

**Final Report  
of the  
Small Business Advocacy Review Panel  
on EPA's Planned Proposed Rule  
Risk and Technology Review (RTR) Amendments  
to the National Emission Standard for Hazardous Air Pollutants (NESHAP)  
for Mineral Wool Production (Mineral Wool RTR)**

**October 2011**

## **Table of Contents**

1. Introduction
2. Background
  - 2.1 Regulatory History
  - 2.2 Description and Scope of Existing Rule
  - 2.3 Related Federal Rules
3. Overview of Revisions under Consideration
4. Applicable Small Entity Definitions
5. Small Entities That May Be Subject to the Proposed Regulation
6. Summary of Small Entity Outreach
7. List of Small Entity Representatives
8. Summary of SER Comments and EPA Responses to SER Comments
  - 8.1 Number and Types of Entities Affected
  - 8.2 Potential Reporting, Recordkeeping, and Compliance
  - 8.3 Related Federal Rules
  - 8.4 Regulatory Flexibility Alternatives
    - 8.4.1 Curing Ovens
    - 8.4.2 Collection
    - 8.4.3 Carbonyl Sulfide (COS) Emissions from Cupolas
    - 8.4.4. Hydrogen Fluoride and Hydrochloric Acid Emissions from Cupolas
    - 8.4.5 Start-up, Shutdown, Malfunction
  - 8.5 EPA Responses to SER Comments
    - 8.5.1 Curing Ovens

8.5.2 Collection

8.5.3 Carbonyl Sulfide (COS) Emissions from Cupolas

8.5.4 Hydrogen Fluoride and Hydrochloric Acid Emissions from Cupolas

8.5.5 Start-up, Shutdown, Malfunction

9. Panel Findings and Discussions

9.1 Number and Types of Entities Affected

9.2 Potential Reporting, Recordkeeping, and Compliance

9.3 Related Federal Rules

9.4 Regulatory Flexibility Alternatives

Appendix A: Materials Shared with Small Entity Representatives

Appendix B: Written Comments Submitted by Small Entity Representatives

## 1. INTRODUCTION

This report is presented by the Small Business Advocacy Review Panel (SBAR Panel or Panel) convened for the proposed rulemaking on the Risk and Technology Review (RTR) Amendments to the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Mineral Wool Production (Mineral Wool RTR) that is currently being developed by the U.S. Environmental Protection Agency (EPA or Agency). Under section 609(b) of the Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), a Panel is required to be convened prior to publication of the initial regulatory flexibility analysis (IRFA) that an agency may be required to prepare under the RFA. In addition to EPA's Small Business Advocacy (SBA) Chairperson, the Panel consists of the Director of the project lead at the Sector Strategies and Programs Division of the EPA Office of Air Quality Planning and Standards, the Administrator of the Office of Information and Regulatory Affairs within the Office of Management and Budget, and the Chief Counsel for Advocacy of the Small Business Administration.

This report includes the following:

- Background information on the proposed rule being developed;
- Information on the types of small entities that would be subject to the proposed rule;
- A description of efforts made to obtain the advice and recommendations of representatives of those small entities; and
- A summary of the comments that have been received to date from those representatives.

Section 609(b) of the RFA directs the Panel to report on the comments of small entity representatives and make findings on issues related to certain elements of an IRFA under section 603 of the RFA. Those elements of an IRFA are:

- A description of, and where feasible, an estimate of the number of small entities to which the proposed rule will apply;
- A description of projected reporting, record keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;
- An identification, to the extent practicable, of all relevant Federal rules which may duplicate, overlap, or conflict with the proposed rule;
- A description of any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities. This analysis shall discuss any significant alternatives such as:

- the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
- the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;
- the use of performance rather than design standards; and
- an exemption from coverage of the rule, or any part thereof, for such small entities.

Once completed, the Panel Report is provided to the agency issuing the proposed rule and is included in the rulemaking record. The agency is to consider the Panel's findings when completing the draft of the proposed rule. In light of the Panel Report, and where appropriate, the agency is also to consider whether changes are needed to the IRFA for the proposed rule or the decision on whether an IRFA is required.

The Panel's findings and discussion will be based on the information available at the time the final Panel Report is drafted. EPA will continue to conduct analyses relevant to the proposed rule, and additional information may be developed or obtained during the remainder of the rule development process.

Any options identified by the Panel for reducing the rule's regulatory impact on small entities may require further analysis and/or data collection to ensure that the options are practicable, enforceable, environmentally sound, and consistent with the Clean Air Act and its amendments.

## **2. BACKGROUND**

### **2.1 Regulatory History of the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Mineral Wool Production**

Section 112 requires EPA to set maximum achievable control technology (MACT) standards for source categories listed for regulation of hazardous air pollutants (HAP). The Risk and Technology Review (RTR) is a combined effort to evaluate both risk and technology as required by the Clean Air Act (CAA) after the application of the MACT standards. [Section 112\(f\)](#) of the CAA requires EPA to complete a Report to Congress that includes a discussion of methods the EPA would use to evaluate the risks remaining ('residual' risk) after the application of MACT standards. EPA published the [Residual Risk Report to Congress](#) in March 1999 (EPA-453/R-99-001). Section 112(f)(2) directs EPA to conduct risk assessments on each source category subject to MACT standards, and to determine if additional standards are needed to reduce residual risks. Section 112(d)(6) of the CAA requires EPA to review and revise the MACT standards, as necessary, taking into account developments in practices, processes and control technologies. The methodology for conducting these reviews is described in: [Risk and Technology Review \(RTR\) Risk Assessment Methodologies: For Review by the EPA's Science Advisory Board with Case Studies – MACT I Petroleum Refining Sources and Portland Cement Manufacturing \(EPA-](#)

[452/R-09-006](#)). The Science Advisory Board (SAB) RTR Methods Review Panel held a meeting on July 28-29, 2009 to review this document, and a [final report of their review](#) is available at the SAB website.

**Background on Regulated Community:**

The Mineral Wool production source category includes those facilities that manufacture rock and slag wool (mineral wool). Mineral wool is a fibrous, glassy substance made from natural rock, blast furnace slag, or other similar materials and consists of silicate fibers typically 4 to 7 micrometers in diameter. Products made from mineral wool are used for thermal or acoustical insulation, sound control and absorbency, and fire protection.

The Mineral Wool MACT applies to owners or operators of any existing, new, or reconstructed mineral wool production facility that is located at a plant site that is a major source of HAP emissions (emit or have the potential to emit at least 10 tons per year of any one HAP, or 25 tons per year of any combination of HAP). Subpart DDD established the following emission limits from mineral wool sources:

Table 1. Mineral Wool Production Processes and Emission Limits.

<b>Cupola</b>	<b>Existing Sources</b>	0.10 lb PM per ton of melt
	<b>New Sources</b>	0.10 lb PM per ton of melt 0.10 lb CO per ton of melt, or Reduce uncontrolled CO emissions $\geq$ 99%
<b>Curing Oven</b>	<b>Existing and New Sources</b>	0.06 lb formaldehyde per ton of melt, or Reduce uncontrolled formaldehyde emissions $\geq$ 80%

Six companies produce mineral wool; five of these are small businesses. All the known mineral wool production plants are major sources of HAP. Thus, they are all subject to the Mineral Wool MACT.

The MACT rule for this source category was promulgated on June 1, 1999. Therefore, the statutory deadlines for promulgating both the residual risk rule and the technology review for the mineral wool source category was June 1, 2007. These deadlines run concurrently for each MACT standard, and EPA is conducting the risk and technology reviews (RTR) together in one rulemaking.

As indicated in Table 1, only particulate matter (PM), as a surrogate for HAP metals at existing and new cupolas; carbon monoxide (CO), as a surrogate for carbonyl sulfide (COS) at new cupolas; and formaldehyde, as a surrogate for phenol and methanol from curing ovens are regulated under the MACT standard. Other pollutants of interest for the mineral wool industry (and which are not currently regulated) include PM<sub>2.5</sub>, hydrogen fluoride (HF), hydrogen chloride (HCl), COS, phenol and methanol.<sup>1</sup> The MACT standard does not have emission limits for COS, HCl, or HF from existing cupolas; limits for phenol or methanol from curing; or emission limits for any pollutants from collection, a process unregulated under the MACT standard.

### **Court-Ordered Deadline and Litigation Background:**

In 2007, the D.C. Circuit (court) found that EPA erred in determining the floors for processes in the Brick MACT standard, and consequently vacated the rule.<sup>2</sup> In response to this vacature, the Sierra Club filed a rulemaking petition to compel EPA to take action to address alleged similar deficiencies in 26 separate MACT standards (referred to as 'Brick MACT' issues). As a result, EPA is reviewing the Mineral Wool MACT to address the following Brick MACT issues:

- Improper methodology used to calculate the MACT floor for formaldehyde from curing ovens;
- Use of unproven surrogates (CO for COS and formaldehyde for phenol and methanol);
- Processes that are unregulated and yet emit HAP; and
- Unregulated pollutants from MACT-regulated processes.

In separate litigation, the court vacated portions of two provisions in EPA's CAA section 112 regulations that govern emissions of HAPs during periods of startup, shutdown and malfunction (SSM).<sup>3</sup> Specifically, the Court vacated the SSM exemption contained in 40 CFR §§ 63.6(f)(1) and 63.6(h)(1) that are part of regulations commonly referred to as the General Provisions (GP) rule. When incorporated into section 112(d) regulations for specific source categories, these two provisions exempt sources from the requirement to comply with otherwise applicable MACT standards during periods of SSM. Because the Mineral Wool MACT relied on the GP for startup and shutdown provisions (40 CFR 63.§ 1194), EPA plans to also review, and revise as necessary, the SSM provisions for the Mineral Wool source category in the proposed rule. Finally, on January 14, 2009, Sierra Club filed an action to compel EPA to perform its obligations under sections 112(d)(6) and (f)(2) for 28 source categories, which includes the Mineral Wool source category.<sup>4</sup> EPA negotiated a consent decree and, as a result, is under a court-ordered deadline to propose rulemaking for the Mineral Wool source category by October 31, 2011.

---

<sup>1</sup> The HAP metals emitted from mineral wool cupolas include antimony, arsenic, beryllium, cadmium, chromium, cobalt, mercury, manganese, nickel, lead, and selenium.

