic EPCRA inspection considerations. Also see Section 4.3.4 for a discussion of EPCRA issues for LVHC points.

4.5 Condensates

4.5.1 Condensate Discharge Points

Key Features for Pulping Condensates

- **! Regulatory concerns limited primarily to air compliance issues**
- **! MACT HAP requirements apply, not NSPS/State TRS limits**
- **! Biological treatment option may involve evaluating controls in wastewater treatment process area**

Condensates in the pulping area contain organic and sulfur compounds that may be emitted to the air. Pulping process condensates are considered to be any HAP-containing liquid that results from the contact of water with organic compounds in the pulping process (in other words, condensed steam from pulping process vent gases). Condensates from the digester, evaporator, and turpentine recovery systems contain the highest loadings of these compounds, with evaporator condensate representing the major volume of pulping area condensate flow. The LVHC and HVLC gas collection systems are also sources of pulping condensates.

The pulping process condensates are collected and routed to a control device and/or conveyed to the wastewater treatment system. Steam stripping is a common control technology for condensates. Steam stripping is a fractional distillation process that involves the direct contact of steam with wastewater. Heat from the steam vaporizes the volatile compounds in the wastewater. The overhead vapor stream is typically incinerated on-site. Mills may condense or rectify the stripper overhead gases and then burn the condensed material in an on-site combustion device. As discussed in Section 4.5.4, this combustion is not subject to RCRA combustion requirements. The steam stripper may be a stand-alone piece of equipment, or, at some mills, it may be integrated into the evaporator system. Steam strippers are currently being used by some mills to control portions of these condensates for odor reduction.

The primary emissions of concern are TRS and methanol. Condensate emission points will be any area where the condensates are exposed to the atmosphere, including open sewers and the wastewater treatment system.

4.5.2 Condensate Air Regulations

Prior to the Cluster Rules, NSPS and State regulations focused only on limiting TRS emissions from steam stripper vent gases. The Cluster Rules, however, require control of both the steam stripper vent gases (as part of the LVHC requirements discussed in Section 4.3) and the pulping process condensates.

Cluster Rules Condensate Requirements

- **Cluster Rules require control of certain condensates**
- **Closed collection system required**
- **Multiple control options available**
- **Steam stripping or biological treatment control options most likely**
- **Condensate segregation option reduces condensate compliance costs**

Basic emission limits. The Cluster Rules require the control of certain condensates from each digester system, turpentine recovery system, LVHC and HVLC gas collection system, and the evaporator system condensates from weak liquor feed stage vapors and vacuum systems. These streams must be captured in a closed collection system and controlled by one of the following options:

- *Recycling.* Recycle the pulping process condensate to an equipment system specified in standards for the pulping system at kraft, soda, and semi-chemical processes that is meeting the closed-vent system and control device requirements of the pulping vent MACT standards

- *WWTP biological treatment*. Discharge the pulping process condensate below the liquid surface of the biological treatment system located at the mill's wastewater treatment plant achieving at least 92 percent total HAP destruction

- *Percent reduction.* Treat the pulping process condensates (generally by steam stripping) to reduce or destroy the total HAP's by at least 92 percent by weight

- *Mass removal.* 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 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

- *Outlet concentration.* At mills that do not perform bleaching, achieve a total HAP concentration of 210 parts per million or less by weight (ppmw) at the outlet of the control device, or at mills that perform bleaching, achieve a total HAP concentration of 330 ppmw at the outlet of the control device. This emission limit is not available to biological treatment systems because of dilution of regulated condensates with other mill wastewaters

Closed Collection System Requirements

- **System consists of hardpiping; covers, water seals, or other emissions control equipment; or venting through closed-vent system to control device (or combination of methods)**
- **Monthly (30 day) visual inspections**
- **Leak detection tests for condensate storage tanks**

The pulping process condensates must be conveyed to whichever control device the mill chooses in a closed collection system that is designed and operated to meet the individual drain system requirements specified in §§ 63.960, 63.961, 63.962, and 63.964 of subpart RR. Subpart RR essentially requires that the means of conveyance be leak-free. Air emissions of HAP from vents on any condensate treatment systems (except biological treatment systems located at the mill's wastewater treatment plant) and closed collection systems that are used to comply with the standards must be handled in a closed-vent system and routed to a control device meeting the Cluster Rules LVHC/HVLC standards (e.g., combustion). These are the same closed-vent/control system requirements that apply to LVHC and HVLC gas collection systems (see Section 4.3.2).

General exceptions. For control devices (other than open biological treatment systems that are part of the mill's wastewater treatment plant) used to achieve the percent reduction, mass removal, or outlet concentration treatment options, the Cluster Rules provide a 10 percent excess emissions allowance. For example, the allowance accounts for 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. The 10 percent allowance includes excused periods of excess emissions associated with the startup, shutdown, and malfunction scenarios described in the facilities startup, shutdown, and malfunction plan. Note that although there are no explicit back-up control requirements as part of the Cluster Rules, back-up controls may be necessary for mills that are concerned that this excess emission allowance is inconsistent with expected control device operating experience.

Note that EPA has clarified in technical corrections to the Cluster Rules how this exception applies to control systems other than a steam stripper (see 63 FR 49455, September 16, 1998). As originally written, this exception applied only to steam strippers complying with the percent reduction option. The technical corrections modified this language so that the exception applies to any control device -- except the biological treatment system at the mill's wastewater treatment plant -- used to meet the percent reduction, mass removal or outlet concentration emission limit options. For a stand-alone, enclosed biological treatment system, the 10 percent excess emission allowance would apply. Note, however, that such systems would have to develop site-specific parameter monitoring and would not be subject to the same percent reduction testing and parameter monitoring as systems that are part of the mill's wastewater treatment plant.

Condensate segregation options. The Cluster Rules also contain condensate segregation options that can save costs by minimizing the condensate volume that must be treated. Under the condensate segregation options, the facility has the option of minimizing the condensate volume sent to treatment from the digester system, turpentine recovery system, and weak liquor feed stage vapors and vacuum system condensates in the evaporator system. The concept focuses on the fact that pulping systems may have more than one condensate stream and these streams will vary in concentration of HAP. 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 energy cost (e.g., less steam is required for a lower volume of condensates). The Cluster Rules contain two options for determining if sufficient segregation of the condensate streams has been achieved to qualify for the volume minimization allowance:

- Treat the total volume of LVHC and HVLC collection system condensates, plus at least 65 percent of the total HAP mass from all condensates from the digester system, turpentine recovery system, and weak liquor feed stage vapors and vacuum systems in the evaporator system; or

- Treat any subset of the regulated streams that contain a minimum total HAP mass (3.6 kg/Mg ODP for unbleached mills and 5.5 kg/Mg ODP for bleaching mills)

If sufficient segregation is not achieved, then the entire volume of condensate from the digester system, turpentine recovery system, and weak liquor feed stage vapors and vacuum systems in the evaporator system must be treated.

Monitoring, reporting, and recordkeeping. The monitoring requirements for the condensate emission limits depend on the control option selected. The reporting and recordkeeping requirements require semiannual reports (quarterly if excursions occur) and specify that all records of monitoring parameters must be maintained. The Cluster Rules also require specific records to be maintained of closed-vent system and closed collection system inspections and results of negative pressure and leak detection tests.

The following basic monitoring requirements apply to each control option (no monitoring of the recycling option is required):

Steam strippers generally will use parameter monitoring to determine continuous compliance, based on site-specific parameter excursion values, although a methanol continuous monitoring system (CMS) can be used as an option for monitoring the outlet concentration. The following parameters must be monitored and recorded:

- Process wastewater feed rate
- Steam feed rate
- Process wastewater column feed temperature

Wastewater treatment plant biological treatment systems require an annual performance test in the first calendar quarter to demonstrate, on a total-HAP basis, that the system achieves at least 92 percent reduction efficiency. For each subsequent quarter, the owner or operator must conduct percent reduction tests, on a methanol-only basis, to determine compliance. In addition, there are several parameters that must be monitored on a daily basis including:

- Outlet soluble BOD_5
- Mixed liquor volatile suspended solids (MLVSS)
- Horsepower of aerator units
- Inlet liquid flow
- Liquid temperature

For the outlet soluble BOD_5, MLVSS, and aerator horsepower parameters, an excursion from an established parameter value triggers the need to conduct an additional percent reduction performance test to determine compliance and requires the mill to correct the problem as soon as practical. The inlet liquid flow and liquid temperature values are necessary only to perform the percent reduction test, and are not used to trigger additional tests or for other purposes.

Biological treatment systems that are not part of the mill's wastewater treatment plant would have to submit a plan for monitoring appropriate control system parameters. For each parameter, the mill would have to develop appropriate excursion levels. The parameters would be used to determine continuous compliance and the excursions (subject to the 10 percent allowance discussed above) could be used to document violations of the standard.

Closed collection systems are subject to visual inspection and leak detection requirements. For the gas vents, the self-monitoring (i.e. inspection) requirements are the same as for the LVHC closed-vent and control system requirements (see Section 4.3.2). For the closed collection system used to convey the liquid condensates, the monitoring requirements under Subpart RR apply. The Cluster Rules also impose a monthly visual inspection requirement.

Condensate segregation requires site-specific monitoring to determine that the mill continues to achieve sufficient segregation to qualify for the segregation alternative. The appropriate parameters will be selected on a mill-specific basis. The mill will have to establish excursion values for the monitored parameters.

4.5.3 Condensate Air Inspection Techniques

For pulping condensates, the Cluster Rules add a new activity of regulatory concern that is not addressed by typical TRS requirements. The TRS requirements address emissions for a condensate steam stripper, but do not impose requirements as to which condensates at the mill must be controlled by a stripper or equivalent control. For this reason, this area is likely to be a focal point for potential compliance concerns during the early years of the Cluster Rules' implementation. As described in Section 4.5.2, there are four main steps necessary to achieve compliance with the Cluster Rules' condensate requirements, each of which may involve different assessment techniques:

- *Define the applicable condensates that must be handled and treated in accordance with § 63.446.* As described above, the mill owner or operator has the option of segregating condensates so that not all pulping condensates must comply with the condensate emission standards. If this option is selected, the owner or operator must not only demonstrate initial compliance with the segregation applicability requirements but also must develop a monitoring plan to document that the segregation option continues to satisfy the applicability criteria. As part of the monitoring plan, the owner or operator will have to develop appropriate parameter excursion levels. If excursions occur, the excursions are direct evidence of violations and will be reported quarterly as excess emissions. Assessments will involve pre-inspection reviews of monitoring reports and then on-site checks of current data and proper monitor operation.

- *Convey the condensates in a closed collection system.* The condensate closed collection system includes elements for transfer of the liquid condensates and closed-vent system and control device elements for transferring air emissions from the liquid condensates. The assessment procedures for the closed-vent system and control device requirements will be the same as the procedures required for the LVHC gas closed-vent system and control device requirements. In addition, the inspector will have to assess compliance with the requirements applicable to the liquid closed collection system -- requirements for tanks and individual drain systems.

- *Treat the condensates using one of the compliance options.* If the recycling option is selected, then no monitoring data will be available, and the inspection will consist of verifying that the condensates are in fact recycled to the process equipment. A check of process diagrams and visual observations are the likely techniques. If a steam stripper is used to treat the condensates, then the inspector should evaluate the required monitoring data to determine compliance. If the biological treatment system (wastewater treatment plant) option is used, the inspector will have to evaluate both required parameter and performance test data to determine compliance. If a stand-alone biological treatment system is used, the inspector should evaluate the site-specific parameter monitoring data to determine compliance.

! *Convey the treated HAP compounds in the same manner as the LVHC collection system*. Unless a mill uses the biological treatment system in the wastewater treatment plant, the gaseous (volatilized) HAP emissions from the treatment of the liquid condensates must be conveyed to a control device in the same manner as LVHC gases. Generally, no separate assessment of this requirement will be necessary; because most mills will rely on steam stripping, this requirement is already incorporated into the LVHC requirement (§ 63.443) that the stripper overhead gases be conveyed and treated as part of the LVHC system.

For initial compliance, the appropriate steps to follow for coming into compliance with the Cluster Rules are outlined extensively in the document *Pulp and Paper NESHAP: A Plain Engish Description (EPA-456/R-98-008)*, including a discussion of applicability, timing and other initial compliance issues. This document, therefore, focuses on on-site assessments that will be conducted after initial compliance has been demonstrated and the appropriate permit conditions have been included to address the Cluster Rules.

4.5.3.1 Pre-inspection Steps

As discussed in Chapter 3, there are a number of steps that should be taken routinely prior to conducting an actual on-site inspection, including file reviews. As part of the file review, the inspector should consider at least the following items:

Process diagrams. Obtain a simplified diagram of the condensate handling system(s) and note what control(s) are employed. This type of diagram may be available in the Part 70 operating permits file if submitted with the application. A drawing or schematic of the closed-vent system and control device -- and individual drain systems -- used to handle condensates should also be available as part of a mill's self-inspection plan for these systems (see § 63.454(b), as well as § 63.965(a)(1) for individual drain systems).

Use of controls located in other process areas. If the facility relies on biological treatment, then the control system may be located in the wastewater treatment plant area. Also, if the facility combusts the vent gases from a steam stripper (or other treatment device) in a lime kiln, power boiler or recovery boiler, the inspector must verify the continuous use of these combustion process units for HAP control when conducting the inspection of the chemical recovery and power boiler areas of the mill. Any downtime will have to be checked against permitted levels of uncontrolled venting.

Evaluation of periodic monitoring reports. The mill will have to record and report monitoring data for control devices (e.g., steam strippers or biological treatment systems) used to treat condensates. If the biological treatment system located in the wastewater treatment plant is used, the report will include quarterly performance test data as well. If the mill elects to use the condensate segregation options, the reports will also include the results of condensate segregation applicability monitoring. For each parameter that must be reported, semiannual reporting is required so long as no exceedances occur. Once an exceedance occurs, quarterly excess emission reports (EERs) are required until such time as EPA approves a return to semiannual reporting. The inspector should review reports submitted since the last inspection in order to prioritize the need for follow-up while on-site.

