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## **A Comparison of Estimated Post-Rule Capital Expenditures to Pre-Rule Estimates for the NESHAP Portion of EPA's Cluster Rule**

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The NESHAP portion of the Cluster Rule was promulgated in two different rules. The 1998 rule contained requirements for pulping, bleaching, papermaking, and wastewater treatment. Some of the requirements had to be met by April 16, 2001, and the remainder had to be met by April 18, 2006. A separate rule finalized in 2001 covered the chemical recovery sources located at kraft, sulfite, soda, and semi-chemical pulp mills, and had a compliance date of March 14, 2004.

With respect to capital expenditures related to compliance with these requirements, it is reasonable to assume expenditures were made in 1999, 2000, and 2001 (since some companies received a one year extension) for the first phase of the 1998 rule and in 2003, 2004, 2005 and 2006 (again, some companies were granted a one year extension) for the second phase of the 1998 rule. For the 2001 rule, most costs would have been incurred in 2002 and 2003.

The final year covered by NCASI's annual environmental expenditures survey was 2002, although estimates of projected expenditures for 2003 were obtained. Thus the majority of capital costs for meeting the second phase requirements of the 1998 rule could not be estimated from this survey. The second phase required kraft mills to collect and incinerate off-gases from brown stock washing and oxygen delignification systems, which would have required major equipment expenditures at a significant number of mills. However, mills had the option to obtain equivalent reductions in hazardous air pollutant emissions from other areas in the mill (referred to as the Clean Condensate Alternative), which would have generally been less costly.

The annual air quality-related capital expenditures from the NCASI surveys are shown below for 1994 to 2002, with the 2003 estimate as well.

Year	Million \$ (adjusted to 2002)
1994	268
1995	227
1996	260
1997	155
1998	131
1999	330
2000	723
2001	334
2002	203
2003 (est.)	280

EPA proposed the 1998 rule in December 1993, but made some very significant changes to the proposal over the next four years before the final rule was signed in December 1997. Given all the uncertainty during this period over what the final rule would require, it seems reasonable to conclude companies did not spend any significant capital during the 1994 through 1998 period on Cluster Rule compliance projects and thus baseline spending on other air-related capital projects would be represented by the five year average annual expenditures - \$208 million. If it is assumed that this baseline spending rate continued for the next five year period when Cluster Rule projects were undertaken, then the estimated incremental spending for the Cluster Rule totaled \$830 million. As mentioned earlier, the costs for additional projects undertaken after 2003 to meet the requirements for phase two of the 1998 rule are not included in this total.

In the preamble to final 1998 rule (April 15, 1998 *Federal Register*, page 18582), EPA estimated capital costs of \$496 million for complying with the 1998 rule and \$259 million for the 2001 rule (which was only proposed at that time). These costs were given in 1995 dollars. In 2002 dollars the total would be \$784 million. An industry pre-rule estimate could be obtained by subtracting the effluent guideline capital cost estimates from the total Cluster Rule compliance cost estimates, giving a result of \$0.8 billion (\$2.7-\$1.9 billion). Both of these estimates are lower than the partial amount estimated from the NCASI survey information (\$830 million).

#### **Capital Expenditure Estimates for the Air Portion of the Cluster Rule**

	Billion \$ (2002\$)
EPA Estimate (1997)	0.8
AF&PA Estimate (1997)	0.8
Estimated Actual	>0.8*

\*Does not include expenditures made after 2003

The partial estimates of actual costs for NESHAP compliance suggest both the EPA and industry pre-rule estimates were too low by an unknown, and perhaps very significant, amount. To get an idea of this amount, a different approach was taken to develop a post-rule compliance cost estimate.

This approach relied on MACT I/III actual capital expenditures provided to NCASI by four companies for their kraft pulp mills. It is believed the compliance costs for kraft pulp mills constituted the majority of capital spent by the industry for NESHAP compliance. The amounts spent by other types of chemical pulp mills (sulfite, soda, semi-chemical) for MACT I/III and MACT II would be small in comparison since there are far fewer mills, and the average mill size is considerably smaller than it is for kraft mills. Further, average MACT II expenditures for kraft mills would be much less than for MACT I/III considering the availability of the bubble and the high level of particulate control already in place.

The four companies reported total spending of \$649 million (actual dollars, not adjusted to a common year) for projects related to MACT I/III compliance at 40 kraft mills. In 2000, these 40 mills had about 40% of the kraft pulp capacity. This percentage was based on kraft black liquor burning capacity, since liquor burning capacity is usually the limiting factor for pulp production. Extrapolating to the remainder of the kraft mills, the total would be \$1.61 billion, which implies an average per-mill cost of \$13.6 million since there were 118 operating kraft mills in 2000.

A very rough estimate of the capital expenditures for MACT II compliance for kraft mills is \$110 million (actual dollars, not adjusted to a common year). This is based on an extrapolation of company-reported information for 24 kraft mills representing about 25% of the black liquor burning capacity.

There was insufficient information to make a post-rule estimate of costs for MACT I/III and MACT II compliance incurred by sulfite, soda, and semi-chemical mills. Anecdotal evidence suggests the total would be in the range of \$25 to \$75 million.

The key conclusions from this comparison are:

1. Both the industry and EPA pre-rule estimates were over a factor of 2 lower than the post-rule estimate based on company-reported costs.
2. Both industry and EPA significantly underestimated the MACT I/III compliance costs.
3. EPA's pre-rule costs for MACT II compliance was at least a factor of 2 higher than the post-rule estimate based on company-reported costs, although EPA's estimate did not account for the bubble provisions contained in the final 2001 rule.