<sup>2</sup> *Sierra Club v. EPA*, 479 F. 3d 875 (D.C. Cir. March 13, 2007)

<sup>3</sup> *Sierra Club v. EPA*, 551 F. 3d 1019 (D.C. Cir. 2008), *cert. denied*, 130 S. Ct 1735 (2010)

<sup>4</sup> *Sierra Club v. Jackson* (N.D. Cal. January 14, 2009), No. 09-152

The upcoming proposed rule is a reproposal of the Mineral Wool RTR, which EPA proposed in 2008.<sup>5</sup> However, that proposal was based upon one source test data point from the National Emissions Inventory (NEI). EPA learned after proposal that the one plant for which EPA had test data closed down during the development of the proposed rule, and EPA did not receive additional data during the comment period on which to support a no-risk conclusion. Moreover, the Brick MACT issues, the petition, and the General Provisions vacature were not addressed by the 2008 proposal. Therefore, EPA decided to collect new data from operating facilities on which to assess risk, and repropose the Mineral Wool RTR along with the other MACT amendments identified by recent litigation.

EPA is making all these revisions (i.e., risk and technology review, Brick MACT issues, and startup / shutdown provisions) at one time to both conserve resources and to avoid making one change to the MACT followed closely by a second change that would likely impose additional controls. Such an approach would be costlier to both industry and taxpayers than if all amendments are done together in one rulemaking.

## **2.2 Description and Scope of Existing Rule**

To conduct the RTR for Mineral Wool Production, EPA will review the test data submitted by the mineral wool companies and evaluate the risk that remains ('residual risk') to determine whether the existing MACT standard is sufficiently protective of human health and the environment. EPA will also conduct a technology review that will be based on new or developing control technologies, work practices, or pollution prevention alternatives (including formulation changes) that result in lower HAP emissions from regulated processes. The risk review may not consider cost impacts. For uncontrolled pollutants and sources, MACT floors must be established independent of cost, but the technology review under an existing MACT standard can take costs and other impacts into consideration.

In lieu of establishing MACT floors for uncontrolled pollutants and sources, EPA has limited discretion under section 112(d)(4) (Health-Based Emission Limits) and section 112(h). However, EPA cannot use 112(d)(4) for those HAP for which the risk data are inadequate to establish a scientifically defensible chronic health threshold, and there is inadequate health data to establish a chronic health threshold for COS. Further, the development of health-based emission limits which provide public health protection with an ample margin of safety requires accurate and comprehensive emissions data for the sources being regulated as well as appropriate consideration of potential simultaneous exposures from other nearby sources of the same HAPs or HAPs with similar health effects, neither of which typically have robust data available.

In addition, EPA cannot use 112(d)(4) for carcinogens like formaldehyde. In order for EPA to exercise its discretion to establish a health-based emission standard for a particular HAP using CAA section 112(d)(4) authority, EPA must first establish that a scientifically-accepted health threshold has been established for that HAP. The characterization of this health threshold is

---

<sup>5</sup> [73 FR 60432](#) (October 10, 2008)



that exposures at or below this threshold (which is a concentration of the HAP in air) are considered to be without appreciable risk of causing adverse health effects. As a general matter, for those HAPs which are considered to be known, probable, or possible carcinogens, there is no scientifically-accepted threshold below which exposures are considered to carry no appreciable risk. As a result, carcinogenic HAPs are generally not considered to be eligible for use with the section 112(d)(4) provision. The exception to this would be carcinogenic HAPs that are known to act carcinogenic only above a specific exposure concentration threshold -- there are very few of these, and EPA does not currently consider formaldehyde to be one.

### **2.3 Related Federal Rules**

The primary federal rule that is related to the proposed RTR rule under consideration is the NESHAP for Mineral Wool Production, also known as the Mineral Wool MACT. Some facilities may currently be subject to SO<sub>2</sub> reductions under the revised SO<sub>2</sub> National Ambient Air Quality Standards (NAAQS). The NAAQS standards are Federal rules that are implemented by States in the State Implementation Plans (SIPs). Some emission limits under consideration in the Mineral Wool RTR have implications for SO<sub>2</sub> impacts which could be then subject to the SIP plans for SO<sub>2</sub> NAAQS implementation.

## **3. OVERVIEW OF REVISIONS UNDER CONSIDERATION**

At the Panel outreach meeting on June 16, 2011, the SERs were presented with information regarding the panel process and potential emission limits based on emissions test data and information available to EPA at the time of that meeting (see Appendix A).

Prior to the outreach meeting, EPA provided to the Panel and SERs draft and predecisional emission limits for various pollutants from mineral wool production processes, and EPA did not at that time have information available on some potential regulatory flexibility alternatives, such as subcategorization of collection processes. Since then, development of the standard has moved forward, and EPA is considering a broader range of possible revisions to the MACT.

As discussed previously, EPA is reviewing the Mineral Wool NESHAP for risk remaining (residual risk) after compliance with the standard in 2002; technology developments since promulgation of the rule in 1999; and requirements of the rule, including those that may be incomplete or deficient as to HAPs such as regulated processes, inappropriate surrogacy relationships, and startup and shutdown requirements. The following sections present an overview of revisions under consideration in the Mineral Wool Production RTR.

### **3.1 Risk Assessment Results**

Table 2 summarizes the emissions for the Mineral Wool Production source category. Based on these data, the HAP emitted in largest quantities in total from these facilities are carbonyl sulfide, formaldehyde, phenol, hydrochloric acid, and hydrogen fluoride; emissions of these 5

pollutants account for 99.8 percent of the total HAP emissions by mass from the data set. Carbonyl sulfide, hydrochloric acid, and hydrogen fluoride were reported as an emission for all of the facilities. Formaldehyde and phenol are also emitted in large quantities, but from fewer facilities; no more than three facilities report emissions of any one of these HAP. Formaldehyde and phenol are emitted only from bonded mineral wool fiber manufacturing, which includes emissions from the application of the binder, curing, and cooling. Raw material feed rates in mineral wool processes are essentially constant with minimal fluctuation (approximately  $\pm 10$  percent). Consequently, emissions also have minimal fluctuation<sup>6</sup>. In refining the acute risk assessment, a short-term emissions multiplier of 3 was used to estimate the maximum hazard from acute exposures. Emissions of persistent bioaccumulative (PB ) HAP reported in the data set for the mineral wool manufacturing source category include lead, cadmium, and mercury compounds.

Table 2. Summary of Emissions from the Mineral Wool Production Category and Availability of Dose-Response Values

HAP	Emissions (tpy)	Number of Facilities Reporting HAP (7 facilities in data set)	Prioritized Inhalation Dose-Response Value Identified by OAQPS <sup>a</sup>			PB-HAP?
			Unit Risk Estimate for Cancer?	Reference Concentration for Noncancer?	Health Benchmark Values for Acute Noncancer?	
Carbonyl Sulfide	224	7			Y	
Phenol	177	3		Y	Y	
Hydrochloric acid	23	7		Y	Y	
Formaldehyde	20	3	Y	Y	Y	
Hydrogen Fluoride	17	7				
Selenium	0.28	7		Y		
Methanol	0.16	3		Y	Y	
Manganese	0.14	7		Y		
Chromium III	0.04	7				
Lead	0.03	7		Y		Y
Arsenic	0.03	7	Y	Y	Y	
Nickel	0.024	7		Y	Y	
Antimony	0.002	7				
Cadmium	0.002	7	Y	Y		Y
Cobalt	0.0013	7		Y		
Elemental Gaseous Mercury	0.0005	6		Y	Y	Y

<sup>6</sup> Angus E. Crane, Vice President and General Counsel, North American Insulation Manufacturers Association, to United States Environmental Protection Agency, Air and Radiation Docket. Comments on the Risk and Technology Review, Phase II, Group 2; Advanced Notice of Proposed Rulemaking. June 29, 2007.

HAP	Emissions (tpy)	Number of Facilities Reporting HAP (7 facilities in data set)	Prioritized Inhalation Dose-Response Value Identified by OAQPS <sup>a</sup>			PB-HAP?
			Unit Risk Estimate for Cancer?	Reference Concentration for Noncancer?	Health Benchmark Values for Acute Noncancer?	
Chromium (VI)	0.0003	7	Y	Y		
Beryllium	0.0002	7	Y	Y	Y	
Gaseous Divalent Mercury	0.0001	6				Y
Particulate Divalent Mercury	0.0001	6				Y

<sup>a</sup> Specific dose-response values for each chemical are identified on EPA’s Technology Transfer Network website for air toxics at <http://www.epa.gov/ttn/atw/toxsource/summary.html>.

### 3.2 Risk Characterization

This section presents the results of the risk assessment for the Mineral Wool Production source category. The basic chronic inhalation risk estimates presented here are the maximum individual lifetime cancer risk, the maximum chronic hazard index, and the cancer incidence. This section also presents results from EPA’s acute inhalation impact screening in the form of maximum hazard quotients, as well as the results of EPA’s preliminary screen for potential non-inhalation risks from PB HAP. Also presented are the HAP “drivers,” which are the HAPs that collectively contribute 90 percent of the maximum cancer risk or maximum hazard index at the highest exposure location.

Tables 3 and 4 summarize the chronic and acute inhalation risk results for this source category. The results for the Mineral Wool Production source category indicate that maximum lifetime individual cancer risks could be as high as 4 in a million. The major contributor to this risk is formaldehyde. Approximately 1,650 people were estimated to have cancer risks above 1 in a million as a result of the emissions from 1 facility. The maximum chronic non-cancer Target-organ-specific hazard index (TOSHI) value for the source category could be up to 0.04 with emissions of formaldehyde dominating those impacts, indicating no significant potential for chronic noncancer impacts.

Worst-case screening acute hazard quotients (HQs) were calculated for every HAP shown in Table 2 that has an acute benchmark, and the highest acute HQ (REL of 8 for formaldehyde) is shown in Table 3. A refined emissions multiplier of 3 was used to estimate the peak hourly emission rates from the average rates. Table 4 provides more information on the acute risk estimates for formaldehyde, the only HAP that had a worst-case screening acute HQ greater than 1 for any benchmark.

Chronic noncancer target organ specific hazard indices (HIs) were calculated for every HAP shown in Table 2 that has a chronic benchmark, and the highest target organ specific HI (0.04

for formaldehyde) is shown in Table 3. There were no HIs greater than 1 for this source category.

EPA conducted a screening-level evaluation of the potential human health risks associated with emissions of PB HAP. Reported emissions of PB HAP were compared to *de minimis* emission thresholds established by EPA for the purposes of the RTR risk assessments.<sup>7</sup> The PB HAPs emitted by facilities in this category are lead, cadmium, and mercury. All lead, cadmium, and mercury emissions were below the *de minimis* threshold levels, indicating no potential for significant multi-pathway risks from these facilities.

