CLUSTER RULE REVIEW

1.0 INTRODUCTION

This text explains the alternatives to meet the Cluster Rule requirements described in the latest version published in the Federal Register on April 15, 1998. The present requirements are those for the kraft pulping process.

The Cluster Rule objective is to lower HAP emissions from the pulp and paper industry. The HAP are 189 contaminants listed in the Clean Air Act. Among these contaminants, fourteen are common to the pulp and paper industry. Those fourteen contaminants include chlorine, chloroform, methanol and methyl ethyl ketone. The standards apply for stationary sources emitting more than ten tons of any individual HAP annually or more than twenty-five tons of total HAP annually. TRS are a group of chemicals consisting mainly of H_2S, methyl mercaptan, dimethyl sulfide and dimethyl disulfide. These compounds are not listed in the HAP list. Therefore, the Cluster Rule requirements do not apply to them. However, the TRS emissions will be reduced indirectly since the TRS are present along with the HAP in the pulping emissions and condensates.

HAP surrogate

For most of the Cluster Rule applications, methanol can be measured as a surrogate for HAP for non-chlorinated compound emissions from the pulping process, and chlorine can be measured as a surrogate for chlorinated compound emissions from the bleaching process.

Definition of source

An affected source is defined as being the whole of the emission points in the pulping and bleaching systems.

A new source is either:

1) an affected source which commenced construction or reconstruction after initial proposal (December 17, 1993)
2) pulping or bleaching systems that are reconstructed after initial proposal
3) new pulping systems, pulping lines, bleaching systems, and bleaching lines that are added to existing sources after initial proposal.

The production areas, which are subject to the Cluster Rule, are listed in the following table.

Item	Production area	HVLC	LVHC	Condensates
1	Chip silos (see note 1)	X		
2	Continuous digester wash and screen	X		X
3	Blow heat accumulator		X	
4	Batch digester #8 to 12		X	
5	Turpentine recovery		X	X
6	Batch digester #1 to 7 and 13		X	
7	Pulp washing	X		X
8	Pulp screening	X		X
9	Evap. - stripper		X	X
10	Evaporators		X	X
11	Bleaching			

NOTE 1: It is more appropriate to collect the chip bin gases in the HVLC system, even if they are included in the digester system which is to be collected in the LVHC system. See section 2.0 A) 1)

2.0 THE COLLECTION AND TREATMENT OF LVHC GASES

The mills have three (3) years to comply with the following requirements. The compliance date is, April 16, 2001.

The equipment from which LVHC (Low Volume High Concentration) are to be collected are the following:

A) Sources

1) Digester systems

Digester systems include the following equipment:

- Flash tanks
- Blow tanks
- Chip steamer not using fresh steam
- Blow heat recovery accumulator
- Relief gas condensers
- Prehydrolisis units

2) Evaporator systems

Evaporator systems include the following equipment:

- Pre-evaporators
- Multi-effect evaporators
- Concentrators
- Vacuum systems
- Condensers
- Hotwells
- Condensate streams (contaminated condensate tanks)

3) Turpentine recovery systems

A turpentine system includes the following equipment:

- Condensers
- Decanters
- Storage tanks

4) Steam stripper systems

A steam stripper system comprises:

- The column (including associated stripper feed tanks, condensers, heat exchangers, reboilers)
- The methanol rectification process (including rectifiers, condensers, decanters, storage tanks, etc...)

B) Collection

The LVHC are to be collected in a closed-vent system and routed to a thermal oxidation device for destruction. The requirements for closed-vent system to be met are the following:

1) maintaining a negative pressure at each opening
2) ensuring enclosure openings that were closed during the performance test be closed during normal operation
3) designing and operating closed vent systems in such way that there is no detectable leak
4) installing flow indicators for bypass lines
5) securing bypass line valves

C) Thermal Oxidation Device Requirements

The LVHC must be sent to a thermal oxidation device to ensure the HAP destruction. Here are the three options that meet the control device requirements:

1) Reducing the HAP content by 98% by weight or, for thermal oxidizers, reducing the outlet concentration to 20 ppmv of total HAP, corrected to 10% oxygen on a dry basis
2) Reducing HAPs by using a properly operated design thermal oxidizer operated at a minimum temperature of 1600 °F and a minimum residence time of 0.75 second
3) Reducing HAPs by using a boiler, lime kiln or recovery furnace that introduces all emission streams to be controlled with the primary fuel or into the flame zone

3.0 THE COLLECTION AND TREATMENT OF HVLC GASES

The mills have eight (8) years to comply with the following requirements. The compliance date is, April 17, 2006.

The equipment from which HVLC (High Volume Low Concentration) are to be collected are the following:

A) Sources

1) Knotter systems

Knotter systems have to be treated if emissions are >0.1 lb/BDT (0.05 kg/Mg ODP). They include the following equipment:

- Knotters, drainers
- Knot drainer tanks
- Auxiliary tanks

2) Oxygen delignification systems

Oxygen delignification systems include the following equipment:

- Blow tanks
- Washers
- Filtrate tanks
- Interstage pulp storage tanks

3) Pulp washing systems

Pulp washing systems include the following equipment:

- Washers (Vacuum, diffusion, pressure, horizontal, etc...)
- Intermediate stock chests (not the pulp storage following the last stage of washing)
- Vacuum pumps
- Filtrate tanks
- Foam breakers or tanks

4) Decker systems

Decker systems have to be treated if water used has more than 400 ppmv of HAP ; If fresh or machine white water is used, it does not have to be treated. Systems include the following equipment:

- Decker vents
- Filtrate vents
- Vacuum pumps

5) Screen systems

Screen systems have to be treated if HAP emissions are greater than 0.2 lb/ODTP (0.1 kg/Mg ODP) or if the combined knotter and screen systems emissions are greater than 0.3 lb / ODTP (0.15 kg/Mg ODP). They include tanks and chests vented to atmosphere.

