sources under the CAA to title V permitting is discussed in a separate section.

1. How Are the Title V Permitting Requirements Applicable?

We intend, by placing the new standards only in 40 CFR part 63 and not cross-referencing them in RCRA regulations, to rely on existing air programs to implement the new requirements, including operating permits programs developed under title V. All hazardous waste combustors subject to the MACT standards promulgated in this rule will thus be subject to title V permitting requirements for air emissions and related operating requirements (this includes hazardous waste combustors that are considered area sources under the CAA, as discussed in more detail below). In this rule, we are not amending any of the existing air permitting procedures. The procedures of 40 CFR part 71 for federal operating permits, or a State title V program approved under part 70, will remain applicable. Thus, all current CAA requirements governing permit applications, permit content, permit issuance, renewal, reopenings and revisions will apply to air emissions from hazardous waste combustors pursuant to promulgation of the hazardous waste combustor MACT standards.[293]

The public participation requirements for title V permits in parts 70 and 71, such as allowing an opportunity for public hearing and public comments on draft permits, also apply (see 40 CFR 70.7(h) and 71.11). We are committed to enhancing public participation in all of our programs. In 1996, we published a guidance manual on public involvement in the RCRA program intended to improve cooperation and communication among all participants in the RCRA permitting process (*RCRA Public Participation Manual*, EPA530–R–96–007, September 1996). Although the Manual is written in the context of the RCRA program, the principles are common to all program areas. For example, the Manual encourages early and meaningful involvement for communities and open access to information. It also acknowledges the important role of public participation in addressing environmental justice concerns. Since these principles are applicable in all situations, we encourage air programs and sources subject to the hazardous waste combustor MACT standards to refer to the RCRA manual for additional guidance on implementing effective public participation activities.

2. What Is the Relationship Between the Notification of Compliance and the Title V Permit?

The hazardous waste combustor MACT standards promulgated in this final rule include emissions limitations for several hazardous air pollutants, as well as detailed compliance, testing, monitoring, and notification requirements. Under these provisions, you not only demonstrate compliance with the emissions limitations, but also demonstrate that you have established operating requirements and monitoring methods that ensure continuous compliance with those limits. These demonstrations are made during a comprehensive performance test and subsequently documented in an NOC.

We are requiring, in § 63.1210(f), that you comply with the general provisions governing the NOC codified in § 63.9(h). Those provisions specify that in addition to describing the air pollution control equipment (or method) for each emission point for each hazardous air pollutant, the NOC also must include information such as: methods that were used to demonstrate compliance; performance test results; and methods for determining continuous compliance (including descriptions of monitoring and reporting requirements and test methods). We also are requiring in § 63.1207(j) that you comply with the all of the operating requirements specified in the NOC upon submittal to the Administrator.

Although these requirements are self-implementing, in that you must comply in accordance with the time frames set forth in today's rule, the requirements are ultimately implemented through title V operating permits (see 40 CFR parts 70 and 71). Section 63.1206(c)(1) specifies that: (1) You can only operate under the operating requirements specified in the DOC or NOC (with some exceptions as laid out in the regulations); (2) the DOC and NOC must contain operating requirements including, but not limited to, those in § 63.1206 (compliance with the standards and general requirements) and § 63.1209 (monitoring requirements); (3) operating requirements in the NOC are applicable requirements for the purposes of 40 CFR parts 70 and 71; and, (4) operating requirements in the NOC must be incorporated into the title V permit. In addition, because title V permits can only be issued if, among other conditions, ''the conditions of the permit provide for compliance with all applicable requirements'' (see §§ 70.7(a)(1)(iv) and 71.7(a)(1(iv)), parts 70 and 71 are clear that title V permits must contain the operating requirements documented in the NOC.

As mentioned above, you must comply with all operating requirements specified in the NOC as of the postmark date when the NOC is submitted to the Administrator. Operating requirements documented in the NOC must be included in your title V permit—either through initial issuance if you do not yet have a title V permit, or through a permit revision if you already have a permit. Including information from the initial NOC in title V permits should not create the potential for any compliance conflicts. Because it is the first time the NOC operating requirements are incorporated into the permit, there would be no requirements already on permit with which the NOC would conflict.

However, the potential for compliance conflicts could be created when a subsequent NOC is submitted. For example, you are required to conduct periodic comprehensive performance testing (see § 63.1207(d)(1)). Subsequent to each test, you must submit another NOC to the Administrator. Because of the dynamics of the testing and permitting cycles, it is possible that once you have information from the initial NOC in the permit, you could find yourself, after subsequent testing, in a situation where there might be potentially conflicting requirements with which you must comply (i.e., requirements in the title V permit and requirements in the most recently submitted NOC). This might occur, for example, if any of the operating requirements changed from the previous test.[294] The potential for compliance conflicts that might arise from this situation can be avoided, however, by following the guidance presented below.

The requirements in parts 70 and 71 govern the timing and procedures for permit issuance, revisions, and renewals, and you should refer to those requirements when obtaining or maintaining your permit. For today's rule, we provide guidance on what we recommend as to how operating requirements in the NOC should be incorporated into title V permits.[295]

[293] Requirements of other CAA permitting programs, such as construction permits, will continue to apply, as appropriate, to the HWC's sources subject to today's rule.

[294] On the other hand, if the limits did not change, there would be no conflict between the NOC and the permit.

[295] We are recommending this approach as guidance in the preamble, but not including any associated regulatory provisions. This guidance is

Continued

For incorporating information from an initial NOC into a title V permit, when you have an existing title V permit, we recommend that you and your permitting agency follow the procedures for significant modifications. The primary rationale for using these procedures is to afford the public an opportunity to review all of the information pertinent to your compliance obligations. We want to ensure a level of public involvement when including operating requirements in title V permits that is commensurate with that under RCRA. In RCRA, operating parameters are initially developed pursuant to trial burns and incorporated into permits either through initial issuance (in the case of facilities operating under RCRA interim status) or through a RCRA class 2 or 3 permit modification (in the case of new facilities). In either situation, significant opportunities exist for public review and input parallel to those under initial title V permit issuance or significant permit modification procedures.

With regard to a subsequent NOC developed pursuant to periodic performance tests, we prefer an implementation scheme for this rule that avoids unnecessary permit revisions. Thus, we recommend that you coordinate your five-year comprehensive performance testing schedule with your five-year permit term to the extent possible. This would allow changes in the NOC to be incorporated into the permit at renewal rather than through separate permit revisions. This also helps to minimize the number of permit revisions, as well as, the likelihood of having two sets of requirements with which to comply.

We recognize, however, that such coordination may not always be possible or feasible. At times, it may be necessary to include information from the most recent NOC through a permit revision. We expect that this will be accomplished using, at most, the minor permit modification procedures in § 70.7(e)(2) or § 71.7(e)(1). Keeping in mind that the information from the initial NOC was included either as part of the initial permit issuance or as a significant revision, the information was already subject to review by both the regulatory agency and the public. Thus, the public should have a clear understanding of your compliance obligations. The obligation to comply with the emissions limitations in §§ 63.1203, 63.1204, or § 63.1205 does not change even if any of the associated compliance information, such as operating limits, is revised pursuant to subsequent performance tests. Given our experience in regulating (under RCRA) the types of sources subject to today's MACT standards, we do not expect the information in a NOC to change significantly over time. We have been regulating these sources for almost twenty years; the testing and monitoring requirements we are promulgating in this rule reflect the ''lessons learned'' over time. Thus, the initial set of compliance parameters are likely to need primarily minor changes over time. You and your regulatory agency also are experienced in setting operating parameter limits and monitoring systems to ensure compliance with performance standards. Again, this expertise and experience suggests that primarily minor adjustments will need to be made. In light these factors, we are confident that changes in the NOC may be appropriately incorporated into title V permits using the minor permit revisions procedures. Furthermore, regulatory agencies are obligated under § 63.1206(b)(3) to make a finding of compliance based on performance test results. This requirement provides an additional administrative safeguard to ensure that you are setting the proper operating limits.

The minor permit modification process will allow you to meet your compliance obligations under § 63.1207(j) and begin to comply with the conditions in the NOC upon submittal (i.e., post-mark). Under §§ 70.7(e)(2)(v) and 71.7(e)(1)(v), you may make the change proposed in the minor permit modification application immediately after filing such application. Following this, you must comply with both the applicable requirements governing the change and the proposed permit terms and conditions (i.e., the information from the NOC that you are incorporating into your permit). The provisions in this section also ensure that you will not be in the position of having to choose between compliance with the NOC or compliance with your permit because this section also specifies that during this time period, you need not comply with the existing permit terms and conditions you seek to modify.[296] Since the NOC is submitted to the Administrator once you have a title V permit (see § 63.9(h)(3)), we expect that you will submit the NOC together with a minor permit modification application. Any modifications added to the permit through this process can be reviewed by the public at the time of permit renewal.

We encourage permitting authorities to develop permits in a way that minimizes the need for future permit revisions and is consistent with the requirements in parts 70 and 71. For example, you may request that your permitting authority develop a permit that contains alternative operating scenarios. This would allow you to alternate among various approved operating scenarios while concurrently noting the change in your operating record.

3. Which RCRA Permitting Requirements Are Applicable?

The RCRA permitting requirements particular to incinerators and boilers and industrial furnaces are found in 40 CFR 270.19, 270.22, 270.62, and 270.66. These permitting requirements apply to new facilities, to those operating under interim status while they pursue a permit, and to sources seeking to renew their permits. In today's final rule, we amend the introductory text in each of these sections to reflect that RCRA permitting requirements for hazardous waste combustor air emissions and related operating parameters will not apply once you demonstrate compliance with the requirements of the new MACT standards by completing a comprehensive performance test and submitting a NOC to the Administrator.[297] The timing for the deferral of the RCRA permitting requirements is consistent with the timing in today's rule for the deferral of applicable standards in 40 CFR parts 264 and 265.

Even though we rely on the title V permitting program to address air emissions from hazardous waste combustors, we still need RCRA permits at these sources to address: (1) Other RCRA regulations applicable to all types of RCRA units, including hazardous waste combustors, that are not duplicated under the CAA; (2) any risk-based emissions limits and operating parameters, as appropriate; and (3) other RCRA units at the facility. Also, new facilities (including new hazardous waste combustor units) must obtain RCRA permits prior to starting construction. Thus, the remaining RCRA permitting requirements in 40 CFR part 270 governing permit applications and permit content continue to apply. These

essentially an interpretation of the current part 70 and 71 rules.

[296] If, however, the source fails to comply with its proposed permit terms and conditions during this time period, the existing terms and conditions it seeks to modify may be enforced against it (§§ 70.7(e)(2)(v) and 71.7(e)(1)(v)).

[297] The final rule language in these sections differs from that in the NPRM to reflect placement of the standards only in part 63 and deferral of RCRA controls to the air program.

include the provisions in §§ 270.10(k) and 270.32(b)(2), which together provide authority to require a facility owner or operator to submit information necessary to establish permit conditions and to impose site-specific conditions, including risk-based conditions, through the RCRA permit.

Even though you will still have two permits, the scope and subject matter of each are distinguishable. The title V permit will focus on the operation of the combustion unit (e.g., air emissions and related parameters) while the RCRA permit will continue to focus on the other basic aspects of hazardous waste management. The RCRA permit would thus include conditions to ensure compliance with relevant requirements in 40 CFR part 264, including: General facility standards; preparedness and prevention; contingency planning and emergency procedures; manifesting; recordkeeping and reporting; releases from solid waste management units; closure; post-closure; financial responsibility; corrective action; storage; materials handling; and air emissions standards for process vents and equipment leaks from tanks and containers.

The only time we foresee that conditions in both RCRA and title V permits may govern the same hazardous waste combustor operating parameters and limits is when there is a need to impose more stringent or more extensive risk-based conditions, e.g., under RCRA omnibus authority, to ensure protection of public health and the environment. This situation is discussed in greater detail in Part Three, Section IV (RCRA Site Specific Risk Assessment Decision Process).

4. What Is the Relationship of Permit Revisions to RCRA Combustion Permitting Procedures?

In June, 1994, we published a proposed rule for RCRA Expanded Public Participation and Revisions to Combustion Permitting Procedures (59 FR 28680, June 2, 1994). The proposal contained amended procedures for interim status combustion facilities during the trial burn period that were intended to make the procedures for interim status facilities more like those governing permitted facilities. We finalized the expanded public participation requirements (see section immediately below), but did not finalize the proposed permitting revisions. At the time we began to finalize the proposal, we were already committed to issuing comprehensive air emissions standards under MACT. It was anticipated that there would be overlap between the emissions standards in the proposed MACT rule and the combustion permitting procedures in the June 1994 proposed rule. It did not make sense to finalize provisions in one rulemaking effort only to propose changing them yet again in another rulemaking effort. Now, given the approach being adopted in today's final rule to permit hazardous waste combustor air emissions under title V of the CAA, there is no longer as strong a need to pursue the amended procedures for RCRA permitting in the June 1994 proposal. We do not, therefore, intend at this time to finalize these proposed permitting amendments.