Table 3. Summary of Source Category Level Inhalation Risks for Mineral Wool Production

Result		HAP "Drivers"
<b>Facilities in Source Category</b>		
Number of Facilities Estimated to be in Source Category	7	n/a
Number of Facilities Identified in the NEI and Modeled in Preliminary Risk Assessment	7	n/a
<b>Cancer Risks</b>		
Maximum Individual Lifetime Cancer Risk (in 1 million)	4	formaldehyde
<i>Number of Facilities with Maximum Individual Lifetime Cancer Risk:</i>		
Greater than or equal to 100 in 1 million	0	n/a
Greater than or equal to 10 in 1 million	0	n/a
Greater than or equal to 1 in 1 million	1	formaldehyde
<b>Chronic Noncancer Risks</b>		
Maximum Hazard Index	0.04	formaldehyde
<i>Number of Facilities with Maximum Respiratory Hazard Index:</i>		
Greater than 1	0	n/a
<b>Acute Noncancer Screening Results</b>		
Maximum Acute Hazard Quotient [using scaling factor of 3]	8 0.4	formaldehyde (REL) formaldehyde (AEGL-1, ERPG-1))
Number of Facilities With Potential for Acute Effects	1	formaldehyde

<sup>7</sup> ICF International. *TRIM-Based Multipathway Screening Scenario*. Prepared for U.S. Environmental Protection Agency, Research Triangle Park, NC. October 2008.

Result	HAP "Drivers"	
<b>Refined Acute Noncancer Results</b>		
Maximum Acute Hazard Quotient [using scaling factor of 3]	8 0.4	formaldehyde (REL) formaldehyde (AEGL-1, ERPG-1))
<b>Population Exposure</b>		
Number of People Living Within 50 Kilometers of Facilities Modeled	3,700,000	n/a
<i>Number of People Exposed to Cancer Risk:</i>		
Greater than or equal to 100 in 1 million	0	n/a
Greater than or equal to 10 in 1 million	0	n/a
Greater than or equal to 1 in 1 million	1,650	n/a
<i>Number of People Exposed to Noncancer Respiratory Hazard Index:</i>		
Greater than 1	0	n/a
Estimated Cancer Incidence (excess cancer cases per year)	0.0004	n/a
<i>Contribution of HAP to Cancer Incidence:</i>		
Formaldehyde	64%	n/a
Arsenic compounds	33%	

Table 4. Summary of Refined Acute Results for Mineral Wool Production Facilities

Screening Results		MAXIMUM ACUTE HAZARD QUOTIENTS			ACUTE DOSE-RESPONSE VALUES				
		Based on REL	Based on AEGL-1/ERPG-1	Based on AEGL-2/ERPG-2	REL (mg/m <sup>3</sup> )	AEGL-1 (1-hr) (mg/m <sup>3</sup> )	ERPG-1 (mg/m <sup>3</sup> )	AEGL-2 (1-hr) (mg/m <sup>3</sup> )	ERPG-2 (mg/m <sup>3</sup> )
HAP	Max. 1-hr. Air Conc. (mg/m <sup>3</sup> )								
Formaldehyde	0.47	8	0.4	0.027	0.055	1.1	1.1	17	17

Notes on the process used to refine the acute results presented in Table 4:

- 1) The screening was performed for all emitted HAP with available acute dose-response values. Only those pollutants whose screening HQs were greater than 1 for at least one acute threshold value are shown in the table.
- 2) HAP with available acute dose-response values that are not in the table do not carry any potential for posing acute health risks, based on an analysis of currently available emissions data.

Notes on Acute Dose-Response Values:

REL – California EPA reference exposure level for no adverse effects. Most, but not all, RELs are for 1-hour exposures.

AEGL – Acute exposure guideline levels represent emergency exposure (1-hour) limits for the general public.

AEGL-1 is the exposure level above which it is predicted that the general population, including susceptible individuals, could experience effects that are notable discomfort, but which are transient and reversible upon cessation of exposure.

AEGL-2 is the exposure level above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects of an impaired ability to escape.

ERPG – Emergency Removal Program guidelines represent emergency exposure (1-hour) limits for the general public.

ERPG-1 is the maximum level below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild, transient adverse health effects.

ERPG-2 is the maximum exposure below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual’s ability to take protective action.

### 3.3 Potential Amendments Based On Review of the NESHAP Requirements

#### Startup and Shutdown Requirements:

EPA plans to address startup and shutdown requirements for mineral wool production in the rule due to the vacature of these requirements from the General Provisions. The voluntary ICR,

which included questions related to startup and shutdown, indicates that all companies operate the air pollution control devices during the entire production campaign, including periods of startup and shutdown. Therefore, the Agency plans to require compliance with the rule at all times.

#### **Risk Review:**

The Agency conducted the risk review using the emissions test results in the voluntary ICR conducted by mineral wool producers. Because the risk assessment is a conservative estimate of risk, and because the results of the risk assessment indicate risks are within acceptable levels, the Agency does not plan to lower emission limits of the Mineral Wool MACT based upon the risk assessment results.

#### **Technology Review:**

The technology review indicates that in the time since promulgation of the MACT in 1999, new processes and technologies are in place on cupolas in the mineral wool production industry. Regenerative thermal oxidizers (RTOs) have been installed at more than half the industry's cupolas to reclaim energy and recycle that energy in the form of combustion air back into the cupola. This practice reduces the cupola's consumption of coke. Because coke is the single most expensive ingredient in mineral wool production, the use of RTO's provide a long-term cost and energy saving option for the mineral wool industry. However, the formation of SO<sub>2</sub> from the combustion of COS in the RTO is a health and environmental disincentive for their use.

Oxygen injection is used at one plant to reduce COS emissions from the cupola. In this technology, oxygen is injected into the cupola ports during the melting operation. The injected oxygen drives the chemical reaction of COS to CO<sub>2</sub> and SO<sub>2</sub> so that COS emissions are greatly reduced from the cupola stack.

The formation and emissions of SO<sub>2</sub> from the cupola makes it hard to consider either oxygen injection or thermal oxidation as improvements in control technology. To the contrary, these technologies contribute to adverse health effects as a result of increases in ambient levels of SO<sub>2</sub>.

The use of low-sulfur slag, reduced amount of slag, or no slag is a potential improvement used by at least one mineral wool producer. Because both coke and slag contribute to the levels of sulfur charged to the cupola, any reduction in the sulfur content of raw materials will result in a proportionate reduction in the emissions of the sulfur compounds COS and SO<sub>2</sub>.

#### **Review of the Mineral Wool MACT Standard:**

EPA is considering amendments to the Mineral Wool MACT to address any HAP that are emitted by mineral wool producers but are not regulated under the MACT, any processes that emit HAP but are not regulated under the MACT and any surrogacy relationships that the Agency failed to prove were valid in all instances and using any control technology. Because

there are fewer than 30 cupolas, MACT standards for this industry would be based on the average of the best 5 performing cupolas for which the Administrator has information. EPA has the discretion to use the most appropriate averaging method (i.e., mean, median or mode) in calculating the emission limit identified by the MACT level of control so long as there is a rational basis and EPA provides an explanation of such basis. Emission limits for the 3 facilities operating a bonded line are under consideration, as described in a separate section below.

These amendments could include emission limits for COS, HF and HCl from existing and new cupolas, emission limits for phenol and methanol from existing and new curing ovens, and new emission limits for formaldehyde, phenol and methanol from collection (a process that was not regulated under the MACT and yet is a source of HAP emissions). EPA is also considering lowering the emission limits for formaldehyde from existing and new curing ovens to the levels achieved in practice at mineral wool production facilities operating a bonded line. All new emission limits for regulated sources would be set at the MACT floor level, would account for variability and would be based upon emissions testing conducted by mineral wool producers in response to the voluntary ICR.

EPA also considers MACT emission limits achieved by 'beyond the MACT floor' controls, and considers the cost of these controls, the toxicity of the pollutants reduced by these controls and other factors in 'beyond the MACT floor' determinations. The EPA did not identify any beyond the MACT floor controls for this industry during the technology review of the standard, and 'beyond the MACT floor' control technologies are not under consideration at this time.

Emission limits for formaldehyde, phenol and methanol are being considered for collection processes on a bonded line.

#### **Subcategorization of Collections – Vertical, Horizontal and Drum:**

EPA collected information from the mineral wool companies that operate a bonded line to understand the different equipment designs and whether all collection processes are the same, or whether design and manufacturing process differences warranted consideration of subcategories for the collection process. This process led to the identification of three distinct subcategories: vertical, horizontal, and drum. Because collection processes are only regulated under the rule if they occur on a bonded line, one approach may be the 'bundling' of collection and curing emission limits on bonded lines. Therefore, the revisions under consideration for collection and curing include emission limits for phenol, formaldehyde and methanol at vertical collection/curing bonded lines, horizontal collection/curing lines, and drum collection/curing lines.

*The Vertical Collection Design:* The molten rock/slag mixture is poured from the cupola spout onto a group of stainless steel drums spinning in opposite directions. The spinning drums form fine fibers of the mineral mixture. High air volume directs the fibers off the fiberization spinners toward a fast-moving porous vertical conveyor belt. A strong vacuum is drawn on the opposite side of the belt causing the fibers to lay against the vertical belt as it moves upward. At the top of the conveyance, the belt travels around a curve, the vacuum is released and the



fibers are removed onto a second belt that will convey the layer of binder-sprayed mineral wool fibers into the curing oven. Because the conveyor belt is vertical, the air volume drawn through the belt and fiber layer must be very high and the fiber layer that can be collected upon the belt is thin. In this design, 'shot'- BB-sized black granules that are high in iron (a result of using slag from the iron and steel industry)- falls out of the fiber layer. The vertical design is used to produce a specific type of mineral wool that is low in 'shot' and may be used in the hydroponic gardening market as well as in a specialized market of insulation products in which shot is undesirable.

*The Horizontal Collection Design:* Horizontal collection is similar to vertical collection, but because the conveyor belt is horizontal it works with gravitational forces and the layer of mineral wool collected upon a horizontal belt is thicker and 'shot' is not selectively removed. The air volume that is drawn through the fiber layer is a much lower air volume than in the vertical design, and this air stream is conducive to thermal oxidation at the hottest part of the cupola exhaust stack or the existing thermal oxidizer on the curing oven.