6) Weak liquor storage tanks

There is no treatment applicable for existing sources. The new sources requirements are the same as for the above mentioned equipment.

B) Collection

The LVHC must be collected in a closed-vent system and routed to a thermal oxidation device for destruction. The requirement for closed-vent system to be met are the following:

1) maintaining a negative pressure at each opening
2) ensuring enclosure openings that were closed during the performance test be closed during normal operation
3) designing and operating closed vent systems in such a way that there is no detectable leak
4) installing flow indicators for bypass lines
5) securing bypass line valves

C) Thermal Oxidation Device Requirements

The thermal oxidation device requirements for the HVLC are similar to those for the LVHC. One of the following requirements has to be met.

1) Reducing the HAP content by 98% by weight or, for thermal oxidizers, reduce the outlet concentration to 20 ppmv of total HAP, corrected to 10% oxygen on a dry basis
2) Reducing HAPs by using a properly operated design thermal oxidizer operated at a minimum temperature of 1600 °F and a minimum residence time of 0.75 second
3) Reducing HAPs by using a boiler, lime kiln or recovery furnace that introduces all emission streams to be controlled with the primary fuel or into the flame zone

D) Clean Condensate Alternative

There is an additional alternative for the kraft mill equipment subject to the HVLC requirements. The option is called the "Clean Condensate Alternative" or CCA. This alternative consists of using clean condensate or fresh water instead of contaminated condensate throughout the mill. By reducing the HAP content in the process water,

reduction in HAP emissions will also be achieved since less HAP will be available to volatilize from the process equipment.

To demonstrate compliance, the mass emission reduction of HAPs achieved by the clean condensate alternative must equal or exceed that which would have been achieved by implementing the kraft pulping vent controls. Eligibility for this compliance is done on a case-by-case basis during the permitting process. For the purpose of developing a compliance strategy, sources may use either emission test data or engineering assessments to determine the baseline HAP emission reductions that would be achieved by complying with the kraft pulping vent standard. To demonstrate that the alternative technology complies with the emission reduction requirements of the standards, emission test data must be used. Two conditions must be met for a CCA compliance demonstration:

1) owners and operators that choose this alternative must first comply with pulping process condensate standards before implementing the alternative technology
2) the HAP emission reductions can not include any reductions associated with any control equipment required by local, state, or Federal agencies' regulations or statutes or with emission reductions attributed to equipment installed before to December 17, 1993 which is the date of publication of the proposed rule.

For the purposes of the CCA, the rule provides an alternative definition of the affected sources which includes the causticizing system and the papermaking systems. The mill must specify the process equipment within the expanded sources with which to generate the required HAP emission reductions using the CCA.

The mass emission reduction of HAP must equal or exceed the reduction that would have been achieved through the application of the kraft pulping vent standards. The operating conditions determined during the initial performance test which allow to meet the requirements must be maintained and parameter values monitored to show compliance. For the clean condensate alternative, the total amount of HAP, not only methanol, must be measured to demonstrate compliance.

4.0 THE COLLECTION AND TREATMENT OF FOUL CONDENSATE

The mills have three (3) years to comply with the following requirements. The compliance date is, April 16, 2001.

A) Sources

The equipment from which the condensate have to be treated are the following:

- Digester system
- Evaporator system
- Turpentine recovery system
- LVHC collection system
- HVLC collection system

B) Collection of Condensates

The pulping process condensates have to be conveyed to the treatment system in a closed collection system meeting the requirements for individual drain systems as specified in Subpart RR (40 CFR 63.446(d)). These requirements are basically that the conveyance system be leak-free.

C) Control of Condensates

The HAP have to be treated in such a way that one of the following alternative is met:

1) removing 92%, on a weight basis, of the HAP present in the condensates
2) recycling the applicable condensates streams to process equipment that is controlled in accordance with the kraft pulping standards (see section I) or II).
3) reducing the concentration of HAP in the condensate to 330 ppmw for kraft mills with bleaching systems, 210 ppmw for kraft mills without bleaching systems
4) removing at least 10.2 lb of HAP per ODTP (5.1 kg/Mg of ODP) produced for kraft mills with bleaching systems or removing at least 6.6 lb of HAP per ODTP (3.3 kg/Mg of ODP) produced for kraft mills without bleaching systems
5) discharging pulping process condensates to a biological treatment system achieving at least 92% destruction of total HAP

NOTE: a) The methanol can be used as a surrogate for HAP for all these alternatives except 5), biological treatment, for which the total HAP have to be measured to demonstrate compliance.
b) The air emission from the condensate treatment systems, with the exception of biological treatment system, have to be routed to a control device meeting the kraft pulping standards.

All the condensate flow from the equipment or process listed in sub-section A) are to be treated. However, it is possible to lower the condensate flow sent to treatment through condensate segregation. The segregation is the separation in high HAP concentrated condensates and in low HAP concentrated condensates. The condensates from the digester system, the turpentine recovery system and the weak liquor feed stages in the evaporator system are subject to segregation. However, the total flow of condensates from the LVHC

collection systems and the HVLC collection systems have to be treated.

Two options are provided for determining if sufficient segregation has been achieved.

1) isolate at least 65% of the total HAP mass in the total of all applicable condensates
2) a minimum total HAP mass from the high HAP concentrated condensates be sent to treatment. This minimum mass is 7.2 lb/ODTP for unbleached mills and 11.1 lb/ODTP for bleached mills. These mass correspond to the minimum mass removal from the condensates mentioned in section C) 4).

Remaining condensates:

For the remaining condensates, those that were left aside during the segregation process, there are no further MACT requirements and they can be returned to the mill or sewer.