5. What Is the Relationship to the RCRA Preapplication Meeting Requirements?

In 1995, we finalized the expanded RCRA public participation requirements (60 FR 63417, December 11, 1995). These included requirements for a facility to advertise and conduct an informal meeting with the neighboring community to discuss anticipated operations prior to submitting a RCRA Part B permit application. Since hazardous waste combustors subject to the new MACT standards (and title V permitting) still need RCRA permits for other hazardous waste management activities, you are still subject to the RCRA preapplication meeting requirements in 40 CFR 124.31. Even though operations and emissions associated with the combustor unit are now to be addressed primarily under CAA requirements, we anticipate that the public will continue to exhibit a great deal of interest in combustor activities at RCRA meetings. They may not always be familiar with our administrative ''boundaries'' dictated by the various environmental statutes. Given this potential lack of familiarity, and because combustor units and emissions are already discussed at these meetings, we strongly encourage you to continue including combustor unit operations in discussions during RCRA preapplication meetings. Furthermore, conditions for hazardous waste combustor activities may sometimes be imposed under RCRA, for example, in cases where the results of a site-specific risk assessment indicate a need for conditions more stringent or more extensive than those imposed under MACT. You should be prepared to discuss the site-specific risk assessment process and how it may result in additional conditions being included to their RCRA permits.

All other public participation requirements in 40 CFR part 124 associated with the RCRA permitting process continue to apply. These include requirements for public notice at application submittal, public notice of the draft permit, opportunity for public comments on the draft permit, and opportunity for public hearings. These requirements also are explained in the *RCRA Public Participation Manual* (EPA530–R–96–007, September 1996), which provides guidance on how to implement RCRA public participation requirements, as well as, recommendations on how to tailor public involvement activities to the situation at hand. For example, if the community around a facility does not speak English as a primary language, the manual encourages use of multilingual fact sheets. As mentioned previously, we encourage you and States to apply the principles contained in the RCRA manual to hazardous waste combustor MACT compliance and title V activities as well.

C. Is Title V Permitting Applicable to Area Sources?

Under today's rule, hazardous waste combustors meeting the definition of an area source will be subject to today's MACT standards (see discussion in Part One, Section III.B). As discussed in the May 1997 NODA, under § 63.1(c)(2), area sources subject to MACT are subject to title V permitting as well, unless the standards for that source category (e.g., subpart EEE for hazardous waste combustors) specify that: (1) States will have the option to exclude area sources from title V permit requirements; or (2) States will have the option to defer permitting of area sources. We received several comments on our NODA discussion (see 62 FR 24215) on the issue of subjecting area sources to title V permitting. The comments were fairly evenly split—several supported requiring area sources to obtain title V permits, while several were against it. After considering the comments, we have chosen not to provide the option to the States to exclude hazardous waste combustor area sources from title V permitting requirements or to defer permitting of these sources.

Commenters that support the Agency's position affirm that title V permits serve an important role to incorporate all requirements applicable to a source in one enforceable permitting document. They maintain that the compliance certifications and opportunities for public involvement inherent in the title V program will serve a useful and valuable public service. Other supporters note that requiring all hazardous waste combustors to obtain title V permits will help to ensure that the permits are both consistent and adequate. The idea of

consistency being a desirable end result is echoed by others as well. One commenter points out that area sources in several other source categories are not exempt from title V permitting requirements, and recommends that hazardous waste combustor area sources also be subject to title V to maintain consistency with the rest of the MACT program. Finally, some commenters state that if the Agency were not to pursue title V permitting for hazardous waste combustor area sources, then the Agency would have to strengthen the nontitle V permitting programs with respect to public involvement and agency approval of modifications relating to facility emissions.

We agree with these points. Title V permits clarify your regulatory obligation, thereby making it easier for you to keep track of your many compliance obligations across several air programs. Clarifying the regulatory obligations improves compliance in many cases; we have seen an increase in compliance among air sources with the advent of the title V permitting program. For example, through the process of applying for and issuing title V permits, applicable requirements of which a source is unaware or with which it is found to be out of compliance are identified. Once these requirements are included in a title V permit, the source must certify compliance with these requirements both initially and then on an annual basis.

We concur with commenters about the benefits of the public involvement opportunities afforded by the title V permit program. Our experience in the RCRA combustion program has shown that many of the sources that would fall into the area source classification (e.g., some commercial incinerators and cement kilns burning hazardous waste as fuel) are the ones in which the public is generally most interested. Subjecting hazardous waste combustor area sources to title V permitting will ensure that the public will continue to be involved in permit decisions under the CAA, as they have been under RCRA. For example, the public will have an opportunity to comment on and request a public hearing for a draft title V permit. They have access to State or Federal court to challenge title V permits, depending upon whether the permit is a part 70 or part 71 permit. Title V also provides greater access to information about sources in many cases. Under title V, States and EPA cannot deny basic information about sources to citizens unless it is protected as confidential business information. Conversely, there could be disparity in what information citizens might be able to obtain under State non-title V operating permits.

Consistency is a key objective as well. Part 70 sets out the minimum criteria that a State program must meet. If a State fails to develop and implement a program that meets these minimum criteria, then a part 71 federal operating permits program is put into place. These minimum criteria provide for consistency across State and Federal title V permitting programs, which might not occur under other State air permitting programs. Consistency within CAA programs is not the only concern. We also are, as part of our approach to integrating regulation of these sources under RCRA and the CAA, striving to maintain consistency with how sources have been regulated under RCRA. Under RCRA, all of the sources that would fall into an area source classification are currently treated the same as the sources that are classified as major under the CAA. It is appropriate to continue treating all hazardous waste combustor sources in the same manner (i.e., to apply the same permitting requirements to all of these sources) under the CAA.

Commenters that do not support applying title V requirements to area sources generally base their position on three arguments. First, they argue that Congress had consciously differentiated between area and major sources when developing the CAA, so that there would be a strong incentive for facilities to limit emissions and thus avoid the additional requirements imposed on major sources. These commenters maintain that subjecting area sources to title V requirements would create a disincentive for these sources to minimize emissions. Secondly, they suggest that other CAA permitting mechanisms, such as federally enforceable state operating permits, might be more appropriate for the hazardous waste combustor area sources. One commenter notes that some sources have already invested a lot of time and effort working with permitting authorities to develop federally enforceable state operating permits that limit their potential to emit below major source levels, and that the Agency's action subjecting these sources to title V permits would render this work meaningless. Finally, they assert that this would be the first time the Agency did not provide the option to the States to either defer title V permitting for area sources or exempt them entirely, and they express concern about the precedent that would be set if the Agency were to start requiring area sources to obtain title V permits in this rule.

After careful consideration, we are not persuaded by these counter-arguments. Although the CAA does differentiate in some provisions between area and major sources, it did not specify that area sources should be exempt from the title V permitting program. On the contrary, it provides discretionary authority in section 502(a) for the Administrator to decide whether to exempt a source category, in whole or in part, from title V permitting requirements. Furthermore, the implementing regulations in 40 CFR 70.3(b)(2), 71.3(b)(2), and 63.1(c)(2) specify that the Administrator will determine whether to exempt any or all area sources from the requirement to obtain a title V permit at the time new MACT standards are promulgated. Clearly, the decision to subject area sources to title V permitting is intended to be made in the context of both the source category and the applicable standards. The exemption from title V may only be provided if compliance with the requirements would be ''impracticable, infeasible, or unnecessarily burdensome.'' CAA section 502(a). Given that the hazardous waste combustors subject to today's rule, including those that may meet the definition of area sources, have all been subject to common permitting regulations under RCRA, subjecting these sources to title V permitting is not impracticable, infeasible, or unnecessarily burdensome. Furthermore, if we exempt area sources from title V permitting requirements, we would most likely have continued to apply RCRA permit requirements for stack emissions to these sources. Thus, the area sources would have been subject to dual permitting regimes (e.g., federally enforceable state operating permits under the CAA and RCRA permits) and the resulting burden associated with duplicative regulation. This would be contrary to a major goal of today's rule. In conclusion, we decided that it is appropriate to subject all hazardous waste combustor sources subject to today's MACT standards to title V permitting requirements. As noted earlier in this preamble, this is also consistent with the Congressional scheme under RCRA that mandates regulation of all hazardous waste combustors for all pollutants of concern.

Although we provided the option to defer title V permitting for some area sources subject to other MACT standards, this rule is not the first time we have not allowed States to defer area sources from title V requirements. See, e.g., 64 FR 31898, 31925 (June 14, 1999) (NESHAP for Portland Cement Manufacturing Industry to be codified at

40 CFR part 63, subpart LLL). Moreover, EPA regulations governing other categories of solid waste combustors under CAA section 129 do not differentiate between major and minor sources in imposing title V permitting requirements. See, e.g., CAA section 129(e); 40 CFR 70.3(a) and 70.3(b)(1), and 40 CFR 60.32e(i). Given that the decision to apply title V requirements is made in a specific context, we do not share commenters' concern about the precedent our approach might set for other situations. We will continue to evaluate each situation on its own merit. Finally, we do not agree with commenters that this approach will provide a disincentive to limit emissions because sources will still be ''capped'' by the emissions limits being promulgated in today's rule. Neither would progress already achieved in developing federally enforceable state operating permits be rendered meaningless, as suggested by some commenters. We anticipate that a source will likely be able to use the information gathered during the process of developing a federally enforceable state operating permit (e.g., information about its emissions and applicable requirements) in completing a title V application. Commenters appear to think that sources will have to start totally anew and without an ability to use past experience and results. This is neither a realistic nor practical view of how sources are likely to act.

Commenters opposed to subjecting hazardous waste combustor area sources to title V had also noted that these sources would be receiving RCRA permits for the air emissions as well. This argument would have merit if we choose to promulgate the new standards in both CAA and RCRA regulations. Since we are promulgating the MACT standards only in the CAA regulations, however, requirements on air emissions from hazardous waste combustor area sources would not be included in RCRA permits.[298] Commenters also discount our position in the NODA about difficulties that would arise if an area source were to move from one permitting program to another as they make modifications to their emissions levels that could change their major/area source determination. They point to our ''once in, always in'' approach to MACT standards that is stringently applied. Under this approach, once a MACT standard goes into effect, a major source will always be regulated under that standard, even if it later decreases its emissions to below major source levels. This ensures that sources cannot routinely ''flip'' between being regulated or unregulated, which in turn means that sources would not be moving in and out of the title V permitting universe. The commenter was correct in raising this to our attention. We are not relying on this argument to support our decision to subject hazardous waste combustor area sources to the standards or to title V.

D. How will Sources Transfer from RCRA to MACT Compliance and Title V Permitting?

1. In General, How Will this Work?

As discussed in Section A (Placement of Standards and Approach to Permitting), we are deferring RCRA controls on hazardous waste combustor air emissions to the part 63 hazardous waste combustor MACT standards, which are ultimately incorporated into title V permits issued under the CAA. Promulgation of the new hazardous waste combustor MACT standards under the CAA does not, however, by itself implement this deferral or eliminate the need to continue complying with applicable RCRA requirements—either those in a source's RCRA permit or in RCRA interim status performance standards. These requirements include obligations for RCRA permitting (for example, interim status facilities will continue to be subject to RCRA permitting requirements, including trial burn planning and testing).

Therefore, today's rule adopts specific provisions that address the transition from RCRA permitting to the CAA regulatory scheme. As discussed in Section B.3 (Applicability of RCRA permitting requirements), the requirements in §§ 270.19, 270.22, 270.62, and 270.66 do not apply once a source demonstrates compliance with the standards in part 63 subpart EEE by conducting a comprehensive performance test and submitting an NOC to the regulatory agency.[299] In this section, we discuss how regulators can implement the deferral from RCRA to hazardous waste combustor MACT compliance and title V permitting.

a. What Requirements Apply Prior to Compliance Date? You have three years following promulgation of the MACT standards to achieve compliance with the emissions standards. However, the rule is effective shortly after promulgation. During the approximately three years between the effective date and the compliance date, you will be subject to applicable requirements for hazardous waste combustor MACT compliance and title V permitting. For example, there are compliance-related requirements in 40 CFR part 63 subpart EEE that are separate from the actual standards for emissions levels, such as those in §§ 63.1210(b) and 63.1211(b) for submitting a Notice of Intent to Comply and a progress report, respectively. Requirements in 40 CFR parts 70 and 71 for operating permit programs developed under title V will also apply. These include requirements governing timing for submitting initial applications, reopenings to include the standards, and revisions to incorporate applicable requirements into title V permits. The interface between an NOC and the title V permit has already been discussed. Consequently, our discussion on implementing the deferral of RCRA controls focuses on the transition away from RCRA permits and permit processing once a facility demonstrates compliance with the standards through a comprehensive performance test and submits a NOC to the regulatory agency.

Many of the activities undertaken during the three year compliance period play a role in implementing the transition of RCRA controls to MACT compliance and title V. For example, some of you may have to make changes to their design or operations to come into compliance with the new standards. If you have a RCRA permit, you may need to modify the RCRA permit to reflect any of these changes before they are actually made. This may be necessary to remain in compliance with the RCRA permit while setting the stage for demonstrating compliance with CAA MACT requirements. We urge you (the source) to seek guidance from your RCRA permitting authorities as early as possible in this process. As part of our ''fast track rule'' (see 63 FR 33781, June 19, 1998), we promulgated a streamlined process in 40 CFR 270.42(j) for modifying the RCRA permit, so that you can make these necessary changes and begin operating in accordance with the new limits before the compliance date arrives. To take advantage of the streamlined process, however, you must first comply with the Notice of Intent to Comply requirements in § 63.1210. The Notice of Intent to Comply requirements obligate you to advertise and conduct an informal meeting with the neighboring community to discuss plans to comply with the new standards, and to subsequently provide information about

[298] The exception would be, as discussed earlier, cases where States, at their own choosing, have incorporated the HWC MACT standards into their State RCRA programs.