*The Drum Collection Design:* In the drum collection design, fibers are drawn using a very high volume air flow into the center of a rotating drum. The sides of the rotating drum have small holes through which the air flow may exit but the fibers are caught. The angle of the drum, a vacuum, and centrifugal force pull the fibers against the inside wall of the drum and out the end. The entire drum is enclosed and the air flow may be vented to the hottest part of the cupola exhaust stack or to the existing thermal oxidizer on the curing oven.

#### **Compliance Schedule:**

Section 112 allows up to 3 years for compliance with the technology standards that are developed as a result of the 112(d)(3) standard promulgated in 1999 or technology review under 112(d)(6); but allows 90 days for compliance with amendments to the MACT due to the risk review conducted under 112(f)(2).

Through Agency review and stakeholder input, a broad range of program improvements have been suggested. From these EPA identified those which could only be addressed through regulation change, and further limited to those which would provide the most protective impact. The Agency plans to base all emission limits upon the industry supplied test data as collected under the voluntary industry ICR.

#### **4. APPLICABLE SMALL ENTITY DEFINITIONS**

The Regulatory Flexibility Act (RFA) defines small entities as including "small businesses," "small governments," and "small organizations" (5 USC 601). The regulatory revisions being considered by EPA for this rulemakings are expected to affect a variety of small businesses, but would not affect any small governments or small organizations. The RFA references the definition of "small business" found in the Small Business Act, which authorizes the Small

Business Administration to further define “small business” by regulation. The SBA definitions of small business by size standards using the North American Industry Classification System (NAICS) can be found at 13 CFR 121.201.

The detailed listing of SBA definitions of small business for affected industries or sectors, by NAICS code, is included in Table 5, below.

## 5. SMALL ENTITIES THAT MAY BE SUBJECT TO THE PROPOSED REGULATION

The following table lists industries/sectors potentially affected by the regulation. The estimated number of small firms within each NAICS code and the number of employees in those small firms is shown.

Before beginning the formal SBREFA process, EPA actively engaged in outreach with entities that would potentially be affected by the upcoming rulemaking. EPA held phone conferences and meetings with many of these companies and their trade association, the North American Insulation Manufacturers Association (NAIMA) to discuss the data collection effort that will support the proposed rulemaking. EPA provided these contacts with an early opportunity to ask questions and discuss their concerns with the upcoming rulemaking.

Table 5. Small Business Industry Sector

Name of Industry/Sector	2002 NAICS Code	SBA Size Standard for Small Business	Small Firms	
			Number	Average Number of Employees
Mineral Wool	327993	500	5	108

The Mineral Wool production source category includes those facilities that manufacture rock and slag wool (mineral wool). Mineral wool is a fibrous, glassy substance made from natural rock, blast furnace slag, or other similar materials and consists of silicate fibers typically 4 to 7 micrometers in diameter. Products made from mineral wool are used for thermal or acoustical insulation, sound control and absorbency, and fire protection.

All the known mineral wool production plants are major sources of HAP (none are area sources). The Mineral Wool NESHAP applies to owners or operators of any existing, new, or reconstructed mineral wool production facility that is located at a plant site that is a major source of HAP emissions.

EPA has identified seven operating major source mineral wool manufacturing facilities with ten different cupolas, three curing ovens, three cooling operations, and three collection sources. Five of the seven facilities are small businesses. One large company operates two of the seven facilities.

## **6. SUMMARY OF SMALL ENTITY OUTREACH**

EPA conducted a meeting/teleconference with potential SERs on April 27, 2011. To help them prepare for the meeting/teleconference, on April 14, 2011, EPA sent materials to each of the potential SERs via email. A list of the materials shared with the potential SERs during the pre-Panel outreach meeting is contained in Appendix A. For the April 27, 2011, pre-Panel outreach meeting with the potential SERs, EPA also invited representatives from the Office of Advocacy of the Small Business Administration and the Office of Information and Regulatory Affairs within the Office of Management and Budget. A total of four of five of the potential SERs participated in the meeting. EPA presented an overview of the SBREFA process, an explanation of the planned rulemaking, and technical background on the rule.

Following the presentations, the remaining time during the pre-Panel meeting included discussions of:

- the timeline for the SBAR process;
- the procedures for handling and sharing confidential business information (CBI);
- SER requests for the availability of risk and other data, including the actual emissions limit for formaldehyde;
- whether EPA has identified any new technology since initially setting the MACT standards (the only technology EPA identified was incinerators on cupolas);
- the potential start-up/shut-down/malfunction (SSM) requirements. The court vacated the startup, shutdown, and malfunction (SSM) exemption contained in section 63.6(f)(1) and (h)(1) of the part 63 General Provisions, which were cited to in the Mineral Wool MACT; and
- the process of calculating MACT floors.

EPA asked the potential SERs to provide written comments by May 11, 2011. These written comments are included in Appendix A.

EPA conducted two site visits on May 12, 2011 to understand the processes and to meet with company representatives to discuss the upcoming rule proposal. EPA visited Thermafiber and Isolatek facilities, and NAIMA representatives attended both site visits along with EPA.

EPA conducted a meeting/teleconference with SERs on June 16, 2011. To help them prepare for the meeting/teleconference, on June 2, 2011, EPA sent materials to each of the SERs via email. A list of the materials shared with the SERs during the Panel outreach meeting is contained in Appendix A. All six SERs (see Table 6) participated in the meeting. EPA presented

a brief overview of the SBREFA process and updated information on the planned rulemaking. The industry trade association, NAIMA, presented alternatives to the proposed emission limits and potential changes to the MACT standards that they feel would enable EPA to address the risk and Brick MACT issues without threatening the viability of the mineral wool industry (see Appendix A for NAIMA’s presentation). The SERs were given an opportunity to comment on the preliminary proposed emission limits and discuss questions and recommendations associated with the risk and technology reviews.

The Panel asked the SERs to provide written comments by June 30, 2011. Comments made during the Panel outreach meeting and written comments submitted by the SERS are summarized in section 8 of this document.

## 7. LIST OF SMALL ENTITY REPRESENTATIVES

Table 6: List of Small Entity Representatives

Name	Affiliation
Lee Houlditch	Amerrock Products
John Dolin	Industrial Insulation Group
Tom Lund	Isolatek Int’l
Christopher Bullock	Rock Wool Mfg
Steve Edris	Thermafiber, Inc.
Angus Crane	North American Insulation Manufacturers Association (NAIMA)

## 8. SUMMARY OF SER COMMENTS AND EPA RESPONSES TO SER COMMENTS

### 8.1 Number and Types of Entities Affected

Section 5 of this report, which presents the information on the entities potentially affected by this rule, was provided to the SERs in the pre-Panel Outreach presentation (see Appendix A). The Panel believes that the SERs are in agreement with EPA on this matter.

## **8.2 Potential Reporting, Recordkeeping, and Compliance Requirements**

While the Panel did not receive specific comments on reporting and recordkeeping, NAIMA suggested that given the expense and complexity of possible technology installation, a 7-year compliance deadline is requested.

## **8.3 Related Federal Rules**

The Panel received verbal comments from SERs on potential SO<sub>2</sub> NAAQS compliance issues. Specifically, if facilities add on incinerators to the existing cupolas for COS control, SO<sub>2</sub> emissions will increase and may subject facilities to SO<sub>2</sub> reduction requirements from the State.

## **8.4 Regulatory Flexibility Alternatives**

### **8.4.1 Curing Ovens**

NAIMA discussed the relationship among Formaldehyde, Phenol and Methanol. They stated that EPA's recommended ranges for Phenol and Methanol are out of sync for Formaldehyde and would fundamentally force a lower Formaldehyde limit. To prevent this outcome, they proposed two alternative regulatory options:

#### *Alternative 1*

Three separate limits could be set at the following levels:

- formaldehyde – 0.06 lbs. per ton of melt
- phenol – 0.04 lbs. per ton of melt
- methanol 0.04 lbs. per ton of melt

#### *Alternative 2*

Use formaldehyde as a surrogate for phenol and methanol and set the limit for formaldehyde at 0.06 lbs. per ton of melt

### **Discussion of the Curing Oven Alternatives:**

EPA staff asked about the relationship between formaldehyde, phenol and methanol: where the 0.04 lbs/ton melt emission limit came from because the test data supplied to the EPA shows different numbers. The SERs responded that the 0.04 lb/ton melt emission limit is based on the relationship between (or percentage) of formaldehyde to phenol and methanol in a particular binder formula. The SERs stated that the phenol and methanol emission limits have to be consistent with the ratio of formaldehyde to phenol and methanol in the binder used. The SERs said they would include the data used to obtain the 0.04 lb/ton melt emission limit in their

formal written comments to the Panel. The SERs stated that the EPA's initial proposed limits are so low for phenol and methanol that, because of the ratio between formaldehyde, phenol, and methanol, the floor for formaldehyde would be created no matter what industry did. If industry operated within the 0.06 lb/ton melt emission limit for formaldehyde, industry would be above the limit for phenol and methanol due to the specific ratio in every resin batch.

EPA staff asked if the inability to meet the proposed emission limits for all three pollutants was a function of the product used or a function of formaldehyde degrading in heat. The SERs responded no, and further elaborated that it was a function of the resin in the batch formula used. The SERs agreed with EPA staff that this was a reflection of the existing technology. NAIMA offered to organize a meeting with the binder supplier and the EPA to discuss how the ratio of formaldehyde to phenol and methanol are inextricably linked.

SBA staff asked if there was a difference between the ratio information presented under alternative 1 for the curing oven (slide 6) and the test data the EPA had received to date under the ICR. EPA staff suspected that this was the case and explained that the preliminary emission limits are based on the testing results from industry and seem to be 2 orders of magnitude different from the emission limits under alternative 1.

SBA staff pointed out that alternative 1 for curing ovens is not setting a new MACT; instead of setting a new MACT based on the top 2 performers, industry wants to retain formaldehyde as a surrogate for phenol and methanol; and it sounds like the EPA is presenting a MACT calculation (top 12% or top performer calculation) rather than a translation of what the industry is doing. SBA staff went on to say that breaking the surrogacy by establishing equivalent emission limits is very different from setting a new MACT. SBA staff wanted to make sure everyone understands that alternative 1 is not setting a new MACT standard, but is breaking surrogacy by using the proportions in the existing technology. The SERs replied that alternative 1 is a compromise while alternative 2 is their preferred method. The SER bottom line was that industry cannot meet the proposed emission levels because they are too low.