The inspector should confirm that any periods of excess emissions indicated in the reports are within regulatory limits. If not, the inspector may need to evaluate on-site records that document the reasons for the excess emissions and/or uncontrolled venting. The review will be necessary to evaluate claims of allowable excursions. For control devices other than biological treatment systems at the mill's wastewater treatment plant, the Cluster Rules allow for excess emissions for up to 10 percent of operating time (including startup, shutdown and malfunction periods) within a semiannual reporting period without the exceedances constituting a violation. For other monitored parameters with excursion levels, allowable excursions may occur as a result of startup, shutdown or malfunction periods. The inspector should evaluate these types of claims in connection with the facility's startup, shutdown and malfunction plan required under 40 CFR 63.8.

Evaluation of episodic malfunction reports. The inspector should review malfunction/upset reports since the last inspection, if available. If the reports identify corrective actions to be taken by the source, note the need to verify during the on-site inspection that the corrective steps were actually taken and that they resolved the problem. The facility should have records of these corrective actions consistent with the Part 63 SSM Plan.

Also, in evaluating claims of malfunction periods noted on excess emission reports, the inspector should compare the duration and timing of those periods to whether the facility submitted a malfunction report. If a malfunction report is required for all or some specified subset(s) of malfunctions, note any discrepancies between the malfunction reports submitted and claims in an EER of "malfunction" as a cause of excess emissions. Significant discrepancies signify either errors in EER or malfunction reporting that should be addressed with the facility either as part of the inspection or by agency compliance staff responsible for processing periodic and episodic reports.

4.5.3.2 On-site Inspection Steps

The appropriate on-site inspection steps must be tailored to the objectives of the inspection and the priority given to the condensate requirements in a particular inspection. The possible steps for a routine Level 2 inspection include:

Permit verification. One objective of a standard Level 2 air inspection will be to verify that the permit includes all the appropriate standards for the applicable condensate equipment systems. Prior to the inspection, review the permit to determine what conditions apply to the pulping condensates. Depending on the nature of the specific permit conditions, the inspector may then evaluate a number of potential issues to verify that the mill's operations remain consistent with permit requirements, including:

- Are all sources of condensates properly identified in the permit? *(Note: This step is critical if the mill has elected to use the condensate segregation options.)*

- Have any modifications occurred that could trigger NSR or that could affect the condensate segregation applicability requirements for the facility? Have the additional controls associated with HVLC and condensate points triggered NSR based on increases from the combustion control units?

NOTE! Additional controls on HVLC and condensate points as a result of the Cluster Rules may increase SO_2 and NO_x emissions and trigger NSR:

- **EPA believes that the pollution control project exemption from major NSR generally should apply**
- **State minor NSR will still apply and major NSR may apply if the State determines it necessary or for sources located near Class I areas**
- **See 63 FR 18531-32 for further detail**

- Are the HAP control methods identified?

- Compare the basic process/design information with conditions in the permit to verify the accuracy of the information in the permit and to support subsequent assessment activities.

Evaluation of closed collection system. Prior to evaluating the control methods used to treat the condensates, the inspector should determine that the source is satisfying the requirements to maintain a closed collection system. Because the results of inspections and other monitoring of the collection system are recorded but not reported, an on-site records review inspection is necessary to evaluate that the system meets the regulatory requirements.

As part of the Cluster Rules, facilities will have to enclose and convey pulping liquid condensates through a closed collection system. Emissions from the liquid condensates must be handled by a closed-vent system and sent to a control device meeting the requirements for the LVHC and HVLC gas collection systems. The Cluster Rules require the facility to develop a self-inspection plan, including a series of periodic checks, to assure that this system continues to operate properly. The inspector should review the records of these activities to assure that the required checks are occurring and that the source has taken any corrective action steps necessary to remain in compliance.

In addition to the same basic closed-vent system and control device requirements applicable to LVHC/HVLC gas collection, the condensate requirements also include provisions for individual drain systems and tanks:

For individual drain systems, a self-inspection plan is required and the source should have records of these inspections. The Cluster Rules require visual inspections every 30 days. The key elements of the plan are visual inspections of:

- Water seals used to control air emissions -- check liquid levels
- Closure devices on drains, junction boxes and unburied portions of sewer lines -- check to ensure device is in place and has no defects (gaps, cracks, holes, broken/damaged seals, missing caps, etc.)

Checks of Closed Collection/Closed-vent Systems for Suspected Problems with Facility Self-Inspections

- **Visual inspections (ductwork, piping, valves, water seals, closure devices, junction boxes, unburied sewer lines, etc.)**
- **Leak checks using Method 21 analyzer (positive pressure components and tanks)**
- **Pressure checks using portable pressure gauge, etc. (negative pressure enclosure/hood openings of closed-vent systems)**

If defects are identified, the mill must take corrective action and maintain records of the action taken. Provided appropriate corrective action is taken, the facility will remain in compliance -- the existence of an observed defect by itself is not a violation. The inspector should evaluate the records and interview site personnel to verify that appropriate corrective action was taken. The inspector should pay special attention to claims of a need for delay in repair. Under the Cluster Rules, such delays are allowed if the repair requires emptying or removing the drain from service and there is no alternative capacity for the wastewater handled by the affected drain.

For tanks, the Cluster Rules require the mill to conduct leak checks (using Reference Method 21) initially and annually thereafter. If a leak is detected, the mill must follow specified corrective action procedures and complete corrective action generally within 15 days. The inspector should determine whether the source has records to document compliance with these requirements. In addition, use of a portable leak check analyzer may be appropriate where problems are suspected with particular tanks.

After a review of the applicable records and interviews with mill personnel, if the inspector detects or suspects a compliance problem, the inspector should consider conducting the types of checks that the facility is supposed to undertake as part of its self-inspection program to the extent feasible within time and safety constraints.

Evaluation of proper operation of control equipment. A Level 2 inspection next should focus on assuring that the control equipment is being properly operated and maintained so that the facility continues to achieve compliance with the applicable emission limits. The proper steps for this phase of the inspection will depend on the control measures used for the condensates, which will generally include either recycling to the process, steam stripping, or biological treatment systems.

Recycling. If the facility complies by recycling the condensates to the process equipment, no recordkeeping or monitoring requirements will apply. The inspector should verify through a review of process diagrams and a visual walk-through that the required recycling equipment is in place. In addition, a DCS may provide real time and historical data that documents recycled flow of condensates to the process.

Steam Stripping. This control method is by far the most likely option and is expected to be used in nearly all mills. The main design characteristics of steam strippers that have an effect on removal efficiency are the steam-to-feed ratio (SFR) and the number of trays (or overall packing height). Generally, as either of these increases, removal efficiency will tend to increase.

Basic Steam Stripper Inspection Steps

- **Evaluate required monitoring data (SFR, temp., or methanol CMS); check against required limits and for shifts from baseline conditions**
- **Check monitors for operating condition, including most recent QA/QC records**
- **SFR values generally should be at least 1.5 lb/gal.**

The Cluster Rules generally require monitoring of both the steam and feed rates. The mill is required to establish parameter excursion levels for purposes of reporting excess emissions. Although not explicitly stated in the rule, the Agency expects these excursion levels to be expressed as an SFR because the appropriate level for each of these two parameters is dependent on the level of the other parameter. Background data collected in support of the Cluster Rules indicate that a SFR of at least 1.5 lb/gal should be maintained to achieve the 92% reduction required by the rule. The Cluster Rules also require monitoring of the process wastewater column feed temperature. A minimum temperature excursion level will be established during the performance test.

In addition, if the mill elects to meet the Cluster Rules' condensate treatment standard expressed in a ppmw format, the owner can install a methanol CMS at the outlet of the steam stripper to measure the outlet concentration instead of measuring the control device parameters. If this option is selected, the inspector should check recent QA/QC results to assure proper operation of the monitor, and then analyze real-time and trend data, to the extent available, through a DCS or other available records.

The number of trays (or overall height of packing) is fixed by the design of the applicable stripper being used. However, removal of trays for maintenance and repair can occur, and is one of the reasons for the 10 percent excess emission allowance in the Cluster Rules. If excess emissions as detected by the SFR monitoring are high, then an inspector may follow up to examine tray maintenance and repair records to determine whether the mill's O&M procedures for the steam stripper are adequate to minimize emissions.

NOTE! This section addresses only biological treatment systems that are located in the wastewater treatment plant area. Other biological treatment systems are subject to site-specific parameter monitoring.

Use of WWTP Biological Treatment System. As discussed in Section 4.5.2, for this control option the Cluster Rules require the mill owner or operator to conduct percent reduction performance tests on a quarterly basis. In addition, the owner or operator also must monitor five separate parameters on a daily basis (outlet soluble BOD_5; mixed liquor volatile suspended solids; horsepower of aerator units; inlet liquid flow; and liquid temperature). For each parameter the mill must establish parameter excursion levels. For the outlet soluble BOD_5, mixed liquor volatile suspended solids, and aerator horsepower parameters, an excursion triggers the need to conduct a percent reduction performance test (in addition to the scheduled quarterly tests) to determine compliance and requires the mill to correct the problem as soon as practical. The inlet liquid flow and liquid temperature parameters are necessary to conduct the percent reduction test, and are not used for actually triggering the test or other purposes.

To inspect the biological treatment system, the inspector should determine:

- Did each quarterly performance test document that the treatment system met the required percent reduction efficiency?
- Were any performance tests triggered by excursions required during the period reviewed?
- If so, were the tests conducted when and as required?
- If so, what were the results?
- Were the corrective action steps taken in response to the excursion successful in addressing the underlying problem? Examples of potential problems that could result in excursions and failure of the biological treatment system include black liquor spills and aerator malfunctions.

4.5.4 Condensate RCRA and EPCRA Issues

NOTE! The Cluster Rules revised RCRA rules to allow on-site burning of condensates derived from steam stripper overhead gases.

The mill may want to concentrate the methanol stripped from the condensates as supplemental fuel for power boilers to recover the methanol's heating value. There is some possibility that the concentrated methanol condensate would exhibit the hazardous waste ignitability characteristic which potentially could make the use of the methanol condensate in the power boilers subject to RCRA boiler and industrial furnace (BIF) requirements. To encourage recovery of these methanol condensates, EPA -- as part of the Cluster Rules -- added an exclusion from the RCRA definition of a "solid waste" for condensates derived from overhead gases from steam strippers used to comply with the condensate control requirements. This exclusion is limited to on-site combustion. (See 63 FR 18533 for further detail.)

The EPCRA concerns for the condensates generally remain the same as for the LVHC and HVLC gas collection systems. See Section 4.3.4.

4.6 Spent Pulping Liquor, Turpentine, and Soap Management

NOTE! Enforcement of CWA BMPs is almost entirely through inspection because each kraft mill will use site-specific methods to implement BMPs..

Spent pulping liquor management is an integral component of optimal wastewater treatment operation as well as economic mill operation. The Cluster Rules require kraft mills that bleach pulp to implement measures to prevent or otherwise contain spent pulping liquor, turpentine, and soap. In addition, the management of these materials may trigger RCRA handling requirements or EPCRA/CERCLA reporting requirements. This section describes the:

- Common spent pulping liquor, turpentine, and soap discharge points
- Best Management Practices (BMPs) to control spent pulping liquor, turpentine, and soap and BMP compliance procedures
- BMP inspection steps
- RCRA regulatory requirements, EPCRA/CERCLA reporting obligations, and the associated inspection procedures

4.6.1 Potential Spent Pulping Liquor, Turpentine, and Soap Management Discharge Points

Mills that perform chemical pulping of wood or other fibers generate spent pulping liquors that are generally either recovered in a chemical recovery system or treated in a wastewater treatment system. Spent pulping liquor at kraft mills is comprised of black liquor that is used, generated, stored, or processed at any point in the pulping and chemical recovery process. Black liquor is generated during the cooking process in the digester and contains dissolved organic wood materials and residual alkali cooking chemicals. After separation from the pulp, spent liquor is routed to the chemical recovery cycle. Weak black liquor that is more dilute in nature is separated during pulp washing operations. Some of the weak black liquor is reused in the pulping process, and the rest is sent to the chemical recovery process. The black liquor is evaporated to a high concentration and then burned in a recovery boiler to recover the energy associated with the dissolved organic wood materials and to regenerate cooking chemicals used to pulp the wood.

Some kraft mills, particularly those that used softwood as raw material, isolate soap and turpentine from the spent pulping liquor. Fatty and resin acids found in the wood material become saponified during the kraft pulping process. During black liquor evaporation, the soap becomes insoluble and rises to the surface of the liquor. The soap is removed from one effect of the evaporator to a skimming tank where it is removed. The skimmed liquor is then returned to the next evaporator effect.

Turpentine partitions to the foul condensates when digester relief vent gases are condensed. Typically, the turpentine is recovered by decanting the condensates and skimming the top layer containing the insoluble turpentine. The turpentine is then sent to a storage tank for off-site sale, while the condensates are routed with other pulping area condensates to the wastewater treatment plant (with or without steam stripping, depending on the mill).

NOTE! NSPS Subpart Kb volatile organic liquid tank standards may apply to turpentine and black/green liquor storage tanks, but likely impose only minimal recordkeeping requirements.

Note that the turpentine and black liquor storage tanks (as well as green liquor storage tanks in the chemical recovery area) store materials with volatile organic liquid (VOL) content. Subpart Kb of the NSPS covers new or modified (after 7/23/84) VOL storage tanks with a design capacity of at least 40 cubic meters (approximately 10,000 gallons). Subpart Kb imposes minimal recordkeeping requirements on all applicable tanks and then imposes, based on tank capacity and the true vapor pressure of the stored materials, additional recordkeeping requirements and/or design/control standards. Process vessels meeting the definition in 40 CFR 280.12 of a "flow through process vessel" are exempt from subpart Kb requirements.[12] For turpentine tanks, Subpart Kb generally will impose only minimal recordkeeping (document the tank's capacity) because of the tanks' relatively small size (usually 10,000-20,000 gallons) and the low true vapor pressure of the material stored (estimated to be <1 kPa). The black and green liquor would be affected similarly.