[299] If, however, there is a need to collect information under § 270.10(k) then the permitting authority may require, on a case-by-case basis, that facilities use the provisions found in these sections.

these plans to the regulatory agency.[300] We anticipate discussion at this meeting will include modifications to the RCRA permit that must be processed before you can start upgrading equipment to meet the emissions limits set by MACT. The goal of these activities is to ensure that by the end of the three-year compliance period, you will be in compliance with both the MACT standards and their RCRA permits or interim status requirements.

b. What Requirements Apply After Compliance Date? After the compliance date, a transition period exists during which there will be, in effect, two sets of standards concerning emissions from hazardous waste combustors: (1) The MACT standards in 40 CFR part 63; and (2) the performance standards that are still in the RCRA permit or in the 40 CFR part 265 interim status regulations. During this period, in cases where operating parameters and limits are addressed by both programs (MACT and RCRA), you must comply with all applicable parameters and limits; those which are more stringent will govern. We anticipate that the MACT standards will be compatible with the RCRA performance standards, although in some cases the DOC is likely to set narrower or different operating conditions. Thus, in complying with the MACT standards, you also will comply with corresponding conditions in the RCRA permit or in the RCRA interim status regulations. However, at some sites, certain RCRA permit conditions may be more stringent than the corresponding MACT standards or may establish independent operating requirements. Some potential reasons why such a situation would occur are discussed in the May 2, 1997 Notice of Data Availability (62 FR 21249, 5/2/97). In these situations, you must comply with the more stringent or more extensive conditions in the RCRA permit.

We also note that there may be situations where it is not clear whether a RCRA compliance requirement is less stringent than a MACT requirement. This can occur, for example, when the two compliance requirements have different averaging periods and different numerical limits. In this situation, we recommend that the source coordinate with permitting officials early in the MACT process, perhaps when the source submits RCRA permit modification pursuant to the fast-track rulemaking, in order to determine which requirement is more stringent. We believe the permitting officials should give sources an appropriate level of flexibility when making this determination.

Our approach of placing the MACT air emission standards for hazardous waste combustors in 40 CFR part 63 subpart EEE and not including them, even by reference, in the RCRA regulations means that the air emissions must ultimately be incorporated into title V permits issued under the CAA. To completely implement the deferral of RCRA controls, conditions governing air emissions and related operating parameters should also be ultimately removed from RCRA permits. (For the special case of risk-based conditions derived from RCRA omnibus authority, see earlier discussions.) Similarly, hazardous waste combustors that are in the process of obtaining RCRA permits will likely need to have the combustor air emissions and related parameters transitioned to MACT compliance and title V permits at some point.

We intend to avoid duplication between the CAA and RCRA programs. We encourage you and regulators to work together to defer permit conditions governing air emissions and related operating parameters from RCRA to MACT compliance and title V, and to eliminate any RCRA provisions that are no longer needed from those permits. As discussed below, we are adopting a provision in today's final rule to help permitting authorities accomplish this task in the most streamlined way possible. The RCRA permits will, of course, retain conditions governing all other aspects of the hazardous waste combustor unit and the rest of the facility that continue to be regulated under RCRA (e.g., general facility standards, corrective action, financial responsibility, closure, and other hazardous waste management units). Furthermore, if any risk-based site-specific conditions have been previously included in the RCRA permit, based either on the BIF metals and/or hydrochloric acid/chlorine requirements[301] or the omnibus authority, the regulatory authority will need to evaluate those conditions vis-a-vis the MACT standards and the operating parameters identified in the NOC. If the MACT-based counterparts do not adequately address the risk in question, those conditions would need to be retained in the RCRA permit or included within an appropriate air mechanism. In those limited cases, sources and permitting agencies may instead agree to identify the RCRA limit in the title V permit. Since one goal of the title V program is to clarify a source's compliance obligations, it will be beneficial, and convenient, to acknowledge the existence of more stringent limits or operating conditions derived from RCRA authority for the source in the title V permit, even though the requirements would not reflect CAA requirements. We strongly encourage Regional, State, and local permitting authorities to take advantage of this beneficial option.

2. How Will I Make the Transition to CAA Permits?

In the May 1997 NODA, we expressed our intent to rely on the title V permitting program for implementation of the new standards, and asked for comments on how and when the transition from RCRA should occur (see 62 FR 24250, May 2, 1997). We are amending the regulations in 40 CFR part 270 to specify the point at which the RCRA regulatory requirements for permitting would cease to apply. However, once you have a permit, you must comply with the conditions in that permit until they are either removed or they expire. Many commenters expressed an interest in what happens to conditions in a RCRA permit once the new standards are published. We received a variety of suggestions, but a common thread was a request for EPA to lay out a clear path through the permit transition process. While we recognize the desirability of having a uniformly defined route for getting from one permit to another, it is important to provide flexibility to allow a plan that makes the most sense for the situation at hand. There is not a ''one size fits all'' approach that would be appropriate in all cases. Thus, we are not prescribing a transition process via regulation, but providing guidance in the following discussion which we hope will assist regulatory agencies in determining a route that makes the most sense in a given situation. Given the level of interest expressed, we will, in the ensuing discussion, map out a process for implementing the deferral of air emissions controls from RCRA to MACT compliance and title V permitting. We address key considerations that should factor into the decision of how and when to implement the deferral of permit conditions.[302]

[300] The requirements for providing notice of and conducting the public meeting as part of the Notice of Intent to Comply provisions are based on the RCRA preapplication meeting requirements in 40 CFR 124.31.

[301] The BIF limits for metals under RCRA are based on different level of site-specific testing and risk analysis (Tier I through Tier III). It is possible that, if it were based on the more stringent analysis, a RCRA BIF limit could be more stringent than the corresponding MACT standard.

[302] Although we are not mandating an approach to transition by regulation, we are, as discussed in Section 2. How Should RCRA Permit Be Modified?

In identifying key aspects of the transition, we seek the optimal balance of three basic considerations raised by commenters and other stakeholders. The considerations are to: (1) Address public perception issues associated with taking conditions out of a RCRA permit; (2) minimize the amount of time a source might be potentially subject to overlapping requirements of RCRA and the CAA (and thus subject to enforcement under both RCRA and the CAA for the same violation); and (3) provide flexibility to do what makes the most sense in a given situation. The first two considerations are primarily factors of time—when should conditions be removed from the RCRA permit? The third consideration is more a factor of how—what mechanism should be used for removing RCRA conditions?

Why do these particular considerations carry such importance? As for the first, one of the points emphasized in our National Hazardous Waste Minimization and Combustion Strategy is the importance of bringing hazardous waste combustors under permits as quickly as possible. The Strategy has been driving EPA Regions and authorized States to place their top permitting priority on the hazardous waste combustor universe. Consequently, the Strategy may have created a certain perception on behalf of the public about the importance of the actual permit document. The actual issue we are trying to address here is more of a concern about a potential break in regulatory coverage of a source as it transitions from RCRA permitting requirements to the CAA regulatory scheme.

While it might appear that we are altering the policy expressed in the Strategy if we allow removal of conditions from a RCRA permit before the title V permit is in place, it is not the actual permit document that is of paramount importance. Rather, our focus is and has been on maintaining a complete and enforceable set of operating conditions and standards. One of the underlying tenets of the position taken on permitting in the Combustion Strategy was a commitment to bring hazardous waste combustors under enforceable controls that demonstrate compliance with performance standards. Under RCRA, the permit was the available vehicle to achieve better enforcement of tighter conditions than exist in interim status.

We remain committed to this underlying tenet. However, the mechanism for achieving this objective under the CAA is not necessarily the title V permit. In RCRA, the permitting process provides the vehicle for the regulatory agency to approve testing protocols (including estimated operating parameters), to ensure completion of the testing, and to develop final operating parameters proven to achieve performance standards. The final RCRA permit is the culmination of these activities. Under MACT, these activities do not culminate in a permit, but in a NOC. The development of the NOC is separate from the development of the title V permit. The title V permitting process is primarily a vehicle for consolidating in one document all of the requirements applicable to the source. Conversely, it is the NOC that contains enforceable operating conditions demonstrated through the comprehensive performance test to achieve compliance with the hazardous waste combustor MACT standards (which are generally more stringent than the RCRA combustion performance standards). Thus, the NOC captures the intent of the Strategy with regard to ensuring enforceable controls demonstrated to achieve compliance with relevant standards are in place.

Another basis for our position on permitting in the Combustion Strategy is the level of oversight by the regulatory agency during the permitting process, which is typically greater than that which occurs during interim status. For example, although BIFs operating under interim status are required to conduct compliance testing and subsequently operate under conditions they identify in a certification of compliance, there are no requirements for the regulatory agency to review and approve compliance test plans or results. On the other hand, oversight by the regulatory agency is more intensive during the permitting process, *e.g.*, through the trial burn planning (including regulatory approval of the trial burn plan), testing, and development of permit conditions. Although the process required for interim status BIFs under RCRA may, at first, seem analogous to the CAA MACT process, *i.e.*, sources being required to conduct comprehensive performance tests and subsequently operate under conditions in an NOC, there is a significant difference. The difference is the level of oversight that occurs in the MACT process. According to the MACT requirements in 40 CFR 63.1207(e) and 63.1206(b)(3), the regulatory agency must review and approve the performance test protocol and must make a finding of compliance based on the test results that are reported in the NOC. The NOC consequently represents a level of agency oversight that is actually more analogous to the RCRA permit process than to interim status procedures.

An additional reason for the importance, under the Combustion Strategy, of bringing hazardous waste combustors under permits was to allow for the imposition of additional permit conditions where necessary to protect human health and the environment. In general, these conditions are established based on the results of a site-specific risk assessment and imposed under the RCRA omnibus authority. This objective will continue to be met even though we are deferring regulation of hazardous waste combustor air emissions, in general, to the CAA. Coming into compliance with the more stringent and more encompassing MACT standards will accomplish part of the Combustion Strategy's goal of improved protection. For any cases where the protection afforded by the MACT standards is not sufficient, the RCRA omnibus authority and RCRA permitting process will continue to be used to impose additional conditions in the RCRA permit (or, as discussed earlier, in a title V permit).

With regard to the remaining considerations, we seek here to reduce duplicative requirements across environmental media programs (*i.e.*, air emissions under the CAA and RCRA). This objective to reduce duplication is behind our goal of minimizing the amount of time a source might be potentially subject to dual permitting and enforcement scenarios. In order to allow for common sense in implementing environmental regulations, we need to provide flexibility here to do what makes sense in a given situation. We have provided this flexibility in today's rule by not prescribing only one process for transitioning from RCRA to the CAA.

3. When Should RCRA Permits Be Modified?

We identified two options in the May, 1997, NODA for when conditions should be ultimately removed from RCRA permits (see 62 FR 24250). Our preferred option at the time is to wait until the source had completed its comprehensive performance test and the standards had been included in its title V permit. The alternative option we identified would be to modify the RCRA permit once the facility submits the results of its comprehensive performance test.

below, providing a tool in the RCRA permit modification table in 40 CFR 270.42, Appendix I, that may be used to assist regulators and sources in effecting the transition.

Of the comments that spoke to the timing issue, some advocate waiting for the title V permit, but most opposed this position. The majority of commenters favor effecting the transition either on the compliance date, since we had said in the NODA that the pre-NOC would be due to the regulatory agency on that date [303] and would contain enforceable conditions, or upon submittal of the NOC, since it contains enforceable operating conditions demonstrated to achieve compliance with the standards. All three of these approaches are identified in the time line shown in Figure 1. Readers will note that the time line shows two potential points for the title V permit to be issued (options 1A and 1B). Option 1A is based on the statutory time frames for issuing title V permits. Under this option, the title V permit may be issued prior to the compliance date for the new standards, but it might only include the standards themselves and a schedule of compliance. Under option 1B, the operating requirements in the NOC that actually have been demonstrated to achieve compliance would be included in the permit.

We evaluated each of the options in terms of the two timing-related considerations listed above: addressing the perception issue that stems from removing conditions from the RCRA permit (which, as discussed above, is really a concern about a break in regulatory coverage—*i.e.,* that there might be a period of time when the source would not have enforceable controls demonstrated to achieve compliance with stack emissions standards), and minimizing the amount of time sources would potentially be subject to the same requirement(s) under both RCRA and CAA. These considerations may not always be compatible. For example, one way to address the perception of creating a break in regulatory coverage would be to continue to place emphasis on the permit, rather than on the tenet behind the permit (of having enforceable controls that demonstrate compliance with performance standards). This would mean waiting to remove conditions from a RCRA permit until a source has demonstrated compliance with the MACT standards and incorporated the appropriate combustion operating requirements in its NOC into the title V permit (*i.e.,* option 1B). However, this approach would maximize the amount of time the source potentially would be subject to overlapping requirements under RCRA and the CAA. On the other hand, one way to address the overlapping requirements consideration would be to allow removal of conditions from the RCRA permit at the time the standards are promulgated. But, this would create a time period during which the source would not have enforceable controls proven to achieve compliance, which would not address the concern about avoiding a break in regulatory coverage. Clearly neither of these extremes can provide a good balance between the two timing-related considerations.

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[303] We are adopting a DOC (previously the pre-NOC) requirement in today's final rule, but it is amended from how we presented it in the NODA (as discussed in Part Five, Section IV). Rather than submitting the DOC to the regulatory agency, a source must maintain it in their operating record. We encourage source owners and operators to set up the operating record in an unrestricted location that is reasonably accessible by the public.