EPA staff stated that the proposed emission levels for phenol and methanol are UPL derived limits based on test data supplied by the industry. EPA staff also stated that there are 3 curing lines and so asked if industry was saying that 1 or 2 plants operate outside of the proposed ranges. EPA staff elaborated that the test data supplied by industry showed emission levels well within the EPA's proposed ranges and so questioned how actual emission levels can be 1 to 2 orders of magnitude greater. The SERs replied that there was one firm that incinerated from the curing oven, and it is the lowest performer on formaldehyde industry-wide.

SBA staff interjected that there seems to be disconnect between the EPA and the SERs regarding how the test data is being interpreted. The SERs are saying that the test results available to NAIMA do not justify EPA's proposed limits, but EPA is using test data supplied by the industry to calculate the limits. It was agreed by EPA staff, the other Panel members, and the SERs that another meeting was needed as soon as possible to review the test data together and resolve the matter.

## 8.4.2 Collection

NAIMA argued that using control technology on the collection chamber is cost-prohibitive and proposed two alternatives:

### *Alternative 1*

4 lbs. per ton of melt for formaldehyde and use formaldehyde as surrogate for phenol and methanol

### *Alternative 2*

4 lbs. per ton of melt for formaldehyde, 2.7 lbs. per ton of melt for phenol, and 2.7 lbs. per ton of melt for methanol

### **Discussion of the Collection Alternatives:**

The SERs stated that the emission limits on collection chambers would be a completely new control technology not included in previous MACT standard. The SERs and the fiberglass industry (also represented by NAIMA) as a whole voiced a number of concerns: installing a control technology on the collection chamber (an incinerator) is cost-prohibitive; and that the high cost will force companies to go out of business for relatively little benefit (referring to the \$600,000 per ton reduction on slide 8 of the NAIMA presentation). EPA staff clarified that the incinerator is not controlling SO<sub>2</sub> and that everyone needs to understand that different pollutants and control technologies have different cost-effectiveness values. The SERs asked if the \$600,000 estimate for installing an incinerator was within the range of cost benefit ratio established by BACT. EPA staff said no that seems high, but they wanted everyone to recognize that making the comparison to SO<sub>2</sub> cannot be made in this situation.

Regarding slide 9 of the NAIMA presentation, EPA staff asked if the 4 lbs/ton melt was based on a MACT calculation or test data. NAIMA answered that it was derived by looking at the data and talking with members about what is feasible for them to achieve. EPA staff reiterated that the UPL range is 0.3 to 1 for formaldehyde and industry has claimed between 4 to 10 times higher than that - what is asserted as possible disagrees with the test data. The SERs responded that the test data are very limited, but what is important is that the addition of the collection chamber is an introduction of a new source.

NAIMA asked SERs to speak about the difficulties with installing a control technology in such a narrow space. A SER stated that the previous MACT required industry to install an incinerator that is not designed to handle the currently required air volume - to install an incinerator to handle a large amount of air for such a small amount of contaminants isn't feasible and is cost-prohibitive. Another SER stated that a sister company in Finland has no control in this area - it's impractical and would take an incinerator 10 times the size currently installed and would be more costly.

SBA staff stated that it sounds like there is a complete mismatch of test data - there is no middle ground between what the SERs are saying and the test data so there is a problem with the information that has been provided to the EPA at this point. EPA staff stated that a lot of the information is CBI and specifics cannot be discussed. EPA staff asked if some information could be declared as non-CBI so that they could discuss it at the next meeting. NAIMA suggested they would follow-up with the individual companies about what they are willing to share. SBA staff added that if this is an issue of interpreting the test data incorrectly, everyone can sit together in a room to discuss the test data - if EPA staff speaks with each company alone, the CBI designation does not need to be broken. EPA staff stated that the actual test data cannot be held as confidential, but process design can be - under the CAA, the EPA cannot set an emission limit outside of the range that the test data show.

The SERs stressed that they are concerned with the addition of collection chamber limits to the MACT. EPA staff said that uncontrolled sources that emit HAP must be regulated under Section 112, however, alternatives to satisfy Section 112 are welcome from the SERs. SBA staff mentioned that the EPA could set a health-based emission limit that could adequately protect public health and that alternative for curing and collection ovens should not be forgotten - for collection in particular, if the formaldehyde, phenol and methanol coming off of a new or uncovered source does not present a health hazard, then a health-based emission limit incorporating that practice might be feasible using information gleaned from the RTR. EPA staff asked the SERs to include this information in their written comments. NAIMA asked that EPA consider a health based emission limit for formaldehyde collection chamber emissions, but acknowledged that formaldehyde is a carcinogen.

#### **8.4.3 Carbonyl Sulfide (COS) Emissions from Cupolas**

NAIMA questioned whether the Brick MACT decision requires the imposition of new requirements, stating that the cost of each incineration system could be quite expensive, between \$3 and \$6 million. Additionally, NAIMA expressed concern about whether all companies with incinerators can meet the proposed limit of 0.05. Finally, NAIMA argued that there is insufficient scientific support for risk associated with COS. As a result they proposed that EPA adopt one of the following alternatives:

##### *Alternative 1*

An emission limit for carbonyl sulfide of 5 lbs. per ton of melt

##### *Alternative 2*

Pursuant to 42 U.S.C. § 112(b)(3)(c), “delete” carbonyl sulfide from the Clean Air Act Section 112 list of regulated hazardous air pollutants (HAP)

##### *Alternative 3*

Subcategorization of the industry based on melt rates:



- Greater than 9 tons per hour
- 6 to 9 tons per hour
- Less than 6 tons per hour

*Alternative 4*

Threshold limits that limit the scope of applicability - 250 tons of COS per year

*Alternative 5*

Pursuant to 42 U.S.C. § 7412(d)(4), consider a health threshold when establishing a COS emission limit

*Alternative 6*

Subcategorize the industry to reflect the diversity of the industry and the products it manufactures

*Alternative 7*

Use the combined statistical-technical procedure in establishing the COS emission limit, which considers all the emissions data and eliminates outliers and questionable data to come up with an industry average

*Alternative 8*

Provide for exemptions, specifically any unit not posing a greater than one in a million maximum individual lifetime cancer risk from COS be exempted

*Alternative 9*

Cupolas installed prior to the 1999 implementation of the Mineral Wool MACT Standard not be required to meet the newly proposed COS emission limits

*Alternative 10*

Create a health-based risk standard for carbonyl sulfide using the World Health Organization (WHO) framework or other alternative.

*Alternative 11*

Because insulation products increase energy efficiency, create an Offset/Credit program. The COS emissions limit could be established based on accurate data of the best performing 5 sources, but allow mineral wool companies to offset those emissions based on pounds of product produced.

## **Discussion of the COS Alternatives:**

The SERs stated that companies with no incinerator will be put out of business by the proposed COS limits, while those with incinerators definitely cannot meet the limit. The SERs felt that COS is not correctly designated as a HAP; it is a byproduct of the manufacturing process. The SERs stated that the majority of COS in the atmosphere is produced by natural sources (volcanoes, marshes, etc.) and the mineral wool industry contributes an amount nowhere near the amount occurring from nature. Incineration creates SO<sub>2</sub> at much greater levels than COS, and the SERs would like the EPA to consider alternatives such as not regulating COS or alternatives to proposing a limit that cannot be met. The Panel staff members agreed that the extent of COS emissions from natural sources was high and that other companies have had conversations about this. EPA staff stated that about half of the cupolas in the mineral wool industry incinerate their COS for energy recovery - such facilities reduce their use of coke and, in the long term, conserve resources using this technology. EPA staff stated that all options will be costly, and EPA is looking for regulatory flexibility alternatives that will be feasible for industry.

The SERs stated they prefer alternative 2, the delisting of COS, better than any other option. They asked that the EPA look at the possibility of deleting COS from the list of HAPs pursuant to 42 U.S.C. § 112 (b)(3)(c).

Regarding alternatives 3 and 6 (slides 12-13 of the NAIMA presentation), the Panel staff asked if the SERs would be able to provide a specific emission limit once the SERs and the EPA come to a conclusion on the test data. The SERs responded affirmatively and also that they would be able to determine which companies fall into what category.

The Panel staff was concerned about whether alternatives 8 and 9 could answer the Brick issues defined by the EPA (i.e., how do they link back to Section 112) - these alternatives are blurring the line of MACT setting with the residual risk review done on the MACT already set. The Panel staff said it could see how it could be a health-based limit, but not standing on its own. The SERs responded that they can elaborate and would make that connection in their written comments.

SBA staff, who was not familiar with the WHO framework referenced by alternative 10, asked if the SERs could send more detailed information. The SERs said the WHO framework they were thinking of is related to the electromagnetic industry and they would look for other examples and share this with the Panel.

Regarding alternative 11, the Panel staff asked for more substance from the SERs. The SERs responded that they are in a formal process to get recognized for offsets and that they have a framework that could be used.

The SERs stated that the Administrator could also remove COS from the HAP list in as little as 90 days. Panel staff asked the SERs if they have signed a formal position. The SERs stated they have not done so and asked if it was more work for the EPA if they did so and whether or not

there was a downside. Panel staff stated that the EPA is on a deadline to propose and that this opportunity may have to wait until after the proposal since the SERs just brought up this up.

**Additional SER Comments:**

After Panel outreach, NAIMA expounded on several of the above alternatives (3, 4, 5, 6, and 9) and provided some new alternatives which came about as a result of Panel discussions. NAIMA provided the following alternatives in a letter to the Agency on June 30, 2011.

*Alternative 1*

Given the limited risk data and the fact that over 80 percent of atmospheric COS comes from nature, NAIMA recommends an emission limit for carbonyl sulfide of 5 lbs. per ton of melt.

*Alternative 2*

Pursuant to 42 U.S.C. § 112 (b) (3)(c), either the EPA Administrator or NAIMA should petition to delete carbonyl sulfide from “the list” of hazardous air pollutants.

*Alternative 3 (revised to provide more detail)*

NAIMA urges EPA to subcategorize the industry based on permitted maximum melt rate:

- Greater than 9 tons per hour
  - USG – Red Wing
  - USG – Walworth
- 6 to 9 tons per hour
  - Industrial Insulation Group
  - Rock Wool Manufacturing
  - Thermafiber
- Less than 6 tons per hour
  - Amerrock
  - Isolatek International

The CAA grants the Administrator authority to “distinguish among classes, types, and sizes of sources within a category or sub-category.” Obviously, melt rate has important relevance to the size of the source and the economic feasibility of imposing additional costly controls. Therefore, melt rate provides a useful indication of the required difference among plants to justify subcategorization. The melt rate can effectively predict the level of emissions. In fact, the current Mineral Wool MACT Standard uses the hourly melt rate to determine compliance with the MACT standard.<sup>8</sup> Therefore, NAIMA urges EPA to subcategorize the industry based on melt rate as indicated above.