NOTE! BMPs require mills to return spilled or diverted materials to the process to maximum extent the mill determines practicable <u>or</u> to discharge the materials at a rate that does not disrupt the receiving treatment system.

Without careful management, kraft mills can lose pulping liquor through spills, equipment leaks, and intentional diversions from the pulping and chemical recovery areas of the mills. In the absence of adequate collection and recovery (or controlled rate of release to the wastewater treatment plant), intentional diversions can have the same adverse impacts as a spill of similar size. Figure 4-1 depicts the critical systems within the pulping area that involve managing spent liquor and that have the potential for liquor releases. Spent pulping liquor may be accidentally or intentionally released from any of these systems.

Spent pulping liquor losses increase the need for pulping liquor make-up chemicals and decrease energy generated from pulping liquor solids combustion. Liquor losses and spills not only adversely affect economic operation of the pulping process but may also adversely affect wastewater treatment system operations and lead to increased effluent discharges of conventional and toxic pollutants.

Significant sources of black liquor losses from normal process operations include:

- Leaks from seals on brown stock washers
- Leaks from seals on pumps and valves in black liquor service
- Intentional liquor diversions during shutdowns, startups, grade changes, and equipment maintenance
- Sewered evaporator boil-out solutions
- Decker losses at older mills with open screen rooms
- Losses from knotters and screens at mills without fiber and liquor recovery systems for those sources

Unintentional pulping liquor losses at pulp mills are most commonly caused by process upsets, equipment breakdowns (i.e., malfunctioning valves, flanges, and pumps; pipelines corrosion; and lack of preventative maintenance), and tank overfilling. Maintenance and construction in a mill's pulping and chemical recovery areas may cause intentional diversions of pulping liquor to the wastewater treatment system. Research into spill incidents reported through EPA's Emergency Response Notification System shows the following causes of pulping liquor spills[7]:

- Mechanical failure (45%)
- Human error (20%)
- Tank overfilling (16%)
- Intentional diversions (4%)
- Weather (1%)
- Power Failure (1%)
- Unknown (13%)

4.6.2 Spent Pulping Liquor, Turpentine, and Soap Management -- CWA Requirements

With the promulgation of the Cluster Rules, 40 CFR 430.03 requires papergrade kraft mills that bleach pulp to implement BMPs to prevent leaks and spills of black liquor, soap, and turpentine. (Note that these requirements also apply to soda mills as well.) The primary objective of BMPs is to proactively prevent losses; a secondary objective is to reactively collect, contain, recover, or control spills and losses that do occur. The BMP requirements are designed to provide kraft mills the flexibility to implement general mill-specific management controls, combined with various engineering controls and monitoring systems to achieve these objectives. The BMPs include the following elements:

- Return of diverted or spilled liquor, turpentine and soap to the process to the maximum extent practicable as determined by the mill
- Establishment of preventive maintenance programs for equipment in spent pulping liquor, turpentine and soap service
- Continuous, automated monitoring systems (i.e., alarms, conductivity monitors, or pH meters) on storage tanks, in process areas, in process sewers, in process wastewater, and in the wastewater treatment plant to detect leaks, spills, and intentional diversions
- Annual training for personnel involved with operating, maintaining, or supervising operation of equipment in spent pulping liquor, turpentine, or soap service
- Preparation of reports evaluating spill events not contained in the immediate process area
- Establishment of a program to review any planned facility modifications and construction activities in the pulping and chemical recovery facilities
- Installation of secondary containment for spent pulping liquor bulk storage tanks or an annual tank integrity testing program coupled with diversion structures
- Installation of secondary containment for turpentine bulk storage tanks
- Installation of curbing or diking systems for turpentine and soap processing areas
- Wastewater treatment influent monitoring to track BMP performance and effectiveness and to detect trends in spent liquor losses (EPA has recommended in the Technical Support Document [8] that mills monitor for COD, but 40 CFR 430.03(h)(2)(i) of the Cluster Rules provides that other parameters related to spent pulping liquor loss also may be used)

In addition, kraft mill operators and owners must develop a BMP Plan which specifies the procedures and practices each mill will employ to meet BMP requirements. Details of the practices listed above are in the *Technical Support Document for Best Management Practices for Spent Pulping Liquor, Spill Prevention, and Control*.[8]

4.6.3 Spent Pulping Liquor, Turpentine, and Soap Management -- CWA Inspection Techniques

As a result of the new BMP requirements, water inspectors will have to evaluate operations in the pulping area, in addition to the bleach plant and wastewater treatment plant. Consequently, inspectors should carefully review all available materials prior to the on-site inspection to become familiar with the pulping and chemical recovery areas.

4.6.3.1 Pre-inspection Steps

As discussed in Chapter 3, there are a number of steps that should be taken prior to conducting an actual on-site inspection, including file reviews. As part of the file review, the inspector should consider the following items:

Permit review. For direct discharges, BMP requirements are implemented through the NPDES permit. For indirect discharges, BMPs are pretreatment standards and, thus, apply directly to the indirect discharger. Inspectors should review permits to determine the required schedule for implementing BMPs.

Evaluation of the BMP Plan. Each kraft facility that chemically bleaches pulp must complete its BMP Plan by April 15, 1999 (or the date its NPDES permit containing BMP requirements is issued, whichever is later). In addition to detailing the measures a mill will implement to comply with the BMPs discussed in Section 4.6.2, the BMP Plan must be based on a detailed engineering review of the pulping and chemical recovery systems. If the permitting authority instructed the facility to submit the BMP Plan (which is not required by the Cluster Rules) the inspector should review the document prior to the mill inspection. If the permitting authority did not instruct the facility to submit the BMP Plan, the inspector should contact the facility to ensure these materials are made available upon arrival. The Cluster Rules specifically require the kraft facility to maintain a complete copy of the current BMP plan on its premises and to make it available to EPA and the State agency upon request. See 40 CFR 430.03(g).

Evaluation of periodic monitoring reports. As part of the Cluster Rules, mills must conduct daily monitoring of the influent to wastewater treatment systems, expressly for the purpose of tracking the performance of the BMP program. Alternative monitoring points may be selected to isolate possible sources of spent pulping liquor, soap, or turpentine from other sources of organic wastewaters. Although the monitoring program may, from time to time, detect large releases of spent pulping liquor, that is not the specific purpose of this monitoring. The monitoring is intended to systematically measure progress in reducing losses of spent pulping liquor, soap, and turpentine through effective use of BMPs and to assure that the BMP program continues to be effective over time.

Mills must measure BMP effectiveness by establishing action levels. Each facility must establish its own action levels and identify them in the BMP Plan. Mills have the flexibility to choose the statistical methodology they will use to establish these action levels. The action levels must consist of a lower action level, which if exceeded, will trigger investigative requirements, and an upper action level, which if exceeded, will trigger corrective action requirements. It is important to note that exceedance of an action level does not constitute a violation; however, failure to take action called for in the BMP Plan when an action level is exceeded for the time period specified in the BMP Plan does constitute a violation.

The results of the monitoring program must be submitted to permitting authorities at least once a year. Inspectors should review the monitoring reports to determine whether the mills experienced excessive pollutant discharge from uncontrolled or intentional discharge of spent liquor, soap, or turpentine that may have required the mill to perform corrective actions. In the review, inspectors should:

! Compare monitoring results with the BMP Plan to determine whether actions levels were exceeded

- Note general trends of the monitoring results, especially those that demonstrate poor performance, for discussion with mill personnel during the on-site visit

Inspectors should note that any exceedances of the action levels that resulted from a spill or intentional diversion should be documented in the spill records described below (see Section 4.6.3.2).

Process diagrams. If the BMP Plan is not available prior to the inspection or does not include a process diagram, the inspector should obtain a process diagram of the pulping, washing, and turpentine and soap processing systems and note what spill prevention and control devices are employed.

4.6.3.2 On-site Inspection Steps

BMPs require mills to closely document spent pulping liquor, soap, and turpentine management. As a result, appropriate on-site inspection steps should include a review of the reporting and recordkeeping. In addition, inspectors should verify that appropriate influent monitoring measures are implemented, that appropriate actions were taken if action levels were exceeded, and that preventive maintenance measures are performed.

Evaluation of the BMP Plan. As mentioned above, inspectors should review the BMP Plan to become familiar with the procedures the mill determined necessary to comply with the BMP requirements. Inspectors should review the BMP Plan and inspect the pulping area to:

- Ensure the BMP plan contains all required elements
- Evaluate whether the monitoring parameter selected by the mill is appropriate
- Determine whether the mill has achieved the objectives outlined in the plan, as well as whether it has achieved compliance with the rule's BMP requirements
- Ensure mills update the plan, as elements of the program are implemented
- Determine whether mill updates action levels when required, as elements of the program are implemented. Final action levels that reflect operation of the fully implemented program must be established by January 15, 2002 (or the date an NPDES permit containing BMP requirements is issued, whichever is later)

Evaluation of training records. Training is an essential element of a proactive approach to prevent spent pulping liquor, soap, and turpentine losses by reinforcing operator awareness, preventive maintenance, and daily management. Mills are required to maintain initial and refresher training records for all personnel involved with operating, maintaining, or supervising operation of equipment in spent pulping liquor, turpentine, or soap service. These records must be maintained for three years from the date they were created. Inspectors should review these records to determine whether mills are achieving the training goals outlined in the BMP Plan.

Evaluation of repair records. Mills are required to track the repairs of equipment in spent pulping liquor, soap, and turpentine service. These records must be maintained for three years from the date they were created. Inspectors should review these records to ensure mills have implemented the control measures outlined in the BMP Plan as well as to determine whether mills have implemented changes to equipment as a result of an unintentional spent pulping liquor spill to prevent reoccurrence.

Evaluation of spill records. Mills must prepare brief reports that evaluate each spill or intentional diversion that is not contained in the immediate process area. Inspectors should review these reports to confirm that they describe the equipment involved, the circumstances leading to the incident, the effectiveness of the corrective actions taken to contain or recover the spill or intentional diversion, and plans to develop changes to equipment and operating and maintenance practices as necessary to prevent reoccurrence. The status of planned changes should be reviewed with mill staff.

Visual inspection. Referring to the BMP Plan, inspectors should perform a visual inspection of a mill's pulping process area to determine whether the monitoring systems and containment structures specified in the plan have been implemented. Mills have until April 17, 2000 for monitoring systems and April 16, 2001 for containment structures (or the date a NPDES permit containing the BMP requirement is issued, whichever is later) to implement the following:

! *Continuous automated alarm systems* (i.e., alarms, conductivity monitors, or pH meters) on storage tanks, in process areas, in process sewers, in process wastewater, and in wastewater treatment plant. Inspectors should determine whether the alarm signals (audio or visual) on the tanks are in the locations specified in the BMP plan and provide sufficient notice to allow operator response. Likewise, inspectors should visually inspect the process areas, process sewers, and wastewater treatment plant to ensure conductivity monitors or pH meters are placed in the appropriate locations and provide sufficient signal for operator response.

! *Secondary containment structures* are required for turpentine bulk storage tanks and are one option for spent pulping liquor bulk storage tanks. Mills will detail the measures they will use to meet BMPs in the BMP Plan and inspectors must determine whether these structures and management systems are in place by the required date.

! *Curbing or diking systems* are required for turpentine and soap processing areas. Again, mills will detail the measures in the BMP Plan and inspectors must determine whether these structures are in place.

Evaluation of tank integrity testing. Mills may opt to implement tank integrity testing, rather than install secondary containment structures, for spent pulping liquor bulk storage tanks. If this option is used, inspectors should review the procedures used to perform tank integrity tests and the results of such tests. Note that some permits may specify minimum integrity testing requirements. Inspectors should determine whether the mill achieves the minimum requirements by reviewing the available testing records.

Evaluation of pulping and chemical recovery equipment construction or modification program. Whether to meet the Cluster Rules requirements or to modernize mill operations, mills will install new equipment or controls in the pulping and chemical recovery areas. BMPs require a program to evaluate construction and modification activities. This required program is intended to ensure that the prevention of spills and leaks is considered while mills implement changes in the pulping and chemical recovery areas. Inspectors should review documentation of this program.

Evaluation of activities related to influent monitoring program. As mentioned above, mills must conduct daily monitoring of the influent to wastewater treatment systems (or at an alternative location) to track the performance of the BMP program. Remember, influent monitoring is intended to systematically measure progress in reducing losses of spent pulping liquor, soap, and turpentine through effective use of BMPs and to assure that the BMP program continues to be effective over time. While on-site, the inspector should:

> **NOTE! Inspectors should interview mill staff and review records to determine whether mills responded to any exceedances of the action levels. Exceedance of the action levels does not constitute a violation; however, failure to take action does constitute a violation.**

- ! Interview mill staff to discuss any exceedances of action levels or trends noted during the pre-inspection of periodic monitoring reports. BMPs require mills to conduct investigations when lower action levels are exceeded and to complete corrective actions when upper action levels are exceeded. Inspectors should determine whether mills responded to any exceedances of the action levels because failure to take action called for in the BMP Plan when an action level is exceeded constitutes a violation. If the action levels are exceeded, inspectors should also discuss pollution prevention measures that may be implemented to reduce treatment system loadings.

- ! Review the sampling procedures for the parameter the mill selected for monitoring to ensure they are appropriate and consistent with any permit requirements (e.g., conductivity would be inappropriate for monitoring soap and turpentine).

- ! Determine whether an appropriate sampling point is monitored to measure the effectiveness of BMPs. Some mills will select locations further upstream from the final influent stream to the wastewater treatment plant to better isolate problem areas (i.e., pulp mill, chemical recovery operations, and bleach plant).

- ! Collect a sample, if appropriate, to verify the accuracy of the sampling program.