FIGURE 1:

HAZARDOUS WASTE COMBUSTOR MACT IMPLEMENTATION TIME LINE: OPTIONS FOR TIMING OF PERMIT TRANSITION

				Option 1A	*Option 2*			*Option 3*	*Option 1B*	
HWC MACT rule published	NIC due to regulatory agency		Progress report due to regulatory agency	Performance test plans due	DOC in operating record [3]	Notification of test plan approval or intent to deny		Performance tests completed	NOC, including test results, due to regulatory agency	
Year 0	**Year 1**	**Year 1.5**	**Year 2**	**Year 2.5**	**Year 3**	**Year 3.25**		**Year 3.5**	**Year 3.75**	**Year 4.5 [4]**
EFFECTIVE DATE					**COMPLIANCE DATE**					
	Title V permit applications due to permitting authority [1]	Reopenings complete for sources with 3 or more years left in permit term		Title V permit decisions made [2]					Revise title V permit to include NOC	

Notes:

1/ Sources newly subject to title V as a result of the hazardous waste combustor (HWC) MACT rule have 12 months to submit applications. Sources that have title V permits with a remaining permit term of 3 or more years when the HWC MACT rule is promulgated must reopen the permit to address HWC MACT. Such a reopening must be completed within 18 months of rule promulgation. Sources with title V permits with less than 3 years remaining in the permit term do not have to reopen; they can wait until renewal to address HWC MACT. However, in the interim, sources must meet the HWC MACT requirements.

2/ By statute, permitting authorities have 18 months to act on title V applications, if they are submitted after the first full year of a title V permit program. This means that decisions on title V applications or reopening requests submitted at Year 1 would be made by Year 2.5 -- still a year before sources conduct the performance test (which

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(1) provides operating parameters for the unit, (2) demonstrates compliance with the standards, and (3) provides data for the notification of compliance (NOC)). However, permitting authorities are behind schedule in issuing title V permits; thus, we cannot assume that permits will have been issued by this point. We also cannot assume they will not be issued, because the permitting authorities may "catch up" with their schedule.

3/ Although the source is subject to enforceable *requirements* from the time of MACT promulgation (e.g., requirements for the Notice of Intent to Comply (NIC), the progress report, performance tests, and so on), this is the first point at which the source is subject to enforceable *operating conditions* (those contained in the DOC maintained in the source's operating record); however, these conditions have not yet been demonstrated to actually achieve the standards.

4/ It could take up to nine months to incorporate significant permit revisions (see 40 CFR 70.7(e)(4)(ii) and 71.7(e)(3)(ii)).

We evaluated each option to determine which most effectively balances the relevant issues. Options 1A and 1B focus primarily on tying the transition timing to title V permitting. Option 2 links the timing for transition to the DOC (previously called the pre-NOC). Option 3, which we are recommending be followed, ties transition to submittal of the NOC.

a. Option 1A. This option is a variation of an option discussed in the May, 1997, NODA. There we stated, ''The Agency's current thinking is that the RCRA permit should continue to apply until a facility completes its comprehensive performance testing and its title V permit is issued (or its existing title V permit is modified) to include the MACT standards. The RCRA permit would then be modified to remove the air emissions limitations which are covered in the title V permit.'' (see 62 FR 24250). Although this description basically applies to option 1B, the discussion in the NODA might also have been interpreted to mean that once the standards are in a title V permit, the corresponding emissions limits should be removed from the RCRA permit. When reviewing the implementation time line in terms of the statutory and regulatory time frames governing the title V process, we found that sources might well have title V permits issued or modified to include the new standards a year before they ever conduct performance testing. Although the permit would likely include the standards and a schedule for complying with the new limits, it would not include any of the key combustion operating requirements demonstrated in the performance test. Thus, even though option 1A would seem to address the concern about a break in coverage because the title V permit would have been issued, in actuality, the underlying tenet of the Combustion Strategy—that the source have enforceable operating parameters proven to achieve the new standards—is not fully addressed.

b. Option 1B. This option calls for the NOC to be incorporated into title V permits before any conditions could be removed from RCRA permits. As discussed earlier, this approach would not be consistent with our goal of minimizing duplication across permitting programs, even though it was identified as our current thinking in the NODA. As discussed in the NOC/title V Interface Section, the initial NOC must be incorporated into the title V permit as a significant permit modification, which could add another nine months to the transition period. Moreover, commenters express concern over impacts that existing delays in title V permitting activities might have. Commenters wrote that given the tremendous volume of permits to be issued (hazardous waste combustors being just one small subset) there would be no way to predict how long it might take regulatory agencies to initially issue or modify title V permits to include the standards, or to modify permits to include NOCs, despite time frames set forth in the title V regulations. We agree that delaying removal of air emissions and related parameters from RCRA permits until this occurs would unnecessarily extend the amount of time sources might be subject to overlapping requirements. As pointed out by commenters, having overlapping requirements may present technical and administrative difficulties. Examples of technical difficulties include, but are not limited to, the potential for conflicting requirements with regard to testing, monitoring, and compliance certifications. Examples of administrative difficulties include, but are not limited to, permit maintenance issues stemming from different permit modification procedures and appeals procedures.

c. Option 2. Option 2 reflects the time frame suggested by some commenters for effecting the transition upon submittal of the DOC, which, under the NODA discussion, would have been due to the regulatory agency on the compliance date (note: commenters appear to use the terms ''compliance date'' and ''effective date'' interchangeably, but they are quite different). Basing transition on the DOC was still a viable option to consider, even with our amended approach of having the source maintain the DOC in its operating record. The DOC contains enforceable operating conditions for key combustion parameters that the source anticipates will achieve compliance with the new standards. Although the source would have had to comply with other enforceable part 63 requirements by this point (*e.g.*, requirements for the Notice of Intent to Comply, the progress report, and the performance test plan), this would be the first point where a source might have overlapping requirements governing air emissions and related operating parameters—those in the DOC and those in the RCRA permit. Recommending removal of RCRA permit conditions at this point would thus minimize the potential for duplicative requirements. However, we conclude that it would still not address the perception issue adequately. Specifically, even though the source is subject to enforceable operating requirements, the source has not actually demonstrated compliance with the new standards.

d. Option 3. This option reflects the alternative approach we suggested in the May, 1997, NODA, as well as the preferred option of the majority of those who submitted comments on the timing issue. Under this recommended option, a source might well have a title V permit that addresses the new standards to some extent, even if just by including the standards themselves and a schedule for compliance. More importantly, the source will have conducted its comprehensive performance test, and submitted an NOC containing key operating parameters demonstrated to actually achieve compliance (and which are enforceable). Although there would be some time during which a source might have overlapping requirements (those in its NOC and those in its RCRA permit), this would be a finite and predictable amount of time. After considering all the comments, we conclude that option 3 best meets the dual challenges of ensuring the source is continuously subject to enforceable controls demonstrated to achieve compliance while minimizing the time you would be subject to permitting requirements for, and enforcement of, operating parameters and limits under both RCRA and the CAA. Therefore, today's rule adopts option 3.

We acknowledge that this approach does not completely eliminate concerns expressed by some commenters about the potential for facilities to be subject to dual enforcement mechanisms. Although this potential may exist during the brief transition period when a source has enforceable conditions under both CAA and RCRA, we will exercise enforcement discretion to avoid any duplicative inspections or actions, and we encourage States to do so as well. If any inspections are scheduled to occur during the brief transition period (which may be unlikely given how short this period is), the regulatory agency could conduct joint inspections by RCRA and CAA enforcement staff. Joint inspections might help to alleviate some of the potential for any duplicative efforts, either in terms of individual inspections targeting the same areas, or enforcement actions being taken under both RCRA and CAA authorities.

Under Option 3, you would most likely have a title V permit that addresses the hazardous waste combustor MACT standards to some extent. We expect that if the permit were issued prior to the comprehensive performance test and the submittal of the NOC, it would contain the standards

themselves, and related requirements in part 63 subpart EEE, such as the requirements to develop and public notice performance test protocols, to develop and maintain in its operating record the DOC with anticipated (and enforceable) operating limits, to conduct the comprehensive performance test and periodic confirmatory tests, and to submit the NOC, including the test results, to the regulatory agency.

The public would have had an opportunity to comment on the requirements in the title V permit as part of the normal CAA administrative process for issuing permits. Furthermore, the public would have had other opportunities to be involved in your compliance planning. For example, under the requirements for the Notice of Intent to Comply in § 63.1210(b), you would have had to conduct an informal meeting with the community to discuss how you intend to come into compliance with the new standards. You also are required in § 63.1207(e) to provide public notice of the performance test plan, so the public would have the opportunity to review the detailed testing protocol that describes how the operating parameters will achieve compliance.

4. How Should RCRA Permits Be Modified?

Once you have been issued a RCRA permit, you must comply with the conditions of that permit. Unless the conditions have been written into the permit with sunset (*i.e.*, automatic expiration) clauses governing their applicability, conditions remain in effect until the permit is either modified to remove them or the permit is terminated or expires. Promulgation of final MACT standards for hazardous waste combustors does not in itself eliminate your obligation to comply with your RCRA permit. In the May 1997 NODA, we stated that the RCRA permit would be modified to remove air emission limitations that are covered under MACT, but did not elaborate on what modification procedures would be followed. We solicited comments on how the transition should occur.

Of the commenters that addressed this issue, the recurring theme in the comments is for EPA to provide a mechanism that would impose minimal burden on sources and permit writers to process the modifications. Some express a desire to see the RCRA conditions removed in some automatic fashion once the MACT standards became effective. A mechanism for accomplishing this, suggests one commenter, would be to include a requirement in the final rule that would effect removal of conditions from all RCRA permits. One commenter suggests adding a new line item to Appendix I in § 270.42, designated as class 1, to address the transition to MACT. Another suggests a new line item designated as class 1 requiring prior agency approval. A third suggests a new line item designated as class 2.

We do not agree with eliminating conditions from all RCRA permits as part of a national rulemaking effort (*i.e.*, we do not agree with an ''automatic'' removal), particularly given the existence of authorized sate programs and state-issued permits. Permits may contain site-specific conditions developed to address particular situations, *e.g.*, conditions based on the results of a site-specific risk assessment. To ensure that the regulatory agency continues to meet its RCRA obligation to ensure protection of human health and the environment, these conditions may need to be evaluated on a case-by-case basis vis-a-vis the MACT standards before they are removed. If the RCRA risk-based conditions are more stringent or more extensive than the corresponding MACT requirements, the conditions must remain in the RCRA permit.

We do agree with commenters that there should be a streamlined approach to removing conditions from a RCRA permit that are covered by the hazardous waste combustor MACT regulations at the time an NOC demonstrating compliance is submitted to the regulatory agency. All other conditions would, of course, remain in the RCRA permit. Once you demonstrate compliance with MACT, we consider the transition from RCRA to be primarily an administrative matter since you will not only be subject to comparable enforceable requirements under CAA authority, but also will continue to be subject to any site-specific conditions under RCRA that are more stringent than MACT. Our intent is not to impose an additional burden on you or permit writers for a largely administrative requirement. To this end, we are adding a new line item to the permit modification table in 40 CFR 270.42, Appendix I, to specifically address the transition from RCRA to the CAA.

The approach of adding a new line item to the permit modification table is consistent with the comments we received pursuant to the May 1997 NODA. We agree with the commenter who suggests the new item be designated as a class 1 modification requiring prior Agency approval. This classification effectively balances the need to retain some regulatory oversight of the changes with the goal of minimizing the amount of time a source will be subject to regulation under both RCRA and the CAA for essentially the same requirements. A class 1 modification without prior approval, suggests one commenter, would not be sufficient to accomplish the transition with adequate confidence in proper regulatory coverage. Even though we consider the deferral to be an administrative matter, it is important to retain some level of regulatory oversight prior to effecting the change to provide the opportunity to address any differences between the two programs. On the other hand, the administrative exercise of transitioning from RCRA to the CAA does not warrant the extra measures (and attendant time commitment) of a class 2 modification procedure.

We are designating the new line item (A.8.) in the Appendix I table as class 1 requiring prior Agency approval. Thus, the administrative procedures associated with this mechanism will not be overly burdensome, yet RCRA permit writers will have an opportunity to confer with their counterparts in the air program prior to approving the request to eliminate conditions from the RCRA permit. This allows the RCRA permit writer to verify that you have completed the comprehensive performance test and submitted your NOC. In the few situations where site-specific, risk-based conditions have been incorporated into RCRA permits, it also provides the RCRA permit writer with the opportunity to review such conditions vis-a-vis the MACT standards to ensure any conditions that are more stringent or extensive than those applicable under MACT are retained in the RCRA permit. The public also would be informed that the transition from RCRA was being effected because the modification procedures require a notice to the facility mailing list. We recommend that the public notice for the RCRA permit modification also briefly mention that you have completed performance testing under the CAA, and are operating under enforceable conditions that are at least as stringent as those being removed from your RCRA permit.

One commenter offered suggestions for preparing the RCRA modification requests. We found some of these suggestions helpful and recommend that, to facilitate processing of the RCRA modification requests, you (1) identify in your modification requests which RCRA conditions should be removed, and (2) attach your NOC to the requests.

From another perspective, today's approach for removing conditions from the RCRA permit also may encourage

you to work closely with the air program to expeditiously resolve any potential or actual disagreements on the results of the comprehensive performance test and conditions in the NOC. The RCRA permit writer is not likely to approve the modification request until he or she has received confirmation that their air program counterpart is satisfied with your compliance demonstration under MACT (*i.e.*, that they have made the finding of compliance based on the test results documented in the NOC, as discussed in the following paragraph). Thus, you should continue to be subject to requirements under both RCRA and the CAA until the differences, if any, are resolved.

We are not including a requirement in either part 63 subpart EEE or part 270 specifically for the regulatory agency to approve the NOC before approving the RCRA modification request. We have incorporated the general provision for making a finding of compliance (see § 63.6(f)(3)) into the requirements of subpart EEE at § 63.1206(b)(3). According to these provisions, the regulatory agency has an obligation to make a finding of compliance with applicable emissions standards upon obtaining all of the compliance information, including the written reports of performance test results. Because of this obligation, air program staff currently review stack test results that are submitted in NOCs subsequent to performance testing, and routinely transmit an official letter to you indicating the acceptability of the test results. Furthermore, if you fail the comprehensive performance test, there are requirements in part 63 subpart EEE specifying what you must then do. Given this combination of regulatory obligations and current practices, we see no need to impose additional requirements governing review of performance test results. This approach is also consistent with the timing for when permit requirements are deferred to CAA (see the amended rule language for 40 CFR 270.19, 270.22, 270.62, and 270.66)).