---

<sup>8</sup> [64 FR 31695](#) (June 14, 1999)

#### *Alternative 4*

NAIMA urges EPA to subcategorize the industry based on bonded and unbonded.

During promulgation of the original MACT, the mineral wool industry was subcategorized into two groups: bonded and unbonded. Since the bonded and unbonded subcategories are already established by EPA, NAIMA does not go into detailed analysis of the difference between bonded and unbonded. NAIMA requests that these subcategories be retained. Although the differences between bonded and unbonded lines apply principally to the non-cupola portions of the line, EPA usually subcategorizes two or more sources within a category at the level of the entire source even though the sources may have some emission points in common. There is precedent for different subcategories for various production processes that have some emission points in common but are different with respect to other emission points.<sup>9</sup> Therefore, subcategorizing the entire mineral wool industry into bonded and unbonded subcategories is totally appropriate. The subcategories would be the following:

- Bonded
  - Industrial Insulation Group
  - Rock Wool Manufacturing
  - Thermafiber
- Unbonded
  - Amerrock
  - Isolatek International
  - USG – Red Wing
  - USG – Walworth

#### *Alternative 5 (Alternative 10 in panel outreach; expanded here)*

NAIMA urges EPA to subcategorize the industry to reflect the diversity of the industry and the primary products it manufactures:

- Residential Loose-Fill
  - Amerrock
- Ceiling Tiles
  - USG – Red Wing
  - USG – Walworth
- Fireproofing
  - Isolatek International
- Commercial and Industrial
  - Industrial Insulation Group
  - Rock Wool Manufacturing
  - Thermafiber

---

<sup>9</sup> EPA subdivided the source category for **acrylonitrile butadiene styrene** (“ABS”) into 5 subcategories based on different processes even though all had common emission points ([60 FR 16090-16111](#) (March 29, 1995)).

The CAA allows grouping of facilities based on such broad terms as “class” and “type.” EPA specifically created different subcategories in the leather industry based on “types of leather products produced.”<sup>10</sup>

As suggested above, the subcategories based on product types also display a variety of differences. For example, the residential blowing wool produced by Amerrock uses no binder. Therefore, there are no formaldehyde emissions. Amerrock products are produced for the residential building market. Similarly, USG’s two plants are making unbonded products to produce ceiling tiles. While this product is ultimately bonded with non-phenolic binders, the binder is not applied at the manufacturing site. Ceiling tiles are produced largely for the commercial market.

Isolatek produces mineral wool for fire proofing products. The mineral wool is combined with other ingredients to create a spray applied for fire proofing of commercial and industrial facilities. Again, Isolatek uses no formaldehyde binders.

Commercial and industrial insulation is produced by Thermafiber, Industrial Insulation Group, and Rock Wool Manufacturing using formaldehyde binders.

#### *Alternative 6*

NAIMA urges EPA to subcategorize the industry based on raw material. This subcategorization would be based on predominant use of rock or slag. More than fifty percent use of rock or slag material would place the manufacturer in a particular subcategory. This subcategory could also be characterized as recycled (slag) and non-recycled (rock) plants. There are important differences between recycled and non-recycled plants with respect to raw materials, emissions, and products. The distinction between rock and slag plants is well recognized within the industry and in the scientific and technical literature, and therefore, subcategorization of rock and slag (recycled or non-recycled) plants would not be breaking new ground. The subcategorization would be as follows:

- Rock (Non-Recycled)
  - Amerrock
  - Industrial Insulation Group
- Slag (Recycled)
  - Isolatek International
  - Rock Wool Manufacturing
  - Thermafiber
  - USG – Red Wing
  - USG – Walworth

---

<sup>10</sup> J. Michael Geers and Claudia M. O’Brien, “Basis and Rationale for Potential Subcategorization of Coal-fired Electric Utility Steam Generating Units,” March 8, 2002, p. 10 (<http://www.epa.gov/ttn/atw/combust/utliltox/9brh04.pdf>).

### *Alternative 7*

NAIMA urges EPA to subcategorize the industry based on use of air pollution control differences, specifically, use of an incinerator. EPA's criteria for subcategorization includes "air pollution control differences, process operation . . ., emissions characteristics, control device applicability and costs, safety, and opportunities for pollution prevention."<sup>11</sup> Subcategorization based on existence of cupola incinerator controls and non-incinerator controls would be as follows:

- With Incinerator
  - Industrial Insulation Group
  - Thermafiber
  - USG – Red Wing
  - USG – Walworth
- Without Incinerator
  - Amerrock
  - Isolatek International
  - Rock Wool Manufacturing

### *Alternative 8*

NAIMA urges EPA to subcategorize the industry based on the age of the facility/cupola. The subcategories would be as follows:

- Prior to 1950
  - Isolatek International
  - Thermafiber
- 1951 – 1975
  - Rock Wool Manufacturing
  - USG – Walworth
- 1976 – Present
  - Amerrock
  - Industrial Insulation Group
  - USG – Red Wing

### *Alternative 9*

NAIMA urges EPA to subcategorize the industry based on cupola stack heights. The subcategories would be as follows:

- 150 feet and above
  - Amerrock
  - Industrial Insulation Group
  - USG – Red Wing
- 100 to 150 feet
  - Rock Wool Manufacturing

---

<sup>11</sup> [59 FR 26429-26444](#) (May 20, 1994)

- USG – Walworth
- Below 100 Feet
  - Isolatek International
  - Thermafiber

*Alternative 10 (Alternative 5 at panel outreach; expanded here)*

NAIMA advocates use of an alternative health based limit under § 112 (d)(4) of the Clean Air Act for the collection chamber. As noted above and affirmed by EPA, emissions are low and the risk is low. Therefore, to avoid unnecessarily stringent emission limits, NAIMA urges EPA to create health based limits.<sup>12</sup>

Section 112 (d)(4) is designed to prevent the promulgation of unduly stringent emission limits simply for the sake of regulation. Section 112 (d)(4) allows EPA to set health based limits for certain HAPs based on established health thresholds as an alternative to promulgating specific limits. Human exposures to a HAP at levels below its reference concentrations (“RfC”) or reference dose are considered safe.

NAIMA strongly urges EPA to set health based standards under § 112 (d)(4) when facts support its use, such as carbonyl sulfide which is created in abundance by nature itself.

*Alternative 11*

EPA could establish a threshold limit that would narrow the scope of applicability to only those facilities exceeding a specified threshold amount. NAIMA recommends a threshold of 250 tons of COS per year.

*Alternative 12 (Alternative 9 at panel outreach)*

EPA could establish a grandfather clause and exempt those cupolas installed prior to the 1999 implementation of the Mineral Wool MACT Standard.

*Alternative 13*

Use the combined statistical-technical procedure in establishing the COS emission limit, which considers all the emissions data and eliminates outliers and questionable data to come up with an industry average.

*Alternative 14*

Offset/Credit – EPA recognizes that improved energy efficiency reduces pollutants. Insulation products increase energy efficiency. EPA could establish the COS emissions limit based on accurate data of the best performing five sources, but allow mineral wool companies to offset those emissions based on pounds of products produced.

---

<sup>12</sup> Section 112 (d)(4) applies to non-carcinogenic HAPs; carbonyl sulfide is not a carcinogen.

#### 8.4.4 Hydrogen Fluoride and Hydrochloric Acid Emissions From Cupolas

The SERs disagree that the Brick MACT should require limits for HF and HCl because the previous Mineral Wool MACT did not include these pollutants and because industry-wide emissions are “low”. Additionally, the SERs argued that the proposed limits are so low that they essentially require the installation of control technology. The most effective technology, wet scrubbing, is cost prohibitive. Because of the disagreement of the achievability of the proposed standards, SBA staff stated that there may be a disagreement between the industry and the EPA about the test data. EPA staff stated that the HF and HCl limits are UPL derived limits based on test data provided by the industry. NAIMA made four recommendations for alternative regulatory options:

##### *Alternative 1*

Do not set HF and HCl limits for the Mineral Wool MACT because the Brick MACT decision does not require it.

##### *Alternative 2*

Establish threshold limits that reduce the scope of applicability

- For example, 1,000 tons of HF per year
- For example, 1,000 tons of HCl per year

##### *Alternative 3*

Establish an HF or HCl limit based on actual mineral wool emissions data averages – establish a feasible and achievable limit. Mineral wool emission data is limited and based only on BTEC data collected last year.

##### *Alternative 4*

Adopt the following emission limits for Mineral Wool MACT:

- Hydrogen Chloride – 25 tons per year
- Hydrogen Fluoride – 25 tons per year

The SERs discussed the alternatives to the EPA proposed limits for HF and HCl, stating that alternative 1 would be the easiest for them to achieve. Panel staff asked where the 25 tons/yr limit is coming from in alternative 4 (slide 18). The SERs responded that it is a number based on what industry can meet across the board similar to the 25 tons/yr limit for other HAPs. Panel staff stated that the threshold for major and area sources is 10 tons and 25 tons for overall pollutants.

Panel staff asked the SERs if they intended to establish a limit of 25 tons/yr from this operation instead of having an emission limit of tons/lb melt. The SERs confirmed that was their intention. Panel staff asked if in the long-term this would be prohibitive to industry production and their ability to operate, or if the emissions are so low that industry would never exceed 25



tons/yr. The SERs responded that yes, emissions are much lower than 25 tons/yr - the emissions data industry has on HF and HCl are limited since they previously never had to test for these pollutants.

Panel staff asked what the drivers of these acid gases are and whether it is a function of production process or inputs. The SERs responded that it is a function of inputs and fuel that have residual fluorides and chlorides in them. Panel staff asked if, outside of switching fuels and inputs, if there was a process change that could reduce emissions or if the emissions could only be reduced by taking them out of the process. The SERs stated that the issue is how and where to put all of these controls and still be able to manufacture a product.