4.6.3.3 Root Cause Assessments

Where the initial inspection identifies potential problems with the source's BMP implementation, more detailed review of the BMP procedures for the facility may be appropriate. The Agency has recently examined two instances of NPDES permit violations that were caused by spills and accidental releases of materials from the pulping area of kraft pulp mills. These specific cases, along with information from an industry association survey of spill prevention and control practices and information gained from EPA site visits formed the basis for and approach to the BMP requirements included in the final Cluster Rules. As a general proposition, it is clear that instituting the physical measures included in the final Cluster Rules, along with a proactive, management-supported program of training, maintenance and operator awareness, will prevent many accidental releases and capture and return to the process many other spills and intentional diversions. Further improvement is also found in a careful analysis of the root causes of those spills and releases that occur in spite of the proactive BMPs that may be in place.

In conducting the root cause analysis performed in the wake of one of the cases noted above, it was found that a process valve had failed to actuate in response to the control room signal, and that the control circuit did not include a feedback signal providing valve position status to the operators. As a result, the operator’s initial action to remedy an upset condition was not effective and a large quantity of foul condensate and spent pulping liquor was sewered. The spike of organic material and black liquor solids was sufficient to render the waste water treatment plant ineffective, even though the wastewater treatment plant (WWTP) operators recognized the change in influent color and took "defensive measures." The resulting releases from the WWTP resulted in a substantial fish kill and the permitting authority ordered a mill shutdown.

The root cause analysis required as part of the Consent Order issued as a result of the NPDES permit violation not only uncovered the specific cause noted above, but also was generalized into a series of design and operating changes in the pulping and evaporator areas. In the months that followed, the mill measured a 57% reduction in BOD levels contained in WWTP influent. It is clear that the review of the incident not only determined the cause of the specific event, but also led to a general improvement in the efforts to reduce accidental losses of spent pulping liquor.

By requesting and reviewing information on the mill’s follow-up root cause investigation of incidents, the inspector should be able to construct a list of questions that will determine if: (1) the cause was sufficiently well defined to put in place equipment and/or procedures to prevent a recurrence of the same event in the future; (2) the "lessons learned" were sufficiently "generalized" to allow them to be applied elsewhere in the mill to prevent similar occurrences in the future; and (3) the information was communicated via training and written procedures to all personnel that would benefit from the new information.

4.6.4 Spent Pulping Liquor, Turpentine and Soap Management -- RCRA Issues

Subtitle C of RCRA regulates "solid waste" that is "hazardous." Under RCRA, "solid waste" is defined generally as "any garbage, refuse, sludge . . . and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial . . . operations[.]" (42 USC 6903(27)). EPA has determined, however, that spent pulping liquors being reclaimed are not "discarded" and hence not "solid wastes," due to their integral involvement in the kraft process. See 40 CFR 261.4(a)(6) and 50 FR 641-42 (Jan. 4, 1985).

In addition, there is a general exclusion for wastewaters discharged pursuant to an NPDES permit (which excludes the actual discharge from regulation under RCRA, although all units upstream of this discharge are not automatically excluded). RCRA also exempts wastewater treatment tanks from regulation. See 40 CFR 264.1(g)(6). Thus, if spent pulping liquor that is to be discharged to wastewater treatment is managed in impoundments rather than wastewater treatment tanks, the impoundment would require full regulation under RCRA if the spent liquor exhibits one of the four RCRA hazardous waste characteristics.

Another RCRA issue would be spills that are not recycled into the process or discharged with wastewater pursuant to an NPDES permit. One possible source for this type of RCRA-regulated discharge would be leaks from surface impoundments if the spent liquor exhibits one of the four RCRA hazardous waste characteristics. Spills to the ground could also be an issue.

If a mill uses surface impoundments to contain spent pulping liquors, leaks from these impoundments could trigger RCRA generator requirements, or RCRA corrective action may be necessary to address the problem. As part of an air or water inspection, a screening tool would be to determine whether impoundments are used. An appropriate follow-up would be to investigate what types of liners or monitors are used to prevent/detect leaks.

Another potential concern are general spills or leaks that affect the ground in the pulping area. A screening technique for an air or water inspector would be to identify any obvious evidence of potential spill areas. Typical indications of potential problems are: discoloration, puddling, dead vegetation, or evidence of liquid channeling on the ground area around piping, tanks, and similar areas.

4.6.5 Spent Pulping Liquor, Turpentine and Soap Management -- EPCRA Issues

As with other pulping area operations, the mill may have to take into account discharges associated with management of spent pulping liquor and other residuals in preparing TRI Form R reports. The inspector should verify that the reports include estimates for these activities.

The handling of these materials can also raise potential emergency reporting obligations. For instance, air releases that are not federally permitted and that exceed certain reportable quantities require EPCRA/CERCLA emergency reporting. Also, as noted above, EPA's ERNS database documents numerous emergency notifications related to spills or intentional diversions of spent pulping liquor that result in abnormal discharges to receiving waters.[8]

One method for an air or water inspector to screen compliance with these reporting requirements is to note whether any upsets have been recorded by the mill. A list of recorded upsets can be forwarded to the EPCRA inspector for further evaluation. For the EPCRA inspector, these types of upset records provided by other media inspectors, as well as citizen complaints or other tips, can be used to follow up and determine whether sources have provided appropriate reports of incidents covered by EPCRA/CERCLA emergency notification requirements.

The basic inspection procedures contained in Appendix D provide further detail on procedures and decision steps for conducting a follow-up EPCRA emergency reporting inspection, and the example assessment form in Appendix E contains an example checklist for screening compliance with these requirements.

References:

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

2. Smook, G.A., *Handbook for Pulp and Paper Technologists*. Bellingham, WA: Angus Wilde Publications. 1992

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

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

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

6. *Kraft Pulp Mill Inspection Guide*, prepared for U.S. EPA under Contract No. 68-01-6310, Work Assignment No. 65, Pedco Environmental , Inc., Cincinnati, Ohio, January 1983.

7. U.S. EPA Emergency Response Notification System (ERNS): Data reported for the period January 1988 to March 1993. U.S. Environmental Protection Agency, Washington, D.C., 1993.

8. *Technical Support Document for Best Management Practices for Spent Pulping Liquor Management, Spill Prevention, and Control*, EPA-821-R-97-011, U.S. Environmental Protection Agency. Washington, D.C., October 1997.

9. Buonicore, A.J and Davis, W.T., eds., *Air Pollution Engineering Manual*, Air and Waste Management Association, 1992.

10. Richards, J., *Baseline Inspection Techniques*, Student Manual, Air Pollution Training Institute Course 445, 2nd Edition, 1996.

11. *Ohio EPA's Operation and Maintenance (O&M) Guidelines for Air Pollution Control Equipment*, prepared for Ohio Environmental Protection Agency, under Contract No. 0810252, Environmental Quality Management, Inc., February 1993.

12. Rasnic, J., U.S. EPA, to Kaufman, R., AF&PA, interpretive letter dated October 29, 1998, regarding applicability of NSPS Subpart Kb to pulp and paper facilities.

13. U.S. Environmental Protection Agency, Chemical Pulping Emission Factor Development Document (Revised Draft), July 8, 1997.

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SECTION 5: ASSESSMENT MODULE FOR CHEMICAL RECOVERY OPERATIONS

5.1 Introduction

CONTENTS

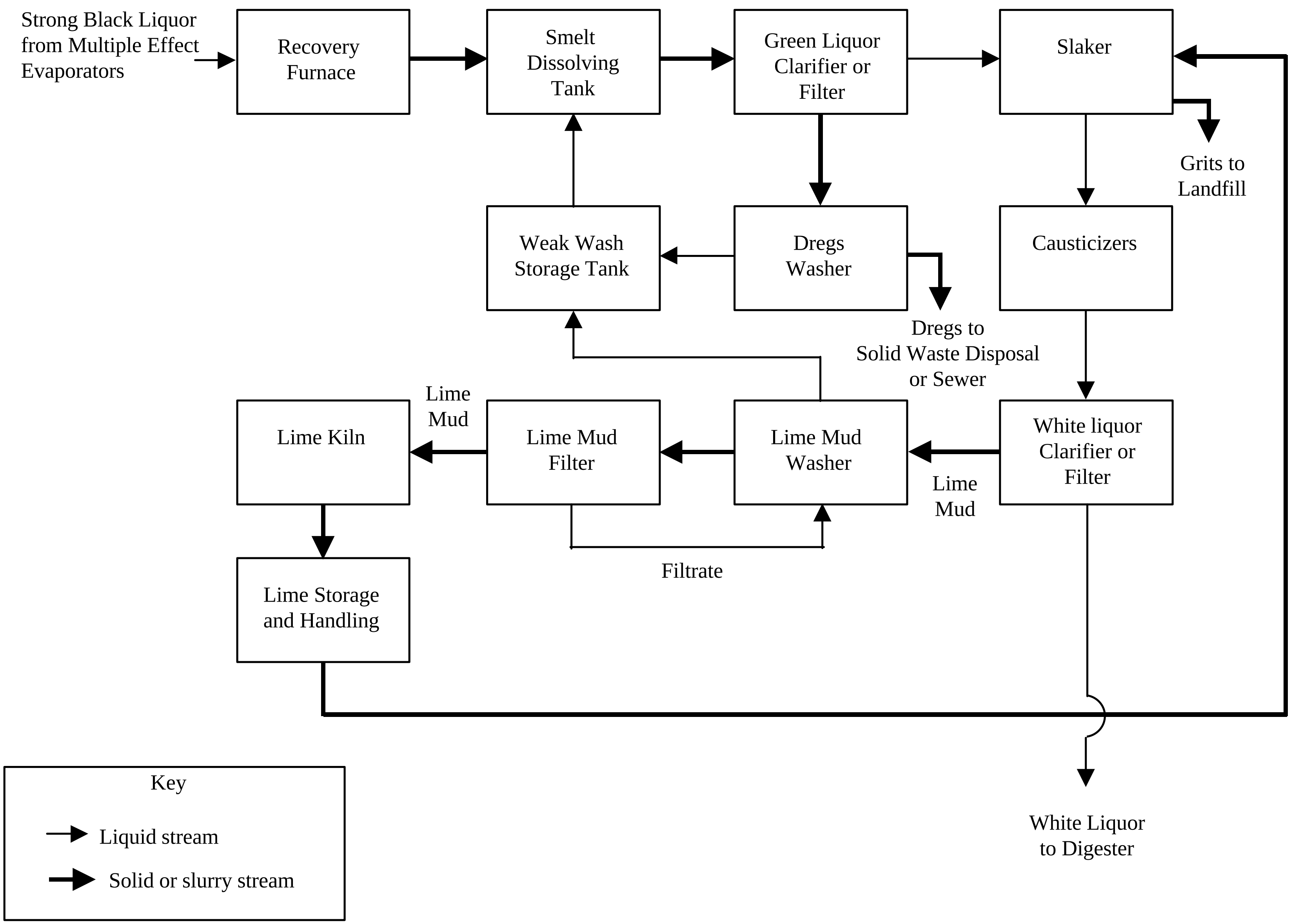
The chemical recovery area contains large air emission sources that are a significant regulatory concern. The recovery process also involves many other equipment systems that will involve less significant air emission concerns, as well as water and solid waste issues. After a brief overview of the process area, this section of the manual focuses first on the main equipment systems of regulatory concern (recovery furnaces, smelt dissolving tanks, and lime kilns) and then addresses the other miscellaneous equipment systems. In addition, Appendix E contains an example assessment form specifically designed to address the issues raised in this process area.

5.2 Overview of Process and Discharges

5.2.1 Description of the Process

Recovery, reconstitution, and reuse of spent cooking liquor to produce fresh cooking liquor is necessary for viable economic operation of most chemical pulp mills. Figure 5-1 provides a simplified schematic diagram of the kraft chemical recovery process. At kraft mills, concentrated black liquor from the multi-stage evaporators is burned in a recovery furnace to generate energy from combustion of organic constituents in the liquor, leaving a molten smelt consisting of sodium sulfide (Na_2S) and sodium carbonate (Na_2CO_3). The smelt is then dissolved in water to form green liquor. The green liquor is causticized with lime, precipitating calcium carbonate and leaving an aqueous solution of sodium hydroxide and sodium sulfide (fresh white liquor), which is reused in the digesters. The calcium carbonate is converted to quick lime via calcination in a lime kiln for reuse in the recausticizing cycle.[1]

Figure 5-1
Flow Diagram of Kraft Chemical Recovery Area



5.2.2 Air Pollutant Emissions

The recovery furnace and lime kiln are the most significant, regulated sources of air pollution in this area and have the following emission characteristics:

- *Particulate matter/HAP emissions*. Both recovery furnaces and lime kilns employ particulate control devices. The particulates will also contain HAP compounds (metals). The recovery furnace will also have some gaseous HAP emissions. Under proposed MACT standards, the mill would use the existing particulate matter control equipment and general operating practices to achieve compliance.

- *TRS emissions*. Good combustion practice is used to control TRS emissions, although older recovery furnaces that use a direct contact evaporator (DCE) design may also use a black liquor oxidation (BLO) system to reduce TRS emissions. Newer recovery furnaces use a non-direct contact evaporator (NDCE) design that results in lower TRS emissions than the DCE design. As described in Section 4, the lime kiln often will be used as the control device for TRS emissions from various pulping operations.

- *SO_2, NO_x and CO emissions*. Although these emissions are not subject to specific federal regulations, state regulations may apply, as well as NSR or operating permit requirements. Add-on control equipment is not generally used for these pollutants.

Other units in the chemical recovery area also are sources of air emissions, with particulate matter emissions the primary concern. The smelt dissolving tank is a source of particulate matter, is often subject to specific regulation, and generally will use some form of low energy wet scrubber. Other units that may be covered by requirements, such as generic opacity regulations or site-specific limits, would include the slaker, lime mud washing system, and various storage and handling units.

Figure 5-2 indicates the typical air emissions from the various equipment systems in the recovery process. The regulatory and inspection issues for the recovery furnace, smelt dissolving tank and lime kiln are discussed in Section 5.3. The other miscellaneous air emission sources are discussed in Section 5.4.