5. How Should Sources in the Process of Obtaining RCRA Permits Be Switched Over to Title V?

In the initial NPRM and the May, 1997, NODA, we did not specifically describe, or solicit comment on, permit process issues for facilities operating under RCRA interim status, or facilities seeking to renew their RCRA permits (which can occur even after the nominal permit term has expired). In the above sections, we focused on implementing the deferral of RCRA controls by determining how and when to move conditions out of existing RCRA permits. For facilities that do not yet have RCRA permits, or that need to renew their RCRA permits, the focus of the discussion shifts to how and when to move nonrisk-based air emissions considerations out of the RCRA permitting process. As indicated earlier, RCRA interim status facilities will continue to be subject to RCRA permitting requirements for air emissions standards and related operating parameters, including trial burn planning and testing, until they have demonstrated compliance with the new standards by conducting a comprehensive performance test and submitting an NOC to the agency. Facilities in the process of renewing their RCRA permits will also continue to be subject to RCRA permitting requirements until the same point.

Again, there is no single approach for moving these two categories of facilities out of the RCRA permitting process (*i.e.*, for stack air emissions requirements). The most appropriate route to follow in each case depends on a host of factors, including, for example: (1) The status of the facility in the RCRA permitting process at the time this rule is published; (2) the priorities and schedule of the regulatory agency; (3) the level of environmental concern at a given site; and (4) the number of similar facilities in the permitting queue. The regulatory agency (presumably in coordination with the facility) will balance all of these factors. In mapping out a site-specific approach, we are encouraging permitting agencies to give weight to two key factors. First, we should minimize to the extent practicable the amount of time a facility would be subject to duplicative requirements between RCRA and CAA programs. Second, as indicated in Part Five, Section V.B (Risk Burn/Comprehensive Performance Testing), testing under one program should not be unnecessarily delayed in order to coordinate with testing under the other. For example, if a facility is planning to conduct a RCRA trial burn within a fairly short amount of time after the rule is promulgated, they generally should not be allowed to delay the trial burn to coordinate with comprehensive performance testing under MACT that may not occur for three more years.[304]

Even though we cannot prescribe a single national approach for the transition from RCRA permitting for air emissions, we can provide some other recommendations to help permitting authorities and facility owners or operators determine a sound approach. In this section, we walk through some examples, intended as guidance, for transitioning facilities that are in the process of obtaining or renewing a RCRA permit. We hope that these examples will also enhance consistency among the various regulatory agencies.

a. Example 1. Facility has submitted a RCRA permit renewal application. Some sources, particularly hazardous waste incinerators, have RCRA permits that are close to expiring. These sources may already have initiated the renewal process by the time this rule is promulgated. In these situations, we anticipate the source might need to modify its current permit to accommodate any upgrades necessary to comply with the new standards. Facilities may modify RCRA permits that have been continued under § 270.51 pending final disposition of the renewal application. Thus, facilities will be able to use the streamlined permit modification procedures that were promulgated in § 270.42(j) to effect the necessary changes pending resolution of their renewal application. Depending on where they are in the renewal process, the permitting authority may, alternatively, elect to fold the modifications into the actual renewal process, thereby streamlining some of the administrative requirements.

Issuance of RCRA hazardous waste combustor permits often takes several years. If the source and the permitting authority are in the early stages of renewal, the schedule of permitting activities may not call for a trial burn to be conducted until sometime close to when the source would be required to conduct comprehensive performance testing under MACT. If so, the source may be able to either coordinate the testing requirements of the two programs, *e.g.*, if a RCRA risk burn is necessary, or to perform just the comprehensive performance test under MACT. If, on the other hand, they are further along in the renewal process, the trial burn might be scheduled for the near future. In this case, the approach outlined in Example 2 below might be more appropriate to follow.

Regardless of the approach followed to transition the air emissions and related operating parameters for the combustion unit to the Air program, the

[304] There may be a short delay allowed for the purpose of combining RCRA trial burn and MACT performance test plans. Of course, even if the timing for the two tests is such that they may be coordinated, that does not mean that one can simply replace the other, particularly because test conditions for one may not be applicable to the other (refer to Section V.B for additional discussion on this topic).

RCRA permit must still be renewed for all other aspects of hazardous waste management at the facility.

b. Example 2. Permitting authority has approved, or is close to approving, the RCRA trial burn plan at the time the final MACT standards are promulgated. Both interim status facilities and those seeking permit renewal are subject to requirements in §§ 270.62 and 270.66 to develop and obtain approval for trial burn plans. Requirements in these sections also call for permitting authorities to provide public notice of approved (or tentatively approved) trial burn plans and projected schedules for conducting the burns. We anticipate that many of the hazardous waste combustors seeking permits who are subject to this rulemaking will have already had their trial burn plans approved, or close to being approved, by the time this rule is promulgated. In such situations, we expect the facility to continue with the trial burn as planned.

If the burn is successful, we anticipate the permitting authority will issue a final RCRA permit that covers both the operations of the hazardous waste combustor unit as well as all other hazardous waste management activities at the site. We recommend that the permit be worded flexibly to facilitate transition to title V once the source subsequently demonstrates compliance with the MACT standards. For example, conditions in the RCRA permit that would ultimately be covered under title V might have associated sunset provisions indicating that the conditions will cease to apply once the combustor unit demonstrates compliance with the MACT standards. This would ensure that the amount of time the source might be subject to emissions limits and operating parameters under both RCRA and the CAA would be minimized. It would also eliminate the need to engage in a separate permit modification action to remove the conditions after the MACT compliance demonstration.

Facilities in this scenario may determine they need to make some changes to their equipment or operations to meet the new emissions limits. These facilities will be able to use the streamlined permit modification procedures that were promulgated in § 270.42(i).

If the trial burn is not successful, we expect permitting authorities to refer to the RCRA trial burn failure policy (see Memorandum on Trial Burns, EPA530–F–94–023, July 1994). This policy includes discussion in the following areas: (1) Taking immediate steps to restrict operations; (2) initiating procedures for permit denial (which would be appropriate for interim status or renewal candidates); (3) initiating proceedings to terminate the permit (which would be appropriate for proposed new facilities); and (4) authorizing trial burn retesting after the facility investigates reasons for the failure and makes changes to address them.

c. Example 3. The permitting authority does not anticipate approving the trial burn plan, or the trial burn is not scheduled to occur until after the Notice of Intent to Comply is submitted. As suggested in the previous example, if a facility is ready to proceed with a trial burn at the time the final hazardous waste combustor MACT rule is promulgated, we expect that activities will proceed as planned. Once the Notice of Intent to Comply is submitted, however, the regulatory authority will have a better understanding of how and when the facility intends to comply with the emissions standards, and how the trial burn would fit in with the MACT compliance demonstration. Thus, we expect the regulatory authority may wish to decide whether to separately continue with the trial burn schedule laid out in the RCRA permitting process or, conversely, coordinate with MACT comprehensive performance testing, based on a number of considerations, including, for example: (1) The facility's schedule and planned modifications for MACT compliance; (2) progress on completing and approving the RCRA trial burn plan; (3) whether the risk testing that may be necessary under RCRA is likely to fit in with the MACT performance test schedule; and (4) whether the facility wants to combine risk testing under RCRA with the MACT performance test.

Even after a source conducts its comprehensive performance test and subsequently submits the NOC to the regulatory agency, separate risk testing might be necessary. For example, if the comprehensive performance test did not generate sufficient data for a site-specific risk assessment, a RCRA ''risk burn'' might be required (see discussion in Part Five, Section V.B.).

E. What Is Meant by Certain Definitions?

When we considered incorporating MACT standards into both RCRA and CAA regulations, we anticipated some confusion about definitions that differ between the two programs. In the NPRM, we solicited comments on our expressed preference not to reconcile these issues on a national basis. (See 61 FR 17452). Several commenters suggest that EPA reconcile the issues and clarify definitions. In the final rule, we have made some changes, as discussed below, to ensure consistency of interpretation and to minimize uncertainty for facilities seeking to comply with today's rule. With these changes, we believe that revisions to the definitions themselves are not necessary.

1. Prior Approval

In the proposed rule, we stated that RCRA and CAA are similar in that they both require EPA prior approval before construction or reconstruction of a facility. There were no adverse comments received regarding this statement. The requirements for obtaining prior approval are apparently clear under both programs.

We suggested in the proposed rule that readers of part 63 might be unaware of their obligations under RCRA. Therefore, as proposed, we are inserting the following note into § 63.1206 Compliance Dates, ''An owner or operator wishing to commence construction of a hazardous waste incinerator or hazardous waste-burning equipment for a cement kiln or lightweight aggregate kiln must first obtain some type of RCRA authorization, whether it be a RCRA permit, a modification to an existing RCRA permit, or a change under already existing interim status. See 40 CFR part 270''. No adverse comments were submitted.

2. 50 Percent Benchmark

As stated in the proposed rule, RCRA and CAA both classify ''reconstruction'' as any modifications of a facility that cost more than 50 percent of the replacement cost of the facility. However, the significance of this term is different depending on which statute is being applied. Two commenters confirmed that the distinction is critical. Therefore, they concluded that, to avoid confusion, EPA should defer to the CAA definition of ''reconstruction'' under RCRA Section 1006(b) because it is the more flexible and appropriate definition.

The primary concern about the 50 percent benchmark is in relation to the limit imposed on RCRA interim status facilities for making modifications. To ensure that this limit would not present a barrier to making upgrades necessary to comply with MACT, we finalized a revision to § 270.72(b) to specify that interim status facilities can exceed the 50 percent limit if necessary to comply with MACT. (See 63 FR 33829, June 19, 1998). Therefore, there is no potential for practical conflict among the CAA and RCRA regulatory regimes, and no further amendment or clarification is needed.

3. Facility Definition

As stated in the NPRM, the definition of ''facility'' differs between CAA and RCRA. The definition has bearing in determining the value of the facility with respect to the 50 percent rule on modifications as discussed above. We proposed that the RCRA definition should be used for the RCRA application to changes during interim status, and the CAA definition should be used when determining applicability of MACT standards to new versus existing sources. Commenters disagreed with this approach and concluded that EPA should defer to the CAA definition of facility because it encompasses the entire operations at a site. We continue to believe that the CAA definition should apply to CAA requirements and that the RCRA definition should apply to RCRA requirements, since the definitions are used for a different purpose under each statute. By clarifying the 50 percent benchmark issue for RCRA interim status facilities as discussed above, we believe this satisfies commenters' concerns and, thus, it is not necessary to reconcile the facility definition.

4. No New Eligibility for Interim Status

RCRA bestows interim status on facilities that were in existence on November 19, 1980, or are in existence on the effective date of statutory or regulatory changes that render the facility subject to RCRA permitting requirements. The original RCRA rules for hazardous waste incinerators and BIFs were finalized in 1980 and 1991, respectively. Because these rules established the dates on which incinerators and BIFs were first subject to RCRA permitting requirements, the effective dates of those rules created the *only* opportunity for interim status eligibility. The interim status windows that occurred in 1980 and 1991 thus are not modified by this rule. The lone exception is that facilities currently burning only nonhazardous wastes that become newly listed or identified hazardous waste under other future rules would still be able, under existing law, to qualify for interim status (§ 270.42(g)).

5. What Constitutes Construction Requiring Approval?

The proposed rule noted that RCRA and CAA both have restrictions requiring approval prior to construction, but that each statute defines construction differently. We expressed our intent in the NPRM to retain the two definitions. In the final rule, we continue to support retaining the two definitions. Since most facilities currently possess RCRA and CAA permits, these definitions are already being applied concurrently with no apparent problems. Consequently, this is the most practical and least confusing approach for permittees and regulators.

XII. State Authorization

A. What Is the Authority for Today's Rule?

Today's rule is being issued under the joint authority of the Clean Air Act (CAA), 42 U.S.C. 7401 *et seq.*, and the Resource Conservation Recovery Act (RCRA), 42 U.S.C. 6924(o), 6924(q) and 6925. The new MACT air emissions standards are located in 40 CFR part 63. Pursuant to sections 1006(b) and 3004(a) of RCRA, 42 U.S.C. 6905(b) and 6924(a), the MACT program will only be carried out under the CAA delegated program. We strongly encourage States to adopt today's MACT standards under their CAA statute and to apply for delegation under the CAA if they do not have section 112 delegation. State implementation of the MACT portions of this rule through its delegated CAA program will facilitate coordination between the regulated entity and its State and reduce duplicative permitting requirements under the CAA and RCRA.

In addition to promulgating the MACT standards, today's rule modifies the RCRA program in other various respects and States authorized for the RCRA base program must revise their programs accordingly. For example, this rule revises the test for determining whether a facility's waste retains the Bevill exclusion by adding dioxins/furans to the list of constituents to be analyzed.

B. How Is the Program Delegated Under the Clean Air Act?

States can implement and enforce the new MACT standards through their delegated 112(l) CAA program and/or by having title V authority. A State's title V authority is independent of whether it has been delegated section 112(l) of the CAA.