#### **Additional SER Comments:**

After the Panel outreach meeting, NAIMA consolidated two of the above alternatives (2 and 4) and provided two new alternatives which came about as a result of Panel discussions, as follows:

##### *Alternative 2 ( a consolidation of Alternatives 2 and 4 from panel outreach)*

NAIMA urges EPA to establish a threshold limit to narrow the scope of applicability to the emission limits proposed for HF and HCl. For example, any facility emitting 100 or more tons of HF per year would be subject to EPA's proposed emission limits. Similarly, any facility emitting 100 or more tons of HCl per year would be subject to EPA's proposed emission limits. Threshold limits for HF and HCL would lessen the regulatory burdens of an amended Mineral Wool MACT.

##### *Alternative 3*

If the first two alternatives are not implemented, NAIMA urges EPA to establish a feasible and achievable limit based on actual mineral wool emissions data. Because mineral wool emissions data is limited and based solely on BTEC data collected last year, NAIMA recommends the following emissions limits for the Mineral Wool MACT Standard:

- Hydrogen Fluoride – 1.0 lbs. per ton of melt
- Hydrochloric Acid – 1.0 lbs. per ton of melt

##### *Alternative 4*

NAIMA has recommended a variety of subcategorization options, including application of the existing bonded and unbonded subcategories to the entire source. If EPA sets a HF and HCl limit, NAIMA urges EPA to extend the bonded and unbonded subcategorization to the regulation of HF and HCl. Similarly, if any other subcategorizations are established for the mineral wool industry, NAIMA urges EPA to apply the subcategorization to the entire source, which would include the regulation of HF and HCl emissions.

#### **8.4.5 Start-up, Shutdown, Malfunction**

The SERs stated that they feel the EPA is suggesting that SSM is a Brick MACT issue, and they wanted to know if they satisfied the EPA's questions in their previous letter (dated 5/16/11 to S. Fairchild). EPA staff stated that SSM is not a brick MACT issue, but they are connected through litigation: the Mineral Wool MACT referred to the General Provisions for SSM requirements, and those requirements have been vacated by the court. As a result, all regulated entities must comply with the MACT at all times, regardless of whether it is in startup or shutdown (malfunction will be addressed under a separate rule). EPA staff asked the SERs what type of emissions occur as a result of regular operational conditions and what additional emissions occur as part of startup and shutdown. EPA staff asked if emissions are greater during the startup process and if so, how much greater? Are there additional emissions during shutdown? How often do startup and shutdown occur? EPA staff mentioned that because a separate rule is being developed for malfunction, the EPA cannot look at any special considerations.

Panel staff stated that for other rules, if startup and shutdown are included in the test data, the EPA may be able to set a numerical limit based on that. If the test data does not include startup and shutdown, the SERs need to communicate to the EPA what the startup and shutdown emissions are and how they are different from normal operations. The EPA cannot simply say that startup and shutdown are not included in the emission levels. Panel staff asked the SERs if the test data includes startup and shutdown as part of normal operations. If not, the SERs need to make that claim quickly and determine whether or not there are substantial differences from normal operations. If they look like normal operations, then it's ok.

The SERs stated that they would like to discuss startup and shutdown during the next meeting. EPA staff stated that there are 3 ways the test data are expressed: concentration, lbs/hr and lbs/ton melt. Because emissions are measured in lbs. per ton of melt, it is impossible to measure emissions during start-up or shut-down because no melt is being produced during start-up or shut-down. SBA staff mentioned that that almost begs for a total emission limit. EPA staff and the SERs agreed that previous limits were written in lbs/ton of melt and they both want to keep it that way. EPA staff indicated that they can simply create an emission limit based on concentration for startup and that they will run it by other project leads to see what has been done.

## **8.5 EPA RESPONSES TO SER COMMENTS**

### **8.5.1 Curing Ovens**

The court found that EPA erred in its development of surrogates under the MACT standards, and failed to establish the facts of surrogacy relationships. In a separate case, the court agreed with EPA that nothing in the Clean Air Act suggests that it is prohibited from resetting the MACT floors in order to correct its own errors. They also agreed that the approach petitioners labeled "MACT-on-MACT would be more accurately described as "MACT-on-Unsupportable-Standards-Erroneously-Labeled-as-MACT"<sup>13</sup>. The Agency therefore must use only valid and supportable

---

<sup>13</sup> *Medical Waste Institute and Energy Recovery Council v. EPA*, # 09-1297 (D.C. Cir. 2011).

surrogacy relationships such as exist between PM and HAP metals. This relationship does not exist between formaldehyde and phenol/methanol because formaldehyde can decrease in a binder formulation independent of phenol and/or methanol. Moreover, the use of formaldehyde as a *tracer compound* in RCRA rules to indicate complete combustion of a high concentration organic waste stream in a hazardous waste incinerator is very different from using it as a surrogate for organic compounds in low concentration for an industrial exhaust application. Because the incinerator, the waste stream and the media are all different, the relationship cannot be extended without supportable data showing the surrogacy relationship is valid. Rather, industry has commented elsewhere that the binder ingredients and formulation can vary from one mineral wool producer to the next, and that the test data from one is not necessarily relevant for another company. Therefore, EPA finds that the surrogacy developed for the MACT rule is not valid, and emission limits must be added for both phenol and methanol to the formaldehyde standard. These emission limits will be based on industry-supplied data collected by source-specific testing under the voluntary ICR.

For several process emission limits, including those for curing ovens, the SERs commented that the emission limits developed by EPA for the industry are too low and facilities can not currently meet these limits. However, EPA based the emission limits on industry's own testing conducted under their voluntary ICR. Under this approach, the industry approached EPA and requested that they be allowed to develop an internal response rather than receive a formal testing order under CAA Section 114. Industry also agreed that any test results submitted would be representative of emissions from sources subject to the MACT standard. The project lead agreed to this approach as long as the information needed by EPA to conduct the risk, technology and regulatory reviews was obtained and that the collected information was valid. EPA must base all decisions upon a complete and valid set of data. The data set is the set of data developed on industry source testing and ICR responses under the voluntary ICR undertaken specifically for these Agency reviews. Moreover, emissions testing was to be conducted according to EPA test methods; a responsible official of each company had to sign the ICR and emission testing responses as valid and true; and the testing contractor had to sign that the emission testing was conducted according to the requirements of EPA's test methods. Therefore, EPA believes the industry should stand behind the testing as valid and accurate.

After determining (using the test data) that the risks from this industry are low, the Agency is also using the same data to review the MACT standard to correct deficiencies in the rule. Only formaldehyde limits (as a surrogate for phenol and methanol) at the curing process were established under the 1999 MACT standard. EPA is correcting that deficiency by adding phenol and methanol limits to the curing oven limits in the 1999 MACT.

### **8.5.2 Collection**

After determining (using the test data) that the risks from this industry are low, EPA is also using the same data to review the MACT standard to correct deficiencies in the rule. Emission limits for collection were not established under the 1999 MACT standard, and this process is responsible for nearly all the risk to the public from this source category. However, during

conversations with industry, EPA learned it is may be appropriate to subcategorize collection processes according to the orientation and design of the collection process. As a result, EPA intends to propose to subcategorize according to vertical, horizontal, and drum collection. Each type of collection process would be required to meet emission limits for formaldehyde, phenol, and methanol, as expressed on a lb (pollutant)/ton (production) basis.

### **8.5.3 Carbonyl Sulfide (COS) Emissions From Cupolas**

In the Brick MACT decision and vacature, the court found that EPA erred in its development of surrogates under the MACT standards and failed to establish the facts of surrogacy relationships. Only carbon monoxide (CO) limits (as a surrogate for carbonyl sulfide) at the cupola was established under the 1999 MACT standard. As with other corrections for inappropriate surrogacy in the rule, EPA is correcting that deficiency by replacing CO limits in the 1999 MACT with COS limits.

#### **Technology Review:**

In addition to addressing rule deficiencies identified by the courts in the proposed amendments to the rule, EPA is conducting both a risk and technology review. The Clean Air Act Section 112 technology review requires EPA to review new technological developments within the industry. EPA may consider the costs of such new technologies, as well as other considerations in this review. EPA has established that of the 11 cupolas operating in the mineral wool industry, six have installed incinerators to burn COS and reclaim that energy for use back in the cupola. This industry practice is widespread because it reduces consumption of coke, which is the most expensive of all the raw materials used in the mineral wool industry. SERs informed EPA that the cost of coke has increased 8-fold since promulgation of the MACT, so industry is seeking cost savings on this expensive raw material. In addition, one SER noted that fuel switching is a more cost effective option over the long run than incineration because it does not require the use of coke. Melter replacement and fuel switching is under consideration across industry, but because it involves discontinuance and replacement of the cupola with an entirely different melting technology, no small business has undertaken fuel switching at this time.

EPA concedes that in recent months the economic downturn in the US and worldwide has had a tremendous impact on all American industry, none more key than in the construction industry. EPA has considered these factors in evaluating the cost effectiveness during the technology review process.

As described in Section 3, new processes and technologies (RTOs) are in place on cupolas in the mineral wool production industry since promulgation of the MACT in 1999. These technology developments can be divided into two classes: those that form and discharge SO<sub>2</sub> as a result of oxidizing COS, and those that decrease levels of sulfur in the raw materials, thereby reducing the potential for formation of the sulfur compounds COS and SO<sub>2</sub>.

#### **COS Oxidation Technologies:**

*Thermal Oxidation:* Because coke is the single most expensive ingredient in mineral wool production, RTOs were developed in response to industry's interest in reducing the consumption of coke. The use of RTOs provide a long-term cost and energy saving option for the mineral wool industry. The initial cost of RTO purchase and installation (about \$0.4 million) is recouped over a period of 5-7 years due to the decreased coke expense. One facility found it economically advantageous to install the RTO in spite of the State requirement to also install SO<sub>2</sub> controls to avoid Prevention of Significant Deterioration (PSD) Permit violations that would have resulted from the increase in SO<sub>2</sub> output as a secondary pollutant from COS oxidation.

*Oxygen Injection:* Oxygen injection is used at one plant to reduce COS emissions from the cupola. In this technology, oxygen is injected into the cupola ports during the melting operation. The injected oxygen drives the chemical reaction of COS to CO<sub>2</sub> and SO<sub>2</sub> so that COS emissions are greatly reduced from the cupola stack.

The formation and emissions of SO<sub>2</sub> from the cupola makes it hard to consider either oxygen injection or thermal oxidation as improvements in control technology. To the contrary, these technologies contribute to adverse health effects as a result of increases in ambient levels of SO<sub>2</sub>.