Figure 5-2
Typical Air Emissions from the Chemical Recovery Processes at a 1000 Ton Per Day Kraft Mill

Pulping System Components	Typical Emissions (tons/yr) [1]				
	Methanol	SO_2	NO_x	TRS	PM [2]
Recovery Boiler (NDCE)	23	534	315	17.5	350
Smelt Dissolving Tank	23	35	Not Available	3.5 [3]	175
Lime Kiln [4]	14	52.5	210	14[3]	87.5
Other Causticizing Area Sources [5]	56	Not Available			

1 Values are uncontrolled, except where otherwise indicated. Values are based on AP-42 factors (SO_2, TRS, and PM), 1997 EPA Chemical Pulping Emission Factor Document [13] (methanol), and Air Pollution Engineering Manual [4] (NO_x). Values also assume 350 operating days per year.
2 Based on controlled emissions (ESP for recovery furnace, venturi scrubber for lime kilns, and mesh pad for smelt dissolving tanks)
3 TRS values based on use of water low in sulfides in smelt dissolving tank and associated scrubber, and efficient mud washing and optimal kiln operation.
4 Represents emissions from lime kiln with scrubber.
5 Sources include green and white liquor clarifiers, causticizer/slaker vent, and lime mud washer systems

5.2.3 Water Pollutant Discharges

In many mills, the later steps of black liquor processing may be located in or near the chemical recovery area. These steps raise significant water discharge issues. However, this manual addresses all black liquor processing in the pulping process discussion; see Section 4.6.

For the remaining equipment systems, the chemical recovery process is a less significant source of wastewater at most kraft pulp mills compared to the pulping and bleaching processes. During the recovery of kraft pulping chemicals, water is used to wash the solid precipitates formed in the recovery cycle. Washing recovers sodium- and sulfur-containing compounds from green liquor dregs and lime mud. This weak wash water is reused in the recovery cycle to dissolve the smelt and as a scrubbing medium for air emission scrubbers. The excess weak wash is discharged to the wastewater treatment plant.[1] No specific regulatory concerns associated with the wastewater from the chemical recovery process apply, and thus water-related issues for this area are discussed only briefly in Section 5.4, which covers the miscellaneous equipment systems that involve washing.

5.2.4 Solid/Hazardous Waste Discharges

Two primary solid waste discharges from the recovery area that must be handled and disposed of are green liquor dregs and lime slaker grits. Green liquor dregs may be sewered and sent to the wastewater treatment plant or landfilled as solid waste. Lime slaker grits generally are landfilled. There are opportunities for beneficial reuse of these materials, such as using them as a cement additive. Although not generally a RCRA hazardous waste concern, these wastes can exhibit the corrosivity hazardous waste characteristic (which applies to wastes containing free liquids that have a pH 2 or 12.5). Generally, these materials are dewatered prior to disposal, and thus would not meet the corrosivity characteristic under RCRA. However, if they do contain free liquids when disposed of, some care must be taken to assure that the pH of these wastes is controlled to be <12.5 so that the mill can handle the material as non-hazardous solid waste.[2,3] Similar concerns can arise for lime muds that are directed into surface impoundments or landfills for disposal as a result of a process upset. In many circumstances, lime mud would be an aqueous waste that could potentially qualify as a waste exhibiting the corrosivity characteristic. Finally, it should also be noted that although the particulate matter removed by the recovery furnace is another possible source of solid waste, mills generally will recycle this material to the spent black liquor stream to recover any remaining cooking chemicals and reduce solid waste handling.[8] These RCRA issues are discussed in Section 5.4.

5.2.5 EPCRA Chemicals and Reportable Releases

Facilities will have to provide information on hazardous chemicals used in the chemical recovery process to satisfy EPCRA's emergency preparedness provisions. Appendix D contains a process-based list of chemicals that may be covered in an inventory for a typical mill. In addition, the mill likely will have to file TRI Form R reports for on-site air, water, and land releases of TRI toxic chemicals that originate from the recovery process. Land releases include both on-site land disposals and off-site waste transfers that contain TRI toxic chemicals. Finally, EPCRA/CERCLA emergency reporting could apply to releases that are not federally permitted and that exceed a certain reportable quantity. As noted above, although EPCRA concerns based on spent liquor spills may arise in or near the chemical recovery area, all spent liquor concerns are addressed collectively in the pulping area discussion (see Section 4.6). The remaining types of incidents are most likely to be associated with the primary air emission sources. These EPCRA/CERCLA reporting issues are discussed briefly in Section 5.3.

5.3 Recovery Furnaces, Smelt Dissolving Tanks and Lime Kilns

These emissions units are subject to significant CAA and State regulation, including proposed MACT requirements, and may raise EPCRA/CERCLA reporting obligations as well. This section describes the:

- Emission points involved
- Air regulations that apply and air compliance inspection procedures
- EPCRA reporting obligations and EPCRA inspection procedures

Key Features of Primary Chemical Recovery Equipment Systems

- **Significant PM air emissions with large add-on control devices**
- **Non-air emission issues generally are minimal**
- **Proposed MACT rule will expand NSPS-type monitoring to existing non-NSPS units**
- **Effective use of computerized data capabilities important for compliance assessment**

5.3.1 Air Emission Points

Recovery furnaces constitute a critical source of particulate matter, TRS, SO_2, NO_x and certain HAP emissions. The furnaces predominantly use electrostatic precipitators (ESPs) for particulate matter control. For TRS emissions, the key control method is proper process operation, although black liquor oxidation (BLO) is used with older direct contact evaporator (DCE) furnaces.[4] Generally, specific controls are not applied for either SO_2 or NO_x at this time. However, as States develop NO_x reduction programs as part of ozone attainment strategies, recovery furnaces may become increasingly subject to NO_x requirements.

Smelt dissolving tanks, although subject to federal and State regulations, are less significant sources of particulate matter and TRS than the recovery furnaces. For particulate matter control, these tanks are generally equipped with low-energy scrubbers. TRS emissions are generally controlled through proper process operation.[4,7]

Lime kilns, like recovery furnaces, constitute a primary source of particulate matter and NO_x emissions in the chemical recovery process, as well as TRS emissions. For particulate matter control, lime kilns are generally equipped with wet scrubbers (especially venturi scrubbers), although ESPs may be used on new units. TRS emissions are controlled through proper process operation.[4] As with recovery furnaces, lime kiln NO_x emissions may become increasingly subject to ozone attainment NO_x requirements.

5.3.2 Applicable Air Regulations

5.3.2.1 Non-HAP Requirements

Basic emission limits. The federal New Source Performance Standards (NSPS) for kraft pulp mills (40 CFR part 60, subpart BB) apply to recovery furnaces, smelt dissolving tanks and lime kilns constructed or modified after September 24, 1976, for both TRS and particulate matter emissions. Several States also regulate these sources for TRS and PM, and some States also impose SO_2 limits on these units. Also, for new or modified emission units, a NSR permit may establish additional limits, including more stringent requirements than NSPS.

Moreover, a recovery furnace that uses fossil fuel as a supplemental fuel source may also be subject to standards for steam generating units, such as NSPS subparts D, Db, Dc, or state regulations applicable to combustion sources. Because recovery furnaces generally use fossil fuels for only a small porion of their total fuel, these steam generating unit standards may apply only in a limited fashion. The Agency has determined that Subpart D applies to recovery furnaces only if fossil fuels account for 10 percent of total fuel usage. For Subpart Db, the SO_2 percent reduction standards do not apply if fossil fuel use is 30 percent. The Agency has prepared applicability determinations that further discuss how these NSPS boiler requirements apply to recovery furnaces.[12] (See also the discussion in Section 8 about the various regulatory requirements that may apply to power boilers at a kraft pulp mill.)

With the exception of these power boiler requirements, Figure 5-3 summarizes which federal and state air regulations specifically apply to kraft mill recovery furnaces, smelt dissolving tanks, and lime kilns. The following key features of these regulations should also be noted:

- *Recovery furnace TRS/SO_2 standards.* The NSPS regulations for TRS emissions from recovery furnaces establish a general 5 ppm standard (corrected to 8 percent O_2), although there is a separate 25 ppm standard (same O_2 correction factor) for cross-recovery furnaces. Several of the states establish different TRS standards for different types and ages of recovery furnaces. The standards are generally expressed on a ppm basis, ranging from 3 ppm to 40 ppm, although some states use a lb/TADP format, ranging from 0.1 to 0.6 lb/TADP. As noted below, several states also have SO_2 limits applicable to recovery furnaces. Nearly all of these limits are on a ppm basis ranging from 200 to 2000 ppm.

- *BLO requirements.* It should be noted that vent gases from BLO systems are not regulated under NSPS due to the prohibitive cost and declining use of BLO.[4] A few States and several California local districts, however, have established TRS limits that apply to black liquor oxidation. These limits include both ppm limits (15 or 20 ppm) and lb/TADP limits (0.2 or 0.5 lb/TADP).

- *Recovery furnace PM standards.* For particulate matter emissions from recovery furnaces, the NSPS establishes a 0.044 gr/dscf standard (corrected to 8 percent O_2) as well as a 35 percent opacity standard. Most states regulate particulates on a lb/TADP basis, ranging from 2 to 4 lb/TADP. One state, however, regulates particulates on the basis of lb/3000 lb of black liquor solids, and others regulate particulate matter emissions in a similar form to the NSPS. Several states also have opacity limits (from 35-45 percent) that apply specifically to recovery furnaces; while others will have general opacity standards that apply. One state, Michigan, also has specific operating requirements for ESPs used to control particulate emissions from recovery furnaces. Those types of O&M limits may apply as site-specific permit limits in other states as well.

- *Smelt dissolving tank TRS standards.* For smelt dissolving tanks, the NSPS establish a TRS limit of 0.033 lb/ton of black liquor solids as H_2S. Most states also regulate TRS from this source on the basis of lb/ton of black liquor solids, although some establish limits on a lb/TADP or ppm basis. Again, some states also establish SO_2 limits for smelt dissolving tanks in the same manner as for recovery furnaces.

- *Smelt dissolving tank PM standards*. For particulate matter emissions from smelt dissolving tanks, the NSPS establish a limit of 0.2 lb/ton of black liquor solids. Of the states that establish particulate matter limits for this equipment, most use a lb/TADP format at varying levels.

- *Lime kiln TRS standards.* The NSPS establish an 8 ppm limit (corrected to 10 percent O_2) for TRS. State TRS limits for existing lime kilns generally range from 20 to 40 ppm, although some jurisdictions use a lb/TADP format ranging from 0.2 to 0.5 lb/TADP. Some States also establish SO_2 limits for lime kilns in the same manner as for recovery furnaces.

- *Lime kiln PM standards.* The NSPS establish a limit of 0.067 or 0.13 gr/dscf (corrected to 10 percent O_2), depending on whether gaseous or liquid fuel, respectively, is being used. Several States have also established specific PM emission limits for lime kilns, although the format of the standards vary. Because of the predominant use of wet scrubbers, the NSPS do not include an opacity standard for lime kilns, and only a few States establish specific opacity limits for this equipment. However, generic state opacity requirements may apply, as well as specific permit conditions.

Figure 5-3
Federal and State Emission Limits for Recovery Furnaces, Smelt Dissolving Tanks, and Lime Kilns

Systems	Regulations[1]							
	NSPS				State			
	TRS	PM	SO_2	Opa-city	TRS	SO_2	PM	Opacity
Recovery Furnaces	Yes	Yes	No	Yes	AL, AZ, CA[2], FL, GA, ID, KY, ME, MD, MS, MT, NH, NM, NC, OH, OR, PA, SC, TN, TX, VA, WA, WI	AK, ID, OR, WA, WI	AL, AK, FL, ID, KY, MS, NH, NM, OR, TN, VA, WA, WI	FL, OR, TN, VA, WA
Smelt Dissolving Tanks	Yes	Yes	No	No	AL, CA, FL, GA, ME, MD, MS, NH, NM, NC, OH, OR, PA, SC, TN, TX, VA	CA, MS, WA, WI	AL, CA, ID, KY, NH, NM, OR, TN, VA, WA	OR, WA
Lime Kilns	Yes	Yes	No	No	AL, AZ, CA, FL, GA, ID, ME, MS, NH, NM, NC, OH, OR, PA, SC, TN, TX, VA, WA	CA, MS, WA, WI	AL, CA, ID, KY, MS, NH, NM, OR, TN, VA, WA, WI	OR, WA

1 Only regulations specific to kraft pulp mills are included. Other NSPS requirements (such as subpart Db) or general State standards (such as generic opacity requirements) may also apply.
2 For purposes of this table, "CA" indicates that one or more air quality management districts in California have specific applicable regulations.

Monitoring, reporting, and recordkeeping (MRR). The NSPS for kraft pulp mills also establish MRR procedures for the recovery furnace, smelt dissolving tank, and lime kiln emissions. TRS continuous emission monitoring systems (CEMS) are generally required for recovery furnaces and lime kilns, but no TRS-related monitoring is required for smelt dissolving tanks. An opacity CEMS is required after the ESP controls on the recovery furnace, and control device parameter monitoring (pressure drop and scrubbing liquid supply pressure) is required where a wet scrubber is used to control particulate matter emissions from a smelt dissolving tank or lime kiln. Figure 5-4 summarizes these NSPS MRR requirements, and the following additional issues should be noted:

- *ESP monitoring on new lime kilns.* Although ESPs are used on some new lime kiln installations, the NSPS do not have any required monitoring for this control option when used for lime kilns. Even with this regulatory gap, states can still require an opacity CEMS or other monitoring as part of the new source review permitting process for these new kilns.

- *Recovery furnace excess emission allowance.* The NSPS contain specific exceptions for a limited duration of excess emissions of TRS or opacity from recovery furnaces. For TRS emissions, excess emissions of one percent or less are not considered indicative of a violation of 40 CFR 60.11(d) so long as the owner or operator can document proper O&M for minimizing emissions. For opacity, the exception is 6 percent or less. These periods exclude excess emissions caused by excused start-up, shutdown or malfunction conditions. Although not explicit in the NSPS, EPA has noted that these allowances must be taken into account in determining whether a facility has violated the TRS and opacity limits (not just the § 60.11(d) general O&M duty).[5] These excess emission allowances do not apply to the smelt dissolving tanks or lime kilns.