Section 112(l) of the CAA allows us to approve State rules or programs to implement and enforce emission standards and other requirements for air pollutants subject to section 112. Under this authority, we developed delegation procedures and requirements located at 40 CFR part 63, subpart EEE, for National Emission Standards for Hazardous Air Pollutants (NESHAPS) under section 112 of the CAA (see 58 FR 62262, November 26, 1993, as amended, 61 FR 36295, July 10, 1996). Similar authority for our approval of state operating permit programs under title V of the CAA is located at 40 CFR part 70 (see 57 FR 32250, July 21, 1992).

Submission of rules or programs by States under 40 CFR part 63 (section 112) is voluntary. Once a State receives approval from us for a standard under section 112(l) of the CAA, the State is delegated the authority to implement and enforce the part 63 standards under the State's rules and regulations (the approved State standard would be federally enforceable). States also may apply for a partial 112 program, such that the State is not required to adopt all rules promulgated in 40 CFR part 63. We will implement the portions of the 112 program not delegated to the State. For example, documents such as the NOC will be submitted to the Administrator when due, if the State is not approved for the standards in today's rule.

Under 40 CFR 70.4(a) and section 502(d) of the CAA, States were required to submit to the Administrator a proposed part 70 (title V) permitting program by November 15, 1993. If a State did not receive our approval by November 15, 1995 for its title V program, the title V program had to be implemented by us in that State. As of today's rule, all States have approved title V programs.[305] This means that all States have the authority to incorporate all MACT standards (changes to section 112 of the CAA) into the title V permits as permit conditions, and have the authority to enforce all the terms and conditions of the title V permits. *See* 40 CFR 70.4(3)(vii).

The MACT standards are effective upon promulgation of this rule. Facilities with a remaining permit term of three or more years will be required to submit title V applications to their permitting authorities to revise their permits.[306] States will write the new

[305] Under the CAA, Indian tribes may apply to EPA to be treated as States and obtain approval of their own Clean Air Act programs. Section 301(d) of the Clean Air Act, 42 U.S.C. 7601(d); see also 40 CFR part 49. Tribes may thus become empowered to implement the section 112 and title V portions of today's rule is areas where they demonstrate jurisdiction and the capacity to do so. Currently under RCRA, there is no Tribal authorization for the RCRA Subtitle C hazardous waste program and thus EPA generally implements the RCRA portions of today's rule in Indian Country.

EPA has authority to implement the federal operating permits program 940 CFR part 71) where a State fails to adequately administer and enforce an approved part 70 program, or where a State fails to appropriately respond to an EPA objection to a part 70 permit. Additionally, some sources in U.S. Territories, the Outer Continental Shelf, and Indian Country, are subject, or will soon be subject, to part 71.

[306] Title V permits are issued for a period not to exceed five years. *See* 40 CFR 70.4(b)(3)(iii). You

Continued

MACT standards into any new, renewed, or revised title V permit and enforce all terms and conditions in the title V permit. A State's authority to write and enforce title V permits is independent of its authority to implement the changes to the MACT standards (changes to section 112 of the CAA). Therefore, while both we and the State can enforce the federal MACT standards within a title V permit, until the State receives approval from us for required changes to section 112 of the CAA, we will implement the 112 program.

C. How Are States Authorized Under RCRA?

Under section 3006(g) of RCRA, enacted as part of the Hazardous and Solid Waste Amendments (HSWA) of 1984, new requirements imposed by us as a result of authorities provided by HSWA take effect in authorized States at the same time as they do in unauthorized States—as long as the new requirements are more stringent than the requirements a State is authorized to implement. We implement these new requirements until the State is authorized for them. After receiving authorization, the State administers the program in lieu of the Federal government, although we retain enforcement authority under sections 3008, 3013, and 7003 of RCRA.

Most of the new Federal RCRA requirements in today's final rule are being promulgated through the HSWA amendments to RCRA. Regulatory changes based on HSWA authorities are considered promulgated through HSWA. The following RCRA sections, enacted as part of HSWA, apply to today's rule: 3004(o) (changes to the MACT standards), 3004(q) (fuel blending), and 3005 (omnibus). As a part of HSWA, these RCRA provisions are federally enforceable in an authorized State until the necessary changes to a State's authorization are approved by us. See RCRA section 3006, 42 U.S.C. 6926. The Agency is adding these requirements to Table 1 in § 271.1(j), which identifies rulemakings that are promulgated pursuant to HSWA.

In contrast, the change to the permit modification table (Appendix I to § 270.42) is promulgated through authorities provided to us prior to HSWA. Therefore, this change does not become effective until States adopt the revision and become authorized for that revision.

Under RCRA, States that have received authorization to implement and enforce RCRA regulatory programs are required to review and, if necessary, to modify their programs when we promulgate changes to the federal standards that result in the new federal program being more stringent or broader in scope than the existing federal standards. This is because under section 3009 of RCRA, States are barred from implementing requirements that are less stringent than the federal program. See also 40 CFR 271.21.

In four respects, we consider today's final rule to be more stringent than current federal RCRA requirements: (1) The added definitions for dioxins/furans and TEQ (40 CFR 260.10); (2) the requirement that permits for miscellaneous units must include appropriate terms and conditions from part 63, subpart EEE standards (40 CFR 264.601); (3) the establishment of new standards to control particulate matter (40 CFR 266.105(c)); and (4) the addition of dioxin/furans as listed potential Products of Incomplete Combustion (PIC) (40 CFR 266.112; Appendix VIII to 40 CFR part 266). Authorized States must adopt these requirements as part of their State programs and apply to us for approval of their program revisions. The procedures and deadlines for State program revisions are set forth in 40 CFR 271.21.

Section 3009 of RCRA allows States to impose standards that are more stringent or more extensive (*i.e.*, broader) in scope than those in the Federal program (see also 40 CFR 271.1(i)(1)). Thus, for those Federal changes that are less stringent, or reduce the scope of the Federal program, States are not required to modify their programs. Further, EPA will not implement those provisions promulgated under HSWA authority that are not more stringent than the previous federal regulations in States that have been authorized for those previous federal provisions. EPA will implement these new provisions in States that are not authorized to implement the previous federal regulations.

In two respects, we consider today's rule to be less stringent than current federal requirements: (1) The inapplicability of certain provisions of RCRA once specified part 63, subpart EEE and other requirements have been met (40 CFR 264.340(b)(1); 265.340(b)(1); 266.100(b)(1), 266.100(d)(1) and (d)(3); 266.100(h); 270.19; 270.22; 270.62; and 270.66); and (2) the provision for RCRA permit modifications to remove inapplicable RCRA conditions (Appendix I to 40 CFR part 270.42).[307]

The rest of the requirements in today's rule, in our view, are neither more nor less stringent than current regulatory requirements. They are either reiterations or clarifications of our existing regulations or policies (40 CFR 264.340(b)(2), 265.340(b)(2), 266.100(b)(2), and 266.101).

Although States must adopt only those requirements that are more stringent, in the spirit of RCRA section 1006(b), which directs us to avoid duplicative RCRA and CAA requirements, we strongly urge States to adopt all aspects of today's final rule (including the clarifying as well as less stringent sections). The adoption of all portions of today's final rule by state agencies will ensure clear, consistent requirements for owners, operators, affected sources, State regulators, and the public. Pursuant to today's rule, the permitting requirements will be implemented solely through the CAA title V program. If a RCRA permitted facility is required to use RCRA risk-based air emissions standards in addition to the CAA designated technology based standards, we will exercise our omnibus authority in section 3005 of RCRA to modify the facility's RCRA permit.[308] Therefore, we believe that the standards promulgated today properly implement the goals of sections 3004(o) and (q) of RCRA to ensure the safe and proper management of the affected combustion units and the goal of section 1006(b) of RCRA to avoid duplicative and potentially confusing permitting requirements under two different environmental statutes (RCRA and CAA). For these reasons, we encourage States to adopt these

will have three years to come into compliance with the new MACT standards. If you have fewer than three years remaining on your title V permit term, our part 70 regulations do not require you to reopen and revise your permit to incorporate the new MACT standard into the title V permit. *See* 40 CFR 70.7(f)(1)(i). However, the CAA does allow State programs to require revisions to your permit to incorporate the new MACT standard. Therefore, if you have fewer than three years remaining on your title V permit, you should consult your state permitting program regulations to determine whether a revision to your permit is necessary to incorporate the new part 63 MACT standards. If your are not required to revise your permit to incorporate the new standard, you must still fully comply with today's standard.

[307] States choosing to adopt the other less stringent changes to RCRA in today's rule also should adopt the change to 40 CFR 270.42. The change to 40 CFR 270.42 provides the RCRA permit modification procedure to eliminate inapplicable RCRA requirements once specified part 63, subpart EEE and other requirements have been met.

[308] If a State has a provision in its State air statute or regulation that is equivalent to the RCRA omnibus authority (RCRA section 3005(c)), we expect that the State will be able to use its air authority in pace of its RCRA omnibus authority.

regulations as quickly as their legislative and regulatory processes will allow.

Part Six: Miscellaneous Provisions and Issues

I. Does the Waiver of the Particulate Matter Standard or the Destruction and Removal Efficiency Standard Under the Low Risk Waste Exemption of the BIF Rule Apply?

Section 266.109 of the current BIF regulation provides a conditional exemption from the destruction and removal efficiency standard and the particulate matter standard for low risk wastes. We proposed to restrict eligibility for the waiver of the particulate matter standard to BIFs other than cement and lightweight aggregate kilns because the waiver could supersede the MACT requirements for the particulate matter standards. We had the same concern for the destruction and removal efficiency requirements. See 61 FR at 17470. After reconsidering the issue, we are clarifying that today's MACT requirements are separately applicable and enforceable and that no action is needed to ensure that a BIF waiver does not supersede the MACT requirements. See the discussions in Part Five of today's preamble regarding integration of the MACT and RCRA standards.

II. What Is the Status of the ''Low Risk Waste'' Exemption?

Section 264.340(b) and (c) exempts certain incinerators from the RCRA emission standards if the hazardous waste burned contains (or could reasonably be expected to contain) insignificant concentrations of Appendix VIII, part 261, hazardous constituents. We proposed that this ''low risk waste'' provision no longer be applicable incinerators on the MACT compliance date because a risk-based exemption from technology-based MACT standards seemed inappropriate. See 61 FR at 17470. After reconsidering the issue, we have determined that no specific action is necessary because the MACT standards are separately applicable and enforceable standards. See the discussion in Part Five of today's preamble regarding integration of the MACT and RCRA standards.

III. What Concerns Have Been Considered for Shakedown?

In the proposal, we expressed concern that some new units do not effectively use their allotted 720-hour pre-trial burn shakedown period or appropriate extensions to correct operational problems. This can potentially lead to trial burn failures and emission exceedances, which pose unnecessary risks to human health and the environment. Therefore, we proposed three shakedown options to enhance regulatory control over trial burn testing:

(1) Prior to scheduling trial burns, we would require facilities to provide the Director a minimum showing of operational readiness.

(2) We would require notification of operational readiness prior to, and following, the shakedown period.

(3) We would provide guidance on how to effectively prepare for a trial burn. These options were proposed for inclusion under both the CAA and RCRA regulations, and comments were requested regarding their usefulness.

A few commenters preferred Option 3 because it would be useful in determining how to effectively prepare for a trial burn. Regarding Options 1 and 2, two commenters felt the cost, time, and resources required for a trial burn already provide adequate financial incentive to prepare, plan, and conduct trial burns efficiently. Two commenters felt that Option 3 provided the potential for inequities in implementation of the guidance by the permit writer. In general, most commenters agreed that additional regulatory requirements are not necessary.

In light of the comments, we decided not to adopt any of the proposed options. We acknowledge that it is in the facility's best interest to conduct a successful trial burn that most facilities will properly utilize their shakedown period. However, during the transition period from RCRA to MACT compliance, we strongly encourage facilities to properly use their shakedown period to correct operational problems that pose unnecessary risks to human health and the environment.

Therefore, with the exception of risk burns, we are pursuing the deferral of RCRA trial burns to the MACT performance test requirements. A source remains subject to RCRA trial burns during the transition period to MACT compliance. For facilities where unique considerations make a SSRA necessary, risk-based permit conditions may result. In such cases, there likely would need to be conditions for all phases of operation in the RCRA permit. Thus, start-up and shakedown would still be an issue for some RCRA combustor facilities given that they would have to be in compliance with the unique RCRA emission standards even during startup and shakedown (unless the permit conditions specify otherwise).

IV. What Are the Management Requirements Prior to Burning?

Today, we are finalizing the proposal to revise 40 CFR 266.101 (''Management prior to burning'') to clarify that fuel blending activities are regulated under RCRA. See 61 FR at 17474 (April 19, 1996). As described in detail in the proposal, this is already implicit (and for some units, explicit) in existing rules. Therefore, today's rule is more an interpretive clarification. See 52 FR 11820 (April 13, 1987). By incorporating the term ''treatment'' into the regulation, we are clarifying that fuel blending activities that are conducted in units other than 90-day tanks or containers also are subject to regulation.

We received two comments expressing concern that this would subject all fuel blending-related equipment permitting, without allowing for case-by-case determinations. For example, these commenters believe that some pre-processing activities conducted by blenders (shredding, drum crushing, and other physical handling) do not meet the definition of treatment and should not be subject to permitting standards. However, we feel that these activities meet the existing definition of treatment. They are ''processe(s) . . . designed to change the physical . . . composition of . . . hazardous waste so as to . . . render such waste amenable for recovery'' via combustion. See 40 CFR 260.10 (definition of ''treatment'').