#### **Low Sulfur Raw Materials:**

*Low Sulfur Slag:* At least one mineral wool producer uses low sulfur slag to produce mineral wool while decreasing the potential to form sulfur compounds in the exhaust stack. Low sulfur slag may be purchased at iron and steel plants operating electric arc furnaces that are fueled with a low sulfur coal and are melting low sulfur content steel scrap. Because the source of slag is iron and steel scrap melted in an EAF, the slag by definition is produced from at least the second melting of the iron and steel. Therefore, most of the sulfur associated with iron ore has been liberated from the metal by the time it is returned as scrap to the EAF. In addition, regulations restricting the levels of SO<sub>2</sub> that can be discharged into the ambient air have become increasingly restrictive and are driving the secondary iron and steel markets to lower sulfur raw materials as well. It is reasonable to conclude that this effort to purge sulfur from industrial inputs results in waste products that are similarly low in sulfur.

*Low Sulfur Coke:* Some industries choose to purchase low sulfur coke to reduce the level of sulfur compounds in their emissions. Coke containing no more than 2% sulfur is available outside the U.S., but at this time is not available for import. Coke containing no more than 3% sulfur is available at high cost within the US. The primary aluminum industry purchases this grade of coke. It is reasonable to conclude, however, that the small businesses that comprise the mineral wool industry cannot easily afford low sulfur coke.

*Equipment and Fuel Switching:* One SER noted that fuel switching is a more cost effective option over the long run than incineration because it does not involve the use of coke, which has become cost prohibitive. Melter replacement and fuel switching is under consideration across industry, but because it involves discontinuance and replacement of the cupola with an entirely different melting technology, no small business has undertaken fuel switching at this

time. At least one facility is currently considering switching out the cupola and replacing it with a different mineral melting technology (such as a furnace) fueled by natural gas. This is being considered a viable alternative because the cost of an RTO to reclaim energy for the cupola is not as cost effective in the long run as is the equipment and fuel switching option. This option would involve a substantial period of time (no less than 1 year) to replace the cupola and associated equipment with a furnace or similar melting equipment. The replacement of coke with natural gas would greatly reduce the sulfur content of the raw materials and the resulting emissions of the sulfur compounds COS and SO<sub>2</sub>.

**SO<sub>2</sub> NAAQS Considerations:**

In addition, EPA is keenly aware of the secondary pollutant issues associated with incineration of COS. Sulfur dioxide (SO<sub>2</sub>) emissions are expected to increase on a pound per pound basis with the incineration of COS. That is, for every pound of COS, a little more than one pound of SO<sub>2</sub> is released into the ambient air. In recognition of the health effects of SO<sub>2</sub>, in 2010 EPA amended the SO<sub>2</sub> NAAQS by lowering the 1-hour, 24-hour, and annual ambient air concentration limits of SO<sub>2</sub>. States have located and installed monitoring stations to collect data on SO<sub>2</sub> levels in areas thought to be most appropriate for this type of pollutant. Monitoring stations have been receiving data for several years, and EPA will propose designations of nonattainment based upon the States 2008 through 2010 monitoring data and any applicable modeling data submitted. Designation of nonattainment areas have not been completed as of the writing of this document. Designations were recommended by the States in June 2011 and are expected to be finalized by EPA in 2012. Therefore, it is unclear at this time whether any of the mineral wool companies are currently situated in areas that will be designated as nonattainment based on SO<sub>2</sub> monitoring.

As with the other emission limits in the proposed rule, the MACT floor emission limits for COS are based upon industry test data provided to EPA under industry’s voluntary ICR. Any mineral wool facility that is unable to meet the emission limits in the rule will have a number of COS reduction technologies that are used currently in the industry; these include:

Table 7. COS Reduction Technologies in the Mineral Wool Industry

Technology	Relative Cost
Oxygen injection	Least expensive
Use of low-sulfur slag in the cupola	V
Use of low-sulfur coke in the cupola	V

Thermal Oxidizer	V
Melter changeout and fuel switching	Most expensive

#### 8.5.4 Hydrogen Fluoride and Hydrochloric Acid Emissions From Cupolas

As with other amendments to the Mineral Wool MACT, emission limits for HF and HCl are being added to the rule to correct Brick MACT deficiencies. HF and HCl are emitted from mineral wool production cupolas. HF and HCl are HAP and under Section 112 EPA must establish emission limits for them. Therefore, using industry’s test data, EPA calculated the MACT floor for HF and HCl from existing cupolas; these data show cupolas achieve the following emission limits, considering variability:

Table 8. Existing and New Cupola Emission Limits

HAP	Emission Limit, lb/ton
HF	0.014
HCl	0.01

#### 8.5.5 Start-up, Shutdown, Malfunction

Industry responses to the ICR indicate that cupolas are the process that could be affected by startup and shutdown requirements; industry responses also indicate that control equipment is functioning during process startup and shutdown events. Emissions during startup and shutdown are no greater than during normal processing of the cupola. Therefore, from an engineering perspective, there should not be excess emissions during startup and shutdown events.

### 9. PANEL FINDINGS AND DISCUSSIONS

#### 9.1 Number and Types of Entities Affected

Six companies exist in this industry; five of the six companies are small businesses. All small businesses in the mineral wool production industry operate under NAICS code 327993.

## **9.2 Potential Reporting, Recordkeeping, and Compliance**

The proposed rule under consideration potentially impacts small businesses by requiring new emission limits on processes that were not regulated under the MACT standard promulgated in 1999, by requiring emission limits for pollutants that were not regulated under the MACT, or both processes and pollutants not regulated under the MACT. All companies are subject to Title V operating permits requirements, and as such will be required to add the newly regulated processes to their operating permits along with compliance demonstrations that the processes meet each pollutant emission limit in the rule. Compliance testing will be required to be conducted using EPA methods for each pollutant. Reporting and recordkeeping requirements are not expected to change from the MACT, with the exception of additional pollutants and processes included in such reports.

## **9.3 Related Federal Rules**

**National Ambient Air Quality Standards for Sulfur Dioxide:** The most prevalent technology for reducing COS emissions will increase emissions of SO<sub>2</sub>. Under the current NAAQS, none of the small entities are in nonattainment areas, so installation of emissions control equipment should not subject them to additional permitting requirements under the SO<sub>2</sub> NAAQS. However, EPA cannot make such assurances about future NAAQS or future nonattainment zones, so there is a risk that future compliance with this rule could trigger additional emissions control requirements through the Title V/PSD permit program.

**Greenhouse Gases:** Most emissions control strategies identified by EPA during the Panel would increase the energy intensity of mineral wool production. Although the Panel does not have specific information about the GHG emissions of individual facilities in this industry, these facilities could be subject to GHG permitting as that program is phased in under the Tailoring Rule.

## **9.4 Regulatory Flexibility Alternatives**

The Panel agrees that EPA does not have discretion in a number of areas that SERs commented upon. Specifically, the EPA does not have the discretion to set the MACT floor emission limits at levels suggested by the SERs. EPA must base emission limits upon information available and, in response to a coordinated voluntary ICR, emissions testing was conducted at mineral wool facilities in support of the development of this standard.

The Panel also recognizes that EPA seeks to comply with the specific requirements for the development of emission standards under Section 112, including those requirements now generally identified as 'Brick MACT' issues. All processes that emit HAP and all HAP emitted must be appropriately identified for regulation and emission limits under this section. This includes the removal of inappropriate or invalid surrogate pollutant emission limits in favor of



HAP-specific emission limits. In addition, EPA does not have discretion to extend the compliance date of the standards beyond 3 years, but States may grant an additional year if petitioned by a company to do so. In summary, the Panel recognizes that EPA has the authority to review the MACT standard for completeness, risk, and technology improvements, and that the Agency is currently under court order to conduct the risk and technology review for the mineral wool source category and propose amendments to the standard by October 31, 2011 and promulgate the amendments by October 31, 2012.

However, whenever opportunities for regulatory flexibility arise, and when that regulatory flexibility can work to lessen impacts to small businesses, the Panel recommends that EPA propose amendments to the mineral wool MACT that offer such regulatory flexibility to the maximum extent possible. Specifically, these opportunities arise in the following situations:

- Selection of the averaging method in calculating the MACT floor for COS from cupolas and phenol, formaldehyde, and methanol emissions from collection and curing processes; and
- Subcategorization of regulated processes, when appropriate.

The results of the technology review show that new technology has been implemented in the mineral wool production industry, which includes the installation of RTOs on cupolas for the reclamation of energy from the combustion of COS and use of that reclaimed energy back into the cupola as a measure to reduce the consumption of coke. However, it is unclear whether this new technology can be considered to control air pollution as it simply converts the HAP COS into the criteria pollutant SO<sub>2</sub>. The Panel agrees that, in this case, add-on technology does not necessarily contribute to a reduction in harmful pollution. However, the Panel recognizes that there are other control options, and therefore, the Panel recommends EPA select an averaging method for use in development of the MACT floor emission limits that would not require the installation of RTOs for compliance.

The Panel recommends that EPA not require beyond the floor (BTF) emission limits for the mineral wool industry. Such limits are likely to have additional cost impacts to industry. In addition, EPA did not identify BTF measures for consideration and has found that the results of the risk assessment show acceptable risks from this source category.

The Panel recommends subcategorization of collection along the lines described in Section 3 of this document, specifically, subcategorization for vertical collection and curing, horizontal collection and curing, and drum collection and curing. Based on available information, the Panel believes that emission standards based on the average emission limits across both collection and curing processes at each of the three subcategories would minimize the burden on small entities while fully complying with EPA's obligations under section 112. The Panel also recommends setting MACT limits for new sources equal to MACT limits for existing sources.

**Timing:**

In its comment, NAIMA suggests a 7-year compliance deadline. The Panel agrees that a longer compliance deadline would minimize the burden on small entities, but agrees with EPA that its

discretion is limited under section 112. Therefore, the Panel recommends that EPA allow the maximum amount of time within its discretion (3 years) and work with state permitting authorities to provide for the additional year permitted by the statute.

**Startup, shutdown and malfunctions:**

Sources may not be able to comply with emission limits that are based on a production process (e.g., pounds per ton of melt) when that production process is not occurring, such as during periods of startup and shutdown. The Panel notes that SERs did not report emissions data to include periods of startup or shutdown. However, the panel believes that SERs do operate emissions control equipment during startup and shutdown. Therefore the Panel recommends that EPA provide a detailed discussion in the preamble to the proposed rule that outlines the manner in which small entities may demonstrate compliance with the rule, when finalized, during start-up and shutdown. The Panel also recommends that EPA propose allowing an affirmative defense against compliance actions for malfunction events, consistent with other section 112 rules recently promulgated.