- *Scrubber parameter reporting.* The NSPS do not require a mill to establish parameter excursion levels or report parameter excursions. However, Part 70 operating permit requirements (including both Part 70 periodic monitoring and Part 64 compliance assurance monitoring, as applicable) likely will result in permit conditions requiring the mill to both establish parameter excursion levels and submit semiannual reports. Moreover, these excursion levels and reporting requirements would be required explicitly under the proposed MACT rules.

- *TRS data availability.* In previous NSPS applicability determinations, EPA has noted that a valid data hour requires both the TRS CEMS data and the O_2 data used to correct to a standard O_2. Although excess emissions are calculated based on 12-hour averages, EPA has indicated that no minimum number of valid hours is necessary to calculate the 12-hour average.[6]

Figure 5-4
NSPS Monitoring, Reporting and Recordkeeping Requirements for Recovery Furnaces, Smelt Dissolving Tanks and Lime Kilns

Process/ Pollutant	Monitoring Requirements	Reporting and Recordkeeping Requirements
Recovery Furnaces/ TRS Emissions	! TRS CEMS required ! Span generally set at 30 to 50 ppm ! O_2 CEMS required to correct to a standard % O_2 ! Located downstream of control devices ! Temperature monitoring possible alternative in some situations under NSPS (and State) regulations ! Note: Other parameter monitoring possible in some State regulations on case-by-case basis	! Calculate and record on daily basis 12-hour average TRS concentrations (corrected for O_2) for the two consecutive periods of each operating day ! Average equals the arithmetic mean of the appropriate 12 contiguous 1-hour average TRS concentrations ! Excess emissions not indicative of 40 CFR 60.11(d) violation if occur 1% or less of operating time
Recovery Furnaces/ PM Emissions	! Opacity CEMS required	! Calculate and record each 6-minute average ! Report as excess emissions any 6-minute average that exceeds the applicable opacity standard ! Excess emissions not indicative of 40 CFR 60.11(d) violation if occur 6% or less of operating time
Wet Scrubbers (Smelt Dissolving Tanks & Lime Kilns)/PM Emissions	! Continuous pressure drop and scrubbing liquid supply pressure monitors (accuracy specification: ±300 Pascals for pressure drop and ±15% for supply pressure monitors) ! Note: Other parameter monitoring possible in some State regulations on case-by-case basis	! Record applicable measurements once per shift ! No reporting applies

5.3.2.2 Proposed MACT Rule Requirements

NOTE! These MACT standards are not yet final. Check http://www.epa.gov/ttn/uatw/pulp/pulppg.html for new developments.

At the same time that the Cluster Rules were promulgated, EPA proposed MACT requirements for certain chemical recovery equipment systems. (See 63 FR 18753, April 15, 1998.) Because EPA has not yet finalized these standards, they are not discussed further in this manual.

5.3.2.3 Asbestos NESHAP Requirements

In addition to the basic emission limits applicable to the recovery boiler and lime kiln, a number of mills may have asbestos-containing material used to insulate steam pipes or used for similar purposes in the chemical recovery area. Any demolition or renovation activity that involves the asbestos-containing material may be subject to the requirements in 40 CFR Part 61, Subpart M. Generally, Subpart M requires prior notice of demolition/renovation activity that will disturb a certain amount of asbestos and requires compliance with a number of work practice and waste disposal requirements. Figure 5-5 briefly summarizes these requirements.

5.3.3 Air Inspection Techniques

5.3.3.1 Pre-inspection Steps

As discussed in Section 3, there are a number of steps that should be routinely taken prior to conducting an actual on-site inspection, including file and permit reviews. As part of this review and to plan the on-site inspection, the inspector should consider at least the following items:

Process diagrams. Obtain a simplified diagram of the affected units and note what control(s) are employed. This type of diagram may be available in the Part 70 operating permits file if submitted with the application. At this stage, the inspector should also attempt to understand how the control rooms for the operations are set up, what process and control parameters can be evaluated from the control rooms, and what distributed control system (DCS) data capabilities are on-site. A significant part of the on-site inspection for these process units will occur in the control rooms, and an upfront understanding of what data are available -- both real-time data and historical data from a DCS -- can streamline the on-site investigation phase.

Evaluation of periodic monitoring reports. The NSPS for kraft pulp mills require that CEMS data for TRS emissions and opacity be recorded and submitted in a semiannual excess emission report (EER) for recovery furnaces. An EER is also required for a lime kiln TRS CEMS. The NSPS do not require reporting of wet scrubber control device parameters, but such reports may be required under a Part 70 permit or as a result of the proposed MACT rules. The inspector should review any reports that have been submitted since the last inspection in order to prioritize the need for follow-up while on-site.

The inspector should confirm that any periods of excess emissions indicated in the reports are within regulatory limits. If not, the inspector may need to evaluate on-site records that document the reasons for the excess emissions. The review will be necessary to evaluate claims of allowable excursions that may apply, including both regulatory allowances for a certain percent of excess emissions, and excused startup, shutdown, or malfunction periods.

Figure 5-5
Asbestos Demolition and Renovation (D&R) Requirements
(40 CFR Part 61, Subpart M)

Regulatory Area	Requirements
Applicability	! Covers regulated ACM (RACM) only: friable asbestos, certain "Category I" nonfriable material with >1% asbestos that has become friable, or other "Category II" nonfriable material with >1% asbestos that likely will be crumbled/pulverized or be reduced to powder as a result of the D&R activity [see 40 CFR 61.141 for all definitions] ! For pipes, the D&R activity must affect 80 linear meters (260 linear feet) ! For other facility components, the threshold is 15 square meters (160 square feet) ! For planned renovations, consider all planned activities for the calendar year in determining total amount of RACM that will be disturbed ! A number of exceptions and alternatives also apply [see 40 CFR 61.145(a)]
Notice Requirements	! General rule is written notice 10 working days prior to the removal activity begins (i.e., any activity that could disturb the RACM), or at least 10 days before end of the calendar year preceding the year in which applicable planned renovation activity occurs ! Follow-up notice required if the amount of asbestos affected changes by 20%, or if start date of work changes ! Exceptions apply for emergency D&R activities ! Regulations prescribe elements that must be included in the notice and require use of form included in Subpart M (or a similar form)
Work Practices	! General rule is to remove RACM prior to any activity that could break up/disturb the RACM or preclude access for subsequent removal ! Wetting requirements apply in numerous stripping and other situations, although use of ventilation system to a glove bag and leak tight wrapping with no visible emissions is alternative for stripping procedures, and leak tight wrapping is alternative to wetting after removal. Other wetting exceptions apply ! Careful handling procedures to preclude disturbing the RACM apply ! Other specific requirements apply
Waste Disposal	! Additional work practice standards apply for handling RACM ! Must deposit the RACM at a landfill that meets specific Subpart M requirements ! A RCRA-type manifest system must be used by the facility, with follow-up reporting required if the generating facility does not receive a receipt from the disposal facility within 45 days ! Other specific requirements apply

Evaluation of episodic malfunction reports. The inspector should review malfunction reports submitted since the last inspection, if available. If the reports identify corrective actions to be taken by the source, the inspector should note the need to verify during the on-site inspection that the corrective steps were actually taken and that they resolved the problem.

Also, if malfunction reports are required for all or some specified subset(s) of malfunctions, the inspector should note any discrepancies between the malfunction reports submitted and claimed "malfunction" periods in an EER. Significant discrepancies indicate errors in EER or malfunction reporting that should be addressed with the facility either as part of the inspection or by agency compliance staff responsible for processing periodic and episodic reports.

5.3.3.2 On-site Inspection Steps

The recovery furnace and the lime kiln generally are a focal point for on-site inspections of pulp mills. Except for visible emission observations and some potential visual checks of the control equipment, the on-site inspection for these units will focus on evaluating control room data. Modern mills are likely to have a single control room that covers both recovery furnace and smelt dissolving tank operations. The room may have a DCS with critical process-related data, as well as housing the CEMS/parameter data. The lime kiln generally will have a separate control room, and may include other operations such as the slaker, causticizer and receiving/conveying units.

The possible steps for a routine level 2 inspection include:

Permit verification. Verify that the permit properly identifies the recovery furnace, smelt dissolving tank and lime kiln. The inspector should also assess whether any modifications have been made, including changes in production that involve a physical or operational change, that could trigger NSR. NSR applicability determinations are complex and a full overview of this issue is beyond the scope of this manual. However, examples of possible NSR concerns include:

! Increasing black liquor solids concentration fired in recovery furnaces or incremental increases in mass of black liquor solids firing. These changes in operation can result in increased recovery furnace NO_x emissions and increased emissions of other pollutants at other units by debottlenecking production.

! Underestimating SO_2 emissions from new recovery boilers. Oil firing capacities need to be considered carefully in the NSR permitting process.

Visible emissions observations. Check for visible emissions if weather conditions permit. Optimally, formal visible emission observation (VEO) tests (i.e., Method 9 or state equivalent) should persist for at least 30 minutes (one reading each 15 seconds, and then averaged into 6-minute intervals). Plot the 6-minute averages to determine if any cyclic patterns are present, and note the timing and duration of all significant opacity spikes. For an ESP, conduct the VEO concurrently with a complete rapping cycle if possible. The following additional considerations apply:[9]

! *ESP emissions.* Check for any condensing plume at the stack discharge. A condensing plume is often indicated by a clear zone directly above the stack, is typically bluish-white or yellow-white in color, and does not disperse like steam.

Where visible emissions are high or a condensing plume is visible, the inspector should conduct a level 2 follow-up inspection of the recovery furnace or lime kiln ESP (as outlined in Figure 5-7).

- *Wet scrubber emissions.* Conduct a qualitative check of visible emissions for clear indications of potential problems. A formal VEO likely will be difficult because of the condensed water droplets in the plume exiting the wet scrubber. The inspector must observe the plume at a point immediately downwind of the point where the condensed water droplets evaporate. The residual plume at this point is often bluish-white, brownish-white or gray; while, the portion of the plume dominated by water droplets is often a bright white. It should be noted, however, that VEOs of the residual plume are not always possible because plumes from various sources may have merged, or high relative humidity will result in long distances before the water droplet plume dissipates. Also, for the smelt dissolving tank in particular, the location of the stack within the mill in relation to other mill facilities (such as the recovery furnace) may make it difficult to observe the plume from an appropriate viewing angle.

Evaluation of TRS CEMS data. Both the recovery furnace and lime kiln may have a TRS CEMS installed. The CEMS data should be the focal point for TRS compliance for these units. The inspector should confirm that the monitors are functioning properly by reviewing the most recent QA/QC checks, such as daily calibration results. In addition, if the periodic reports include excessive monitor downtime, the inspector should follow-up to see if the monitor availability problems have been corrected. The inspector can evaluate monitor data availability records since the last report period, although interviews with mill personnel can also be effective to assess the causes of the problems and the mill's approach to correcting the problem.

If the monitors are functioning properly, real-time data can be recorded to document conditions at the time of the inspection. The inspector should also determine what CEMS data trend analysis capability is available from the DCS or other PC-based system. The historical data can then be reviewed to identify any trends in the emissions profile of the units, or particular periods for which further review may be warranted.

If problems are detected, the follow-up inspection should focus on the recovery furnace BLO (if used) or process operations designed to assure proper combustion of the TRS components. These inspection elements are discussed in the following subsections.

Evaluation of proper operation of control equipment. A critical interest of a level 2 inspection will be to evaluate whether control equipment is being properly operated and maintained. The appropriate steps for this phase of the inspection will depend on the control equipment used for TRS (e.g., BLO systems) and particulate matter (e.g., ESPs or wet scrubbers).

Black liquor oxidation systems. Malfunctions in the BLO system used with direct contact evaporator recovery furnaces generally result in reduced oxidation efficiency, which produces elevated TRS concentration from the recovery furnace. These increased concentrations will be indicated by a TRS CEMS, if required. Where a BLO is used on a DCE furnace that is not equipped with a TRS CEMS, a basic inspection should include documenting proper operation and maintenance of a kraft BLO system. Some key possible BLO malfunctions and associated effects that result in increased outlet liquor sulfidity and TRS emissions are summarized in Figure 5-6.

Figure 5-6
BLO Malfunctions and Associated Effects[7]

Malfunctions	Primary Effect Causing Increased TRS Emissions
Reduced air flow volume through oxidation tank	Reduced oxidation of sodium sulfide
Plugging of air sparge	Stratification of liquor air column and reduced contact
Increased liquor flow	Decreased liquor residence time and oxygen adsorption
Liquor foaming	Foam carryover limits system liquor volume and blowing rates
Increased inlet liquor sulfidity	--

Basic ESP Assessment Steps

- **! Conduct VEO**
- **! Check opacity CEMS data**
- **! Evaluate T-R set electrical data**

Electrostatic precipitators. In addition to the VEO (discussed above), the inspector should evaluate opacity CEMS data and transformer-rectifier (T-R) set electrical data as part of a basic inspection for a unit controlled by an ESP. These evaluations can involve direct comparison of the data with emission or operating limits contained in the mill's permit, but should also involve comparisons with baseline conditions established in prior inspections, a recent performance test, or through accepted engineering principles. See the general discussion of baseline inspection techniques in Section 3.

The following recommendations and discussion summarizes material presented in the *Baseline Inspection Techniques: Student Manual* [9] and EPA's *Operation and Maintenance Manual for Electrostatic Precipitators*[8], and the inspector may want to review those resources for further information (see Section 1 for information on obtaining these materials).

! *Opacity CEMS data.* First, check the operating condition of the opacity monitor by assuring that daily QA/QC checks are within acceptable limits. The inspector can review the most recent calibration data or request that the monitor be placed in the calibration mode with respect to zero and span. Average opacity monitor readings also can be compared with average Method 9 VEO values for identical periods. A major deviation between the values may indicate possible monitor error.