Moreover, these pre-processing activities should be subject to permitting requirements. Controls on these activities are necessary to protect against releases of hazardous constituents to the environment due to the nature of those operations (*e.g.*, crushing or shredding of drums containing hazardous wastes, grinding of waste materials, etc.). *See Shell Oil* v. *EPA*, 950 F. 2d 741, 753–56 (D.C. Cir. 1991), which broadly construes the definition of treatment to assure that the RCRA goal of cradle-to-grave management of hazardous wastes is satisfied and that specific types of units remain subject to subtitle C regulation. For units that do not already meet the definition of a specific unit, subpart X is available to provide the appropriate standards.

V. Are There Any Conforming Changes to Subpart X?

In today's rule, we are making a *conforming change* to part 264 subpart X (§ 264.601) to make reference to part 63 subpart EEE.

Hazardous waste treatment, storage, and disposal facilities that are not

classified under other categories (*e.g.*, tank systems, surface impoundments, waste piles, incinerators, *etc.*) are classified as miscellaneous units and regulated under part 264 subpart X. However, due to the varying types and designs of miscellaneous units, subpart X does not include specific performance standards. Instead, subpart X makes reference to requirements in other sections of the regulations. Section 264.601 of subpart X states that ''Permit terms and provisions shall include those requirements of subparts I through O and subparts AA through CC of this part, part 270, and part 146 that are appropriate for the miscellaneous unit being permitted .'' This statement directs the permitting agency to look at the requirements (*e.g.*, performance standards, operating parameters, monitoring requirements, *etc.*) from other sections in the regulations when developing appropriate permit conditions for miscellaneous units.

In the past, permitting authorities have often looked to the part 264 subpart O regulations for incinerators to develop the appropriate permit conditions for units such as thermal desorbers and carbon regeneration units. Since today's rule upgrades the air emission standards for certain source categories, these new standards also should be considered when determining the appropriate requirements for miscellaneous units, most notably those engaged in any type of thermal operation. Therefore, the language in § 264.601 of subpart X is being modified to incorporate a reference to part 63 subpart EEE.

VI. What Are the Requirements for Bevill Residues?

A. Dioxin Testing of Bevill Residues

In the proposal, we proposed to add polychlorinated dibenzo-p-dioxin and polychlorinated dibenzo-furan compounds to appendix VIII of part 266. Appendix VIII lists those compounds that may be generated as products of incomplete combustion and that must be included in testing of Bevill residues conducted pursuant to 40 CFR 266.112. Products of incomplete combustion can be unburned organic compounds that were originally present in the waste, thermal decomposition products resulting from organic constituents in the waste, or compounds synthesized during or immediately after combustion. We noted in the proposal that there is a considerable body of evidence to show that dioxin and furan compounds can be formed in the post-combustion regions of hazardous waste burning boilers, industrial furnaces, and incinerators, especially at temperatures between 250–450°C.[309] [310] Collected particulate matter in the post-combustion regions of furnaces can provide sites for adsorption of precursors, formation of dioxins and furans by surface chlorination of precursors, catalytic production of chlorine for subsequent chlorination of dioxin and furan precursors, and *de novo* synthesis of dioxins and furans. This same particulate matter may be subsequently managed as excluded Bevill residue.

No evidence was provided by commenters to show that dioxins and furans cannot be formed in cooler, post-combustion regions of furnaces (*e.g.*, ductwork, boiler tubes, heat exchange surfaces, and air pollution control devices). A few commenters referenced the total number of nondetects for all of the compounds in the cement kiln dust database. However, the relevance of this information specifically to dioxins and furans was unclear. Dioxins and furans have repeatedly been detected in cement kiln dust, as well as other Bevill residues.[311] [312]

The majority of commenters were concerned about implementation issues. Many felt that the addition of dioxins and furans to part 266 appendix VIII, in conjunction with the proposed requirement for daily sampling and analysis of Bevill residues, would make Bevill demonstrations prohibitively expensive. They also noted that the turnaround time for daily dioxin and furan analyses would delay compliance demonstrations and result in shortages in storage capacity. One commenter felt that daily sampling for dioxins and furans is not warranted because cement kiln dust at their site has already been shown to meet the proposed Bevill exclusion criteria for dioxins and furans. None of these arguments directly address our basic premise that dioxin and furan compounds can be generated in combustion systems, are of concern to the protection of human health and the environment, and, as such, should be included in part 266 appendix VIII. Rather, these comments pertain to issues that are more readily and appropriately resolved within the context of site-specific Bevill testing plans.

The proposed daily residue test frequency, which was cited most often as an impediment in conjunction with dioxin and furan analysis, is not being promulgated as part of today's rule. The rule will leave maximum flexibility for development of appropriate dioxin and furan analysis frequencies considering site-specific factors. Most facilities should be able to substantially limit the number of dioxin and furan analyses after an initial sampling effort. Most residue test plans rely on the concentration-based comparisons to F039 nonwastewater levels (40 CFR 266.112(b)(2)) in combination with a phased testing approach. Under the phased approach, test frequency can be substantially reduced for those constituents where initial sampling efforts reveal that concentrations are well below the F039 levels. Of the facilities where residue testing for dioxins and furans has been performed, we are aware of only two facilities where dioxins and furans have exceeded the F039 levels. Thus, the burden of higher analytical costs is expected to be appropriately limited to those few sites with significant dioxin and furan residue concentrations.

Several commenters pointed out that some Bevill residues (*e.g.*, slag from primary smelters) are generated prior to the post-combustion regions typically associated with dioxin and furan formation. Indeed, the preamble discussion in the proposal focused exclusively on post-combustion residues and did not address Bevill-exempt primary smelter slags. We currently do not have analytical data on dioxins and furans in smelter slag. However, our current information on dioxin and furan formation mechanisms suggests that it would be highly unlikely to expect significant dioxins and furans in smelter slag. Therefore, we agree that dioxin and furan analyses should be limited to those residues where there is a reasonable expectation that dioxins and furans could be present (*e.g.*, post-combustion residues).

Finally, two commenters disagreed with our assertion that dioxins and furans have been shown, in a national comparison, to be higher in residues from hazardous waste burning cement kilns than from other cement kilns. Although this information was included in the proposal as background, it is not necessary to reconcile various interpretations regarding national trends for today's rule. The 40 CFR 266.112 provisions are site-specific, and 40 CFR 266.112(b)(1) provides ample opportunity for you to demonstrate, on a site-specific basis as necessary, that waste-derived residues are not

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[309] USEPA, ''Estimating Exposure to Dioxin-Like Compounds'', EPA/600/6-88/005Ca, June 1994.

[310] USEPA, ''Combustion Emissions Technical Resource Document (CETRED)''. EPA/530/R–94/014, May 1994.

[311] USEPA, ''Report to Congress on Cement Kiln Dust'', EPA/530/R–94/001, December 1993.

[312] USEPA, ''Dioxins/Furans, Metals, Chlorine, Hydrochloric acid, and Related Testing at a Hazardous Waste-Burning Light-Weight Aggregate Kiln'', June 1997 Draft Report.

significantly different from normal residues.

After considering all of the comments on the proposal, we are adding dioxins and furans to part 266 appendix VIII in today's rule. A notation has been included to clarify that dioxin and furan analyses are required only for post-combustion residues. Commenters provided no compelling information to challenge the classification of dioxins and furans as products of incomplete combustion which can be formed in post-combustion regions of combustion systems, and the presence of dioxin and furan compounds in several post-combustion Bevill residues is clearly documented. Also, the increased use of carbon injection technology to achieve dioxin and furan stack emissions reductions could increase dioxin and furan contamination of Bevill residues in the future. The addition of dioxins and furans to part 266 appendix VIII is not expected to unduly burden the regulated community because facilities with dioxins and furans well below exclusion levels should be able to justify a minimum test frequency.

Dioxins and furans will be listed in part 266 appendix VIII simply as ''Polychlorinated dibenzo-p-dioxins'' and ''Polychlorinated dibenzo-furans''. However, the specific form of dioxins and furans that must be determined analytically will depend on the portion of the two-part test that is being implemented. If you are performing a comparison with normal residues pursuant to 40 CFR 266.112(b)(1), specific congeners and homologues must be measured and converted to TEQ values using the procedure provided in part 266, appendix IX, section 4.0. We received no comments regarding this portion of the proposal. If you are utilizing the concentration-based comparison to the F039 nonwastewater levels in 40 CFR 268.43 as outlined in 40 CFR 266.112(b)(2), then only the tetra-, penta-, and hexa-homologues need to be measured (these are the only homologues with established F039 concentration limits). One commenter seemed uncertain as to whether the tetra-, penta-, and hexa-homologue concentrations should be converted to TEQ values. We have revised the regulatory language to clarify that total concentrations for each homologue, not TEQs, should be used for the F039 comparisons. Another commenter objected to the use of F039 levels for the health-based comparison, noting that the F039 concentrations are technology-based levels. Our rationale for relying on the F039 concentrations has been explained previously (see 58 FR at 59598, November 9, 1993) and is not being revisited in today's rule.

B. Applicability of Part 266 Appendix VIII Products of Incomplete Combustion List

In the proposal, we noted the confusion regarding whether every constituent listed on the part 266 appendix VIII list must be included in residue testing at every facility. We proposed to clarify that the part 266 appendix VIII list is applicable in its entirety to every facility.

The only comments received on this issue were objections to our characterization of this change as a clarification. The commenters felt this was a substantive change that should not be enforced prior to the effective date of any final rule establishing the revision as law. The Agency is proceeding in today's rule to make the part 266 appendix VIII list applicable in its entirety to every facility by changing the title of the appendix from ''Potential PICs for Determination of Exclusion of Waste-Derived Residues'' to ''Organic Compounds for Which Residues Must Be Analyzed.'' This change is considered a revision to the part 266 regulations effective 30 days after the date of publication of today's rule. We will not seek to retroactively enforce this provision.

VII. Have There Been Any Changes in Reporting Requirements for Secondary Lead Smelters?

We proposed that secondary lead smelters subject to MACT standards for the secondary lead source category not be subject to RCRA air emission standards. 61 FR at 17474 (April 19, 1996). This exemption would apply only if a secondary lead smelter processed the type of feed material we evaluated in promulgating the secondary lead MACT standards, namely, lead-bearing hazardous wastes containing less than 500 ppm toxic nonmetals and/or hazardous wastes listed in appendix XI to 40 CFR part 266. *Id.* at 14475. Secondary lead smelters are presently not subject to RCRA air emission standards under these circumstances. See existing § 266.100 (c)(1) and (c)(3). However, they are subject to certain notification and recordkeeping requirements found in § 266.100 (c)(1)(I) and (c) (3) and on-going sampling and analysis requirements in § 266.100 (c)(1)(ii) and § 266.100 (c)(3)(i)(D). The practical effect of the proposal was to continue to relieve secondary lead smelters of these administrative requirements.

The proposal was supported by the public commenters. The reason for the proposal remains. That is, now that secondary lead smelters are complying with MACT standards for their source category, it is not necessary for them to be regulated under RCRA also for their air emissions. 60 FR 29750 (June 23, 1995). For the same reason, it is unnecessary to have the same level of recordkeeping and other administrative oversight as when these units were exempt from RCRA air emission requirements but not yet complying with CAA standards for hazardous air pollutants. 61 FR at 14474. Consequently, we are finalizing this portion of the proposal.

Today's rule takes the form of an amendment to the RCRA BIF rule (new § 266.100 (h)) and indicates that secondary lead smelters are exempt from all provisions of the BIF rule except for § 266.101, which contains the restrictions on types of hazardous waste which may be burned, as described in the first paragraph above. As proposed, a secondary lead smelter must provide a one-time notice to the Regional Administrator or State Director identifying each hazardous waste burned and stating that the facility claims an exemption from other requirements in the BIF rules. Those secondary lead smelters which have already notified pursuant to existing regulatory provisions (namely § 266.100 (c) (1) (i) or § 266.100 (c) (3) (i) (D)) would not have to renotify.

VIII. What Are the Operator Training and Certification Requirements?

Section 129 of the CAA requires us to develop and promulgate a program for training and certification of operators of facilities that burn municipal and medical wastes. We accordingly promulgated operator training and certification requirements for the operators of municipal waste combustors (60 FR 65424 (December 19, 1995)) and medical waste incinerators (62 FR 48348 (September 15, 1997)). At proposal, we considered similar requirements for hazardous waste combustor operators also and requested comments on whether: (1) Operator certification requirements are necessary for hazardous waste combustors, and (2) the American Society of Mechanical Engineers (ASME) standards (or an equivalent state certification program) are appropriate and sufficient. We note that ASME has established a Standard for the Qualification and Certification of Hazardous Waste Incinerator Operators in collaboration with the American National Standards Institute (ASME Standard Number QHO–1–1994) and has been providing certifications since 1996.

Commenters differed widely on two key issues: (1) Whether such a training program should be voluntary, mandatory, or even necessary, considering that RCRA already requires some site-specific training program (40 CFR 264.16); and (2) whether the certifying agency should be an independent body like ASME versus an industry organization like the Cement Kiln Recycling Coalition. Most commenters favored the establishment of a mandatory operator certification program by an independent organization that develops consensus standards (*e.g.,* ASME, American Society for Testing and Materials, or American National Standards Institute) in order to preserve the integrity of certification. We agree and note that ASME has already done commendable work in developing certification programs for operators of municipal waste combustors, medical waste incinerators, high capacity fossil-fuel fired plants, and hazardous waste incinerators. Each combustor program includes defined criteria for certification, including operator qualifications, recommended training, examination content, minimum passing grades, and due process. These programs are incorporated (at least in part) into EPA's combustion regulations to satisfy the CAA section 129 mandate, and we are extending similar requirements in today's rule to all hazardous waste combustor operators also. We find that the concerns about good operator training and certification that underlie the section 129 requirement for municipal waste combustors and medical waste incinerators apply as well to those persons charged with the responsibility for safe handling and burning of hazardous waste.

Some kiln operators and the Cement Kiln Recycling Coalition have commented that cement and lightweight aggregate kilns are much larger and more diverse facilities than most hazardous waste incinerators, that these kilns operate with employee unions that object to additional outside certification when site-specific training programs are already in place, and that the ASME certification programs are not pertinent or applicable to them. We recognize that there are some differences in the operation of incinerators and cement and lightweight aggregate kilns. However, these differences do not suggest that operator training and certification should be abandoned. Rather, they serve to emphasize the importance of having a rigorous operator training and certification program in place and having it subject to regulatory agency scrutiny. In that regard, we are aware of the Cement Kiln Recycling Coalition's efforts to develop a suitable industry-wide training and certification program for the kilns. However, the Cement Kiln Recycling Coalition's efforts to date have not resulted in a final industry-wide set of standards that can be relied upon in today's rule, and we note that the current general facility training programs under § 264.16 do not fully cover the areas that would need to be addressed at facilities burning hazardous waste. For example, § 264.16 neither identifies important areas of training with respect to daily operations (such as hazardous waste and residues handling operations, air pollution control device operations, troubleshooting, normal start-up and shut-down procedures, continuous emissions monitoring system operation and maintenance *etc.*) nor discriminates among the different categories of operators. Also, § 264.16 does not specify any operator certification nor minimum standards for certification, which are needed to ensure the initial and continual competence of the hazardous waste combustor facility operators.

We expect that kiln specific programs will be developed in the near future after complete analysis for consistency, reliability and conformance with principles of good operating and operator practices (including training and certification). Today's rule therefore specifies that each hazardous waste combustor facility must develop an operator training and certification program. In the case of cement and lightweight aggregate kilns, the facility must submit its program to the Agency for approval. The submittal will be evaluated for completeness, reliability and conformance with appropriate principles of good operator and operating practices (including training and certification). If a state-approved certification program becomes available, the facility's program must conform to that state program. These are to ensure that sufficient specifics are included in each facility program. In the case of hazardous waste incinerators, the facility's program must conform to either a state-approved certification program or, if none exists, to the ASME certification program (Standard No. QHO–1–1994). Again, this is to ensure that sufficient specifics are contained in a facility program.

IX. Why Did the Agency Redesignate Existing Regulations Pertaining to the Notification of Intent To Comply and Extension of the Compliance Date?

In today's final rule, we redesignate existing regulations pertaining to the Notification of Intent to Comply with subpart EEE and extensions of the compliance date to install pollution prevention or waste minimization controls to meld them into the new provisions of the subpart. This ensures that similar topics (*e.g.,* notifications, compliance requirements) are grouped together in the rule. We also revise those existing regulations to: (1) Convert the regulatory language to plain language consistent with the new provisions; (2) include references to the new provisions; and (3) include references to the actual effective date of the rule.

We promulgated these regulations as Part 1 of revised standards for hazardous waste combustors. See 63 FR 33782 (June 19, 1998). We are promulgating part 2 today, which comprises the emission standards and compliance requirements. Today's revisions to the existing standards does not constitute a repromulgation and does not reopen the comment period for those standards.

We are redesignating the existing regulations as indicated in the following table:

Existing regulation	Topic	Predesignated regulation
§ 63.1211(a) and (b)	Notification requirements for the notification of intent to comply	§ 63.1210(b) and (c)
§ 63.1211(c)	Requirements for sources that do not intend to comply	§ 63.1206(a)(2)
§ 63.1212	Progress report requirements for the notification of intent to comply	§ 63.1211(b)
§ 63.1213	Certification that must accompany the notice of intent to comply	§ 63.1212(a)
§ 63.1214	Extension of the compliance date	§ 63.1206(a)(1)
§ 63.1215	Requirements for sources that become affected sources after the effective date of the emission standards.	§ 63.1212(b)

Existing regulation	Topic	Predesignated regulation
§ 63.1216	Extension of the compliance date to install pollution prevention or waste minimization controls.	§ 63.1213

Part Seven: National Assessment of Exposures and Risks

We received many public comments on the risk assessment for the proposed rule.[313] In addition, the risk assessment was peer reviewed in accordance with EPA guidelines. Many of the commenters commented on similar topics. These topics included the representativeness of the HWC facilities modeled, the estimation of facility emissions, the exposure scenarios evaluated, and the assessment of risks from mercury. As of result of these comments, we made significant changes in the risk assessment for the final rule. Also, new information became available after proposal on food intake rates for home-produced foods and methods for assessing exposures to mercury. In addition, EPA issued guidance for use of probabilistic techniques in risk assessments and a policy for evaluating risks to children. These were also considered in making revisions to the risk assessment. A complete discussion of the risk assessment for today's rule may be found in the background document.[314]

I. What Changes Were Made to the Risk Methodology?

A. How Were Facilities Selected for Analysis?

The representativeness of the example facilities used in the risk assessment at proposal was widely questioned by commenters. We analyzed eleven example facilities for the proposed rule: two commercial incinerators, two on-site incinerators, two lightweight aggregate kilns, and five cement kilns.[315] While these facilities represented a geographically diverse set of facilities in each source category, it was not possible to demonstrate in any formal way that the facilities were representative of the universe of facilities covered by the rule.

Because of this difficulty, we concluded that the most efficient approach for assuring the representativeness of the facilities analyzed was to select a stratified random sample. The number of strata was determined by the number of categories and subcategories of sources for which risk information was desired. The final sample of facilities chosen for analysis includes 66 randomly selected facilities and 10 of the 11 facilities selected at proposal for a total sample of 76 facilities out of a universe of 165 facilities within the contiguous United States.[316] The sample sizes are as follows:

HAZARDOUS WASTE COMBUSTION FACILITY STRATUM AND SAMPLE SIZES

Combustion facility category	Stratum size	Random sample size	NPRM sample size	Final sample size	High end sampling probability [1]
Cement Kilns	18	10	5	15	98
Lightweight Aggregate Kilns	5	3	2	5	100
Commercial Incinerators:					
Including Waste Heat Boilers	20	11	2	13	97
Excluding Waste Heat Boilers	12	7	2	9	95
Large On-Site Incinerators:					
Including Waste Heat Boilers	43	17	1	18	94
Excluding Waste Heat Boilers	36	15	0	15	90
Small On-Site Incinerators:					
Including Waste Heat Boilers	79	25	0	25	96
Excluding Waste Heat Boilers	65	16	0	16	88
Incinerators With Waste Heat Boilers	29	15	1	16	92

[1] Probability that a facility that lies in the upper 10% of the distribution of risk will be sampled.

For the randomly selected facilities, sample sizes within a given category were chosen such that the probability of sampling a facility in the upper ten percent of the distribution of risk would be 90 percent or greater. The probabilities actually achieved range from 88 to 100 percent depending on the size of the original, non-randomly chosen sample and changes in the sampling frame that occurred during the random sampling process.[317]

We did not target area sources specifically for sampling because the statutory definition of major sources versus area sources is based on facility-wide emissions of hazardous air pollutants and such information was not available at the time the sampling was performed. Therefore, it was not possible to determine the sampling frame. We expect that on-site incinerators, both large and small, at large industrial facilities are major sources rather than area sources. Because area sources are of interest, we made risk inferences based on those area source incinerators that could be identified and had otherwise been

[313] "Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document," February, 1996.

[314] See the background document, "Human Health and Ecological Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Document—Final Report," July, 1999.

[315] See 61 FR 17370 and "Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Information Document" (February, 1996).

[316] A large on-site incinerator analyzed at proposal that is undergoing RCRA closure was excluded from the analysis.

[317] Changes in the sampling frame occurred as a result of facilities that were missing from the original sampling frame were misclassified, or were no longer burning hazardous waste and had begun RCRA closure.

sampled.[318] For cement kilns, all area sources were sampled and used for making such inferences.

B. How Were Facility Emissions Estimated?

At proposal, we estimated baseline emissions (reflecting current conditions) for the example facilities from the distribution of stack gas concentrations for the corresponding category of sources. Both central tendency and high end emissions estimates were made based on the 50th and 90th percentiles of the stack gas concentration distributions. For the purpose of evaluating risks associated with the proposal, we assumed that facilities emitted at the design level determined to be necessary to meet the standard, even if this meant an increase in emissions over baseline. Many commenters thought that using percentiles to estimate emissions was inappropriate and that site-specific emissions should be used instead. Commenters also thought that it was incorrect to project an increase in risk with the proposed standards (which occurred as a result of allowing emissions to increase over baseline). We agree with these comments. For the final rule, we estimated emissions based on site-specific stack gas emission concentrations and flow rates. Site-specific stack gas concentration data were used where emissions measurements were available; otherwise, stack gas concentrations were imputed. For today's rule, we assumed emissions would remain unchanged from baseline in instances where a facility's emissions are already below the design level (which is taken as 70 percent of the MACT standard).[319] In instances where a facility's emissions exceed the design level, we determined the percentage reduction in emissions required to meet the design level. We then applied this reduction to each chemical constituent to which the standard applies.

The imputation approach we used in instances where measured data were not available involves the random selection of emissions concentrations from a pool of emissions concentrations for other facilities and test conditions that are believed to be reasonably representative of the facility in question. For groups of interrelated constituents (*e.g.*, different dioxin congeners or mercury species), imputation was carried out for the group of interrelated constituents taken together rather than each individual constituent separately. We used the random imputation approach to preserve the variability in emissions exhibited by the pooled data. Another commonly used approach for estimating emissions, emissions factors, generally represents average conditions and does not reflect the variability in emissions across facilities in a given source category. Because the objective of the risk assessment is to characterize the distribution of risks across a given source category, we deemed the use of average emissions to be inappropriate except where only very limited data are available (*i.e.*, for cobalt, copper, and manganese). Although the random imputation approach may significantly over or under estimate emissions for a given facility (a problem also inherent in emission factors), we expect that the distributions of risk across a given source category are better characterized using random imputation than with an emissions factor approach or any other approach that does not account for the variation in emissions from one facility to the next.

Emissions estimates were made for all chemical constituents covered by the rule for which sufficient data were available, including all 2,3,7,8-chlorine substituted dibenzo(p)dioxins and dibenzofurans, elemental mercury (Hg^0), divalent mercury (Hg^{+2}), lead, cadmium, arsenic, beryllium, trivalent chromium (Cr^{+3}), hexavalent chromium (Cr^{+6}), chlorine, and hydrogen chloride. In addition, emissions estimates were made for particulate matter (PM_{10} and $PM_{2.5}$) and nine other metals, three of which (cobalt, copper, and manganese) were not assessed at proposal but were included in the risk assessment for the final rule. Chemical-specific emissions estimates could not be made for organic constituents other than dioxins and furans (*e.g.*, various products of incomplete combustion) due to the lack of sufficient emission measurements. We assessed the risks from all constituents for which chemical-specific emissions estimates could be made, as well as from particulate matter. A complete discussion of the emissions estimates used in the risk assessment may be found in the technical support documents for today's rule.[320]

C. What Receptor Populations Were Evaluated?

The risk assessment at proposal examined risks to individuals engaged in subsistence activities such as farming and fishing. Some commenters viewed these types of activities as unlikely to occur and questioned whether these types of exposures are representative of actual exposures and risk. Other commenters thought the exposure pathways included in the analysis did not fully reflect potential exposures to individuals living a true subsistence lifestyle. We share the concerns raised by commenters and have refocused the assessment on non-subsistence receptor populations such as commercial farmers, recreational anglers, and non-farm residents whose numbers and locations can be estimated from available census data. At the same time, we retained the subsistence scenarios and revised them to be more reflective of a subsistence lifestyle. Although it is not known precisely how many individuals are engaged in subsistence activities or exactly where those activities take place, subsistence does occur in some segments of the U.S. population, and we believe it is important to evaluate the associated risks.

D. How Were Exposure Factors Determined?

Since the risk assessment at proposal, we have developed new information on factors that are used to estimate exposures. We obtained data collected from previously published studies and used the data to derive exposure factor information, including information for children.[321] In particular, we reanalyzed data collected by USDA to estimate consumption of home-produced foods, such as meat, milk, poultry, fish, and eggs. Over half of farm households report consuming home-produced meats, including nearly 40 percent that report consumption of home-produced beef. In the Northeast, nearly 40 percent of farm households report consuming home-produced dairy products, and, in the Midwest, nearly 20 percent do. The percentage is lower elsewhere, averaging about 13 percent nationally. Presumably most of these households are associated with dairy farms. Most farm households that consume home-produced foods are engaged in farming as an occupation rather than a means of subsistence.

The data indicate that individual consumption of home-produced foods is

[318] Area source incinerators that were identified included commercial incinerators and on-site incinerators at U.S. Department of Defense installations.

[319] This is also consistent with the assumption made in the cost and economic analysis that facilities that are currently emitting below the design level will not need to retrofit using new control technology.

[320] See ''Final technical Support Document for HWC MACT Standards, Volume V: Emission Estimates and Engineering Costs.'' July, 1999.

[321] EPA published the new exposure factor information in the ''Exposure Factors Handbook,'' EPA/600/P–95/002Fb, August, 1997.

higher than consumption of the same foods in the general populace. We have used the information on home-produced foods to estimate the exposures to farm households and to households engaged in subsistence farming. Only the primary food commodity produced on the farm was assumed to be consumed by farm households. In contrast, a wide variety of foods was assumed to be produced and consumed by households engaged in subsistence farming.

E. How Were Risks from Mercury Evaluated?

Commenters viewed the absence of a quantitative assessment of risks from mercury as a significant failing at proposal. However, a number of issues related to assessing risks from mercury had not been adequately resolved