If the monitor appears to be functioning properly, compare the opacity CEMS data with the permitted opacity limit. Even if the CEMS data are below the permitted opacity limit, the inspector also should conduct a baseline analysis by comparing the average opacity data for selected days with respect to baseline values for the same process operating load. This type of comparison can identify emission problems before opacity exceedances occur and possibly before damage has occurred to precipitator components. Check with mill personnel to determine which DCS utilities may facilitate this type of analysis. Where average opacities are significantly above baseline levels, the inspector should conduct a level 2 follow-up inspection of the ESP (outlined in Figure 5-7).

! *T-R set electrical data*. Each of the T-R sets is connected to a control cabinet that contains all of the electrical meters necessary to evaluate the operating conditions inside an electrical field. The inspector should therefore determine at the outset how the T-R sets and control cabinets are arranged. After having determined the layout of the T-R sets, the inspector should record the electrical data for each chamber, as indicated by the corresponding meters, starting with the set closest to the inlet and moving toward the set closest to the outlet.

NOTE! The example assessment form in Appendix E includes an example format for collecting T-R set data.

The voltage, current, and spark rate for each of the chambers should be compared against baseline data from the most recent performance test. If the data indicate that all or most of the fields in a chamber have shifted in the same direction at about the same time, a shift in the prevailing resistivity range has probably occurred. When only one field is inconsistent with others in the same chamber, however, it is more likely the result of mechanical or electrical problems inside that field. Note that, because of the prevalent use of saltcake as a make-up in the chemical recovery process, high resistivity problems are generally less of a concern for recovery furnace ESPs than for other ESP applications.

Where the T-R set data indicate that impaired electrical conditions exist due either to resistivity shifts or component failures in one or more fields, the inspector should proceed with a more thorough inspection of the ESP. Suggested level 2 follow-up inspection techniques that correspond to specific symptoms are summarized in Figure 5-7.

The inspector also should verify that appropriate process adjustments were made during periods when portions of the ESP were down for maintenance or repairs. ESP efficiency is related to gas flow, and recovery furnace/lime kiln ESP applications should be designed to handle the maximum rated flow of the unit. If portions of the ESP are taken off-line for maintenance or repairs, the operators may have to reduce gas flow to the ESP. For the recovery furnace in particular, the inspector may want to evaluate black liquor solids firing rate and opacity data for any periods since the last inspection when the ESP was operated in this manner. Plant operator interviews can identify the appropriate periods for evaluation. Depending on the DCS capabilities, the inspector can review the necessary process parameter and opacity CEMS data for the relevant period through DCS historical data or other available records. This type of review may be conducted during the inspection, or the inspector may request that copies of the relevant data be made for subsequent review after the on-site inspection.

Figure 5-7
ESP Level 2 Follow-up Inspection Points and Techniques[9]

Symptoms	Inspection Points	Inspection Techniques
! Frequent opacity spikes ("puffing") ! Currents are low in isolated areas ! Resistivity is particularly high or low	Rapper Operation	! Inspect rappers to determine if they are working ! Compare rapper activation frequencies with opacity spiking frequency indicated by opacity monitor ! Note any need to adjust rapping frequencies and intensities for resistivity conditions in each portion of precipitator
! General indications of poor ESP performance	Alignment Records	! Review collection plate/discharge electrode alignment records ! If resistivity is moderate-to-high, collection plate-to-discharge electrode spacing should be approx. $x \pm 0.05$ in., where x is the design spacing ! If resistivity is low, spacing can be $x \pm 1.0$ in.
! T-R set electrical data indicate that chronic problems have resulted in temporary loss ("tripping") of fields	Component Failure Records	! Evaluate component failure records to identify underlying causes
! Increased inlet to outlet temperature drop. Normal drop generally ranges from 5-25 degrees C ! Increased O_2 from inlet to outlet. Increases of >0.5% may signal a problem	Air Infiltration	! Listen for characteristic air rushing sound ! Look for areas of corrosion around the unit ! Compare inlet and outlet temperatures, checking for a significant increase in baseline value for temperature drop across the unit ! Compare inlet and outlet O_2 concentrations (if available), checking for a significant increase in concentration
! Consistently high amount and duration of excess emission periods	Start-up/Shut-down Procedures	! Review opacity monitor records to ascertain start-up/shut-down frequency ! Check to see if precipitator is energized in a reasonable time after start-up of recovery furnace (excessive time periods before energizing cause very high particulate emissions)

Wet scrubbers. Particulate emissions from lime kilns most often are controlled by venturi scrubbers, while smelt dissolving tank vents are generally controlled by low-energy scrubbing systems.[7,12] A basic level 2 inspection of these wet scrubbers involves a combination of visible emission observation of the stack plume, a check of control system parameters, to the extent data are available, and visual check of the control device:[7]

! *Conduct a VEO.* Condensed water droplets likely will interfere with Method 9 VEOs of emissions from a wet scrubber. The inspector still should conduct a qualitative observation to check for obvious emission problems.

! *Obtain operating data from the available control system monitors.* Typical parameters that may be monitored include pressure drop across the scrubber and scrubber liquid supply pressure (monitors required under NSPS and MACT), as well as inlet and outlet gas temperature, and, in some cases, scrubber water temperature.[7,10] As part of this evaluation, the general operating condition of the monitors should be considered. Under the NSPS and proposed MACT rules, the inspector should assure that the facility can verify that the accuracy requirements for pressure drop and liquid supply pressure monitors are satisfied. If these requirements do not apply, the inspector should interview operating staff to determine if any self-imposed QA/QC procedures are followed; if so, those results may be checked. Without QA/QC data, only a qualitative judgment as to the monitor condition can be made, and the final assessment report should note this limitation.

  To the extent possible, the monitoring data obtained during the inspection should be compared not only with any parameter excursion values established by permit or the proposed MACT rules, but also with values from the design, baseline, or previous inspections to determine if there has been a significant change in performance of the scrubber or in the number of control equipment malfunctions. For low-energy scrubbing systems, performance can change significantly with only a slight shift in pressure drop.[7]

! *Check physical condition.* The inspector should visually check the scrubber and surrounding areas for any physical evidence of scrubber malfunction, such as the droplet reentrainment indicators listed in Figure 5-8.[7] This type of assessment is particularly important if the other assessment techniques indicate a potential problem.

If the basic assessment indicates potential compliance problems, the inspector should conduct appropriate follow-up assessments. Figure 5-8 summarizes a few of the more common indicators of suboptimal scrubber performance, as well as suggested follow-up inspection points.

Figure 5-8
Indicators and Possible Causes of Suboptimal Scrubber Performance[9]

Indicators of Suboptimal Performance	Potential O&M Causes
Droplet reentrainment, as evidenced by: ! Obvious fallout of solids-containing droplets within 50 yards downwind of stack ! Discoloration of adjacent surfaces ! Mud lip around stack ! Heavy drainage from open ports on stack ! Ice buildup on structural steel and adjacent surfaces near stack (during cold weather)	! Mist eliminator cleaning frequency (solids build-up on mist eliminator can cause droplet reentrainment)
Significant decrease (more than several inches) in static pressure drop during peak gas flow periods	! Erosion of adjustable throat mechanisms ! Intentional changes in position of adjustable throat mechanism ! Decrease in gas flow rates ! Severe decrease in recirculation liquid flow rate
Decrease in liquid flow rate such that liquid-to-gas ratio is significantly below baseline level	! Decrease in liquid supply header pressures at scrubber inlet ! Decrease in recirculation pump discharge pressures ! Pipe freezing or blockage ! Centrifugal pump cavitation
Outlet gas temperature more than 5°F to 10°F above adiabatic saturation temperature (indicates poor gas-liquid distribution)	! Higher-than-normal supply header pressures ! Apparent pipe or header freezing ! Malfunctioning adjustable throat linkages or actuators

Evaluation of proper operation of process equipment. The inspector also should check process parameters to assure that the process equipment is properly operated and maintained. This type of process evaluation is especially important where potential excess emissions are suspected. Of the three emissions unit types, this type of check is the most critical for the recovery furnace.

NOTE! While reductions in TRS and SO_2 emissions may result from the optimization of certain process variables, operation of the recovery furnace under these process conditions can also increase uncontrolled particulate emissions.

Recovery furnaces. The uncontrolled particulate matter and TRS emission rates from a recovery furnace depend on a number of interrelated operating variables, including:

! Firing rate
! Black liquor heat value
! Black liquor concentration (solids content)
! Total combustion air (primary and secondary air)
! Char bed temperature

Figure 5-9 summarizes some of the more common O&M practices related to these variables that may result in an increase in uncontrolled emissions.

Figure 5-9
Recovery Furnace O&M Practices Affecting Uncontrolled Emissions

Operating Parameter	Emission Concern	O&M/Assessment Technique
Firing Rate	Higher-than-design firing rate (flue gas volume) leading to: ! increased uncontrolled PM emission rate and concentration ! nature of particulates altered ! increased TRS emission rate ! decreased ESP efficiency	Establish baseline comparison of boiler firing rate and (1) grain loading air volume and (2) temperature at the ESP. These monitor parameters would be expected to increase with increased firing rate
Black Liquor Heating Value and Solids Content	Increased black liquor heating value/solids content leading to increased PM emission rate, especially for heating value increases	Difficult to control/evaluate due to significant daily variations. Ensure inlet grain loading remains within allowable variation for specific ESP
Total Combustion Air (excess air) (includes primary and secondary air)	Insufficient total combustion air leading to "black out" (incomplete combustion)	Check total amount of combustion air -- the amount needed for complete combustion is normally between 110 and 125 percent of theoretical air
	Total combustion air greater than 125% of calculated theoretical (stoichiometric) air leading to: ! increased PM emission rate ! increased flue gas volume to ESP ! increased SO_3 formulation, causing particulates to become sticky and to build-up on ESP collection plates -- reduces ESP power input and efficiency Primary air exceeding 45% of total air volume leading to: ! sharp increase in PM emission rate ! increased TRS emission rate	Graph (using DCS if possible) the relationships between percent excess/ primary air and: ! particulate loading to ESP ! visible emissions observed from ESP ! air volume to ESP ! flue gas temperature to ESP Also, check electrical data -- possible indicators of buildup on ESP collection plates include high secondary voltage (> 50 kV) and low secondary current (< 100 mA) in inlet fields
Char Bed Temperature	Increased char bed temperature leading to: ! increased PM emission rate ! increased flue gas volume to ESP	Assure proper combustion air and firing rate operation using techniques outlined above

Smelt dissolving tanks. To control TRS emissions from smelt dissolving tanks, the water used in the tanks and the associated scrubbers should contain minimal amounts of reduced sulfur compounds. If an odor problem from the smelt dissolving tank is suspected, the inspector should obtain measurement data for the concentration of reduced sulfur compounds contained in the inlet water and scrubbing liquid.

Lime kilns. If there is an indication of a problem with the TRS or particulate emissions from the lime kiln, the inspector should check the kiln rotation rate and O_2 levels exiting the kiln. Operation outside of normal operating ranges could increase emissions. In addition, if a permit limits the type and/or quantity of fuel for the kiln, fuel usage data may be reviewed to verify that the permit levels are satisfied. Finally, as discussed in Section 5.4, proper operation of lime mud washers is important for proper operation of the kiln. To the extent emission problems in the kiln are occurring, an analysis of the lime mud washers may be necessary to determine the cause of the problem. Figure 5-10 summarizes these considerations.

Figure 5-10
Primary Lime Kiln O&M Practices Affecting Uncontrolled Emissions

Operating Parameter	Emission Concern	O&M/Assessment Technique
Kiln rotation rate	Increases above normal operating ranges can increase emissions	Compare rate to normal baseline rates using process monitor
O_2 level	Increases above normal operating O_2 levels exiting the kiln can increase emissions	Compare O_2 levels to normal baseline levels using O_2 process monitor, if available
Mud sodium content	Increased sodium in lime mud because of mud washing problems can lead to increased H_2S emissions and fine particulates	Check sodium content of lime mud entering kiln. Generally, should be in 0.5-1% range; 2-2.5% indicates likely problem

Asbestos NESHAP compliance evaluation. Finally, the on-site inspection provides an opportunity to screen for compliance with asbestos demolition and renovation (D&R) notice requirements. The inspector should interview mill personnel to determine whether any maintenance, repair or similar construction activity conducted since the last inspection involved insulated piping or similar locations likely to involve asbestos-containing materials, and, if so, whether asbestos compliance issues were considered and properly addressed. Obtain copies of any notice provided concerning the D&R activities. If there was activity but no notice was filed, follow-up to determine whether asbestos-containing materials were involved, and if so, whether the applicability provisions of Subpart M were triggered -- see the summary of Subpart M requirements in Figure 5-5. Also, verify that the wastes containing the removed asbestos-containing material were properly sent to a waste disposal site that meets the requirements of Subpart M. The mill should have copies of all waste shipment records required under Subpart M.

For asbestos D&R inspections conducted in response to an asbestos D&R notification, see the procedures outlined in applicable Agency guidance, such as *Guidelines* *for Asbestos NESHAP Demolition and Renovation Inspection Procedures* (EPA 340/1-90-007, November 1990).

5.3.4 EPCRA Issues

NOTE! See Appendix D for overview of EPCRA regulations and basic assessment procedures.

General concerns. The basic regulatory requirements for EPCRA are not process-specific but rather apply on a facility-wide basis. Thus the basic requirements of EPCRA are discussed in Appendix D.

For the major air emission points in the chemical recovery area, the key EPCRA issues will be to quantify releases of toxic chemicals to the air, water, or land in the annual Toxic Release Inventory (TRI) report (known as the "Form R" report), and to comply with emergency reporting requirements. The emergency reporting requirements apply under both EPCRA and CERCLA. The releases subject to these emergency reporting requirements are releases that are not federally permitted and that exceed certain reportable quantities. For certain releases that are "continuous" and "stable in quantity and rate," the mill may be able to use special reporting options so that a notice is not required after each such release. See the discussion of continuous releases in Appendix D for further detail on the differences between standard emergency reporting and reporting of continuous releases.

For this process area, the air emissions from the recovery boiler and lime kiln are one potential source of releases that could be subject to EPCRA and CERCLA emergency reporting. These emissions units likely will emit the following air pollutants (and may emit others) that are listed chemicals subject to emergency reporting under CERCLA and/or EPCRA (reportable quantity in lb/24-hour period is also provided):

- Sulfur dioxide (500 lb)
- Nitrogen dioxide (10 lb)
- Hydrogen sulfide (100 lb)
- Methyl mercaptan (100 lb)
- (See other potential chemical releases associated with kraft pulp mill air emission sources listed in Appendix D)

The determination of what constitutes a "federally permitted release" can be complex. However, it is important to note that if the mill as a matter of normal operations emits an applicable pollutant in amounts that exceed the reportable quantity **and** there is no emission limit established for the pollutant, then the emergency reporting provisions likely apply. For instance, a mill should file appropriate emergency reports if no NO_x emission limit applies to the recovery boiler or lime kiln, and the unit normally emits more than 10 pounds of NO_2 in a 24-hour period. In this circumstance, the reduced continuous release reporting options likely are available, as discussed in Appendix D.

Inspection considerations. The EPCRA compliance assessment generally will focus initially on a records review. The inspector should review the following materials:

- *Emergency preparedness information*. These obligations are not process-specific, and thus the basic assessment considerations are covered for all facility operations in Appendix D to this manual.

- *TRI Form R*. Check to ensure that the form is on file, and that the source has adequately considered releases associated with the recovery furnace, smelt dissolving tank and lime kiln. Also, ask to see the estimation technique being used. If the estimation technique involves an assumed reduction efficiency for control methods, make sure that the assumed efficiency is consistent with the overall efficiency that the mill is achieving. The overall assumed efficiency should account for any excess emission releases in a manner consistent with the actual percent of operating time such releases occur. Uncontrolled emission episodes or periods of reduced control efficiency can have a significant impact on the estimate of total releases.

- *Emergency notifications*. Request documentation that the mill has filed all required notices.

If an agency air inspector plans to screen for EPCRA compliance, the inspector should confirm the necessary information with the facility contact during the opening conference or just in advance of the closing conference. For an announced inspection, the inspector should ask the source to have ready EPCRA-related documentation so that the screening check can be performed without interrupting the main focus of the inspection. A screening checklist is included as part of the example assessment form in Appendix E.

In addition to a screening-type records review inspection, an EPCRA inspector may want to conduct further assessments to identify potential compliance concerns with emergency notification requirements. As one technique, the inspector first can check excess emission reports, malfunction reports, and citizen complaints since the previous inspection. The inspector then should cross-check those incidents with notification records identified in EPA's ERNS database, records on file with the state/local emergency coordinator, or records requested from the mill. If this type of investigation identifies episodes of abnormal emissions in which no notification was provided, the inspector should consider a follow-up investigation to determine if reportable quantity thresholds were exceeded.

5.4 Other Miscellaneous Equipment Systems

There are a number of handling, storage and other process equipment systems in the chemical recovery area. These equipment systems generally involve some particulate air emissions as well as the primary wastewater and solid waste discharges associated with the recovery area. This section first provides a brief overview of the various equipment systems involved, and then discusses, respectively, air, water, RCRA and EPCRA/ CERCLA regulatory issues and inspection procedures for these miscellaneous equipment systems.

5.4.1 Emission/Discharge Points

As noted on Figure 5-1 (the equipment system diagram in Section 5.2), there are a number of small equipment systems within the chemical recovery process. The most important of these systems for environmental compliance include:

! *Green liquor preparation.* The green liquor produced in the smelt dissolving tank contains "dregs," or insoluble impurities. These dregs are removed in the green liquor clarifier and then washed in a dregs washer. The wash water is pumped to the mud washer, while the washed dregs are handled as a solid waste. The dregs may be landfilled or included with wastewater sent to the wastewater treatment plant.

! *Slaker/causticizers.* The clarified green liquor is pumped to storage for introduction into the slaker. The green liquor and lime react to form sodium hydroxide and calcium carbonate. Unreacted material ("slaker grit") is removed by a mechanical rake and must be handled as a solid waste. The causticizers are used to carry the reaction to equilibrium; reacted material is pumped to a clarifier to separate the lime mud and the white liquor.

! *Lime mud washers.* Lime mud washers are used to reduce the sodium and sulfide content of the lime mud before its use in the lime kiln. The waste wash water can be used to dissolve smelt in the smelt dissolving tank and/or as a scrubbing medium for air emission scrubbers. The mud washers also have their own air emission controls. As noted above, process upsets resulting in poorly washed mud can have adverse impacts on the lime kiln TRS emissions.

! *Storage and handling equipment*. Raw material storage and handling systems in the chemical recovery process area are another potential source of air emissions. These systems include the silos and conveyance systems for raw lime and the conveyor used to handle hot lime from the lime kiln. Depending on the mill, these systems may be open or enclosed and use different conveyance techniques. The most common control device used for these systems are hooding and venting to a fabric filter.

5.4.2 Applicable Air Regulations and Inspection Techniques

These miscellaneous source are generally not subject to significant regulation, and neither NSPS or NESHAP regulations apply. However, at least one State (VA) does have a specific regulation for slaker particulate matter emissions and most states will have at least generic opacity standards that will apply to these systems. Because these equipment systems are a relatively low priority, a basic screening check is the most likely assessment technique for an agency inspection. Basic process and (less likely) control device parameter data may be available in the lime kiln control room. The following streamlined procedures should be considered:[10]

- *Slaker/Causticizers*. The slaker and causticizers are often ducted together. Air flows from these units generally have low volume and low concentrations. If there are any controls, the controls often will consist of simple equipment such as a spray nozzle. As a screening check, verify that the controls are operating, and then conduct a visual opacity check if warranted.

  Note that the green liquor storage tanks may be subject to volatile organic liquid storage tank requirements under subpart Kb of the NSPS (for new/modified tanks after 7/23/84). As discussed in Section 4.6.1 in the context of turpentine and black liquor storage tanks, the only Subpart Kb requirement that is likely to apply is a requirement to maintain records of the design capacity of the tanks.

- *Mud washers.* The mud washers will have their own controls. These systems are small and vulnerable to upset conditions. General opacity requirements may apply and can be checked. Because the systems are small, monitoring data will be lacking but, if available, an inspector can check hood static pressure data (to make sure the hoods are collecting the emissions) and pressure drop or liquid flow rate for scrubbers. Process data on mud feed rate and sodium content of mud feed to the kiln can also be checked to determine if the washers are operating properly. A sodium content of 0.5 to 1% would be considered typical; a content of 2 to 2.5% generally indicates a potential process problem.

- *Storage and handling equipment.* The storage silos, bucket elevators, and similar equipment at many mills will have small fabric filter controls. The inspector should conduct a brief visual screen for fugitive emissions. If a problem is suspected, a full Method 9 test can be conducted. In addition, the inspector may ask to see any pressure drop or flow data that the source maintains for these control devices. For a source assessment, a useful tool would be to employ a fluorescent dye test as a routine inspection technique. A small quantity of colored dye is injected in the inlet duct of a negative pressure fabric filter, and then the area being tested is taken off-line. A black light can then be used on the clean side of the bags to check for leaks.[3] This test can identify small bag problems and reduce bag failure rates.

5.4.3 Applicable Water Regulations and Inspection Techniques

> **NOTE! The Cluster Rules' CWA BMP requirements for spent black liquor, turpentine and soap are discussed entirely in Section 4.6 even though some handling likely will occur in the Chemical Recovery area as well.**

Air emissions from black liquor processing are controlled by the MACT standards discussed in Section 4, *Pulping Operations*. Initial black liquor processing steps, such as weak black liquor storage and evaporation, may be located in or near the pulping area. Later steps, such as soap skimming and turpentine recovery, may be located in or near the chemical recovery area. Regardless of where these processes are located, leaks, spills, and intentional diversions of black liquor, soap, and turpentine can interfere with the operation of biological wastewater treatment systems. For this reason, the Cluster Rules establish Best Management Practices (BMPs) requirements to limit these leaks, spills, and intentional diversions. See Section 4.6 for a discussion of these requirements.

Other wastewaters associated with the chemical recovery area are generally reused in the chemical recovery process or for air pollution control, and only limited flows are discharged to the wastewater treatment plant. Thus, with the exception of the BMPs, the Clean Water Act compliance assessment concerns related to wastewaters generated in the chemical recovery area will be addressed at the wastewater treatment plant.

Note that discharges (including discharges of materials used in the manufacturing process) are allowed only if specifically described in both the mill's NPDES permit application and the permit itself. The inspector should verify that any mill sewering lime mud slurries during process upsets and lime mud washer maintenance activities is specifically permitted to do so. The sewering of these lime muds during upset or maintenance periods may damage or plug sludge removal devices or mechanical clarifiers. Sewering of lime mud may increase the inorganic load of wastewater treatment sludges to such an extent that incineration is not feasible, and the mill may need to dispose of the sludge on land, rather than recovering the energy value of the sludge organic content through incineration. If, during upset or maintenance periods, the lime mud is directed into surface impoundments or landfills for disposal, the lime mud may present a hazardous wasted concern if it contains free liquids and has a pH 12.5 (which most lime mud does). To avoid increases in lime mud loadings to the treatment plant, a diversion basin that allows subsequent use of the lime mud in the process can be used to avoid lime mud losses.[2]

There may be some elements of the storm water control activities at the mill that are affected by this area, and a storm water evaluation may need to consider how storm water runoff from this area is handled. Outdoor storage and handling areas are a possible source of concern that should be addressed in the management practices adopted by the mill in conjunction with a stormwater permit. See Section 9, Assessment Module for Woodyard, Papermaking and Other Operations, for a more detailed discussion of storm water issues.

5.4.4 Applicable RCRA/EPCRA Regulatory Issues and Inspection Techniques

Certain wastes can constitute hazardous wastes if they exhibit the corrosivity characteristic. To qualify, the waste must contain free liquids (>20 percent by volume) and have a pH 2 or 12.5. Some States may consider corrosive wastes to be hazardous wastes solely on the basis of pH level, and not the presence of free liquids.

In the chemical recovery area, three primary sources of wastes potentially could qualify as corrosive hazardous wastes unless the mill takes appropriate handling steps. Slaker grits and green liquor dregs are two of the three primary solid waste concerns in this area. Generally, lime slaker grits are washed in order to recover cooking and causticizing chemicals. However, at least one plant has noted that this washing process is also important to maintain a pH level <12.5 (i.e., below the pH level that is one element of the RCRA corrosivity characteristic).[5] Note also that, generally, these wastes are dewatered prior to disposal and would be able to pass a paint filter test for free liquids. The third concern is lime mud that may be sent to a surface impoundment or landfill for disposal. Generally, the mud is used in the kiln. However, during process upsets, some mud may be handled for disposal. The lime mud may fail a paint filter test and have a pH 12.5. Thus, disposal in this manner presents a possible noncomplying disposal practice.

These materials generally are landfilled on-site although there is some opportunity for beneficial reuse of the materials as a cement additive.[2] Solid waste landfill permits and requirements are issued by State agencies within the general criteria and guidelines included in 40 CFR Part 257. One concern is potential leachate from on-site solid waste landfills. It should be noted that if the leachate is commingled with other process wastewaters and sent to the wastewater treatment plant, the landfill leachate would constitute "process wastewater" and be part of the wastewaters subject to the NPDES permit for the facility (see 40 CFR 430.01 (m)). The inspector must identify the specific State permit requirements before conducting the inspection. On-site landfill issues are addressed in Section 9, Assessment Module for Woodyard, Papermaking and Other Operations.

For EPCRA, the primary concern will be to ensure that the TRI Form R report addresses all of the releases to the air, water and land from these equipment systems. In addition, because some of these equipment systems do emit methanol and other air pollutants (see Figure 5-2), and generally are not subject to any federal regulation or permit condition limiting those emissions, emergency reporting requirements may also apply. Note that, for EPCRA emergency reporting purposes, all releases that are not federally permitted from all units at the mill would be combined to determine whether the air emission releases exceed an applicable reportable quantity threshold. See further discussion of emergency reporting requirements in Section 5.3.4 and Appendix D.

References:

1. *Proposed Technical Development Document for the Pulp, Paper and Paperboard Category and Effluent Limitations Guidelines, Pretreatment Standards, and New Source Performance Standards.* U.S. Environmental Protection Agency, Washington, D.C., October 1993.

2. *Model Pollution Prevention Plan for the Kraft Segment of the Pulp and Paper Industry*, EPA 910/9-92-030. U.S. Environmental Protection Agency, 1992.

3. *Pollution Prevention Opportunity Assessment and Implementation Plan*, EPA 910/9-92-027. U.S. Environmental Protection Agency, 1992.

4. Buonicore, A.J and Davis, W.T., eds., *Air Pollution Engineering Manual*, Air and Waste Management Association, 1992.

5. *Credible Evidence Rule Revisions: Response to Comments,* U.S. Environmental Protection Agency, February 1997.

6. U.S. Environmental Protection Agency, Applicability Determination Index (ADI): Document Control #9600134.

7. *Kraft Pulp Mill Inspection Guide*. Prepared for U.S. Environmental Protection Agency under Contract No. 68-01-6310, Work Assignment No. 65, Pedco Environmental , Inc., Cincinnati, Ohio, January 1983.

8. *Operation and Maintenance Manual for Electrostatic Precipitators*, EPA/625/1-85/017, U.S. Environmental Protection Agency, 1985.

9. Richards, J., *Baseline Inspection Techniques, Student Manual,* Air Pollution Training Institute Course 445, 2nd Edition, 1996.

10. Telephone Communication, with J. Richards, Air Control Techniques, Inc., September 1997.

11. Richards, J., *Control of Particulate Emissions, Student Manual*, Air Pollution Training Institute Course 413, 2nd Edition, 1995.

12. U.S. Environmental Protection Agency, Applicability Determination Index (ADI): Document Control #s NB01 and NB03 (Subpart D) and NN04, NR117, and NR100 (Subpart Db).

13. U.S. Environmental Protection Agency, *Chemical Pulping Emission Factor Development Document (Revised Draft)*, July 8, 1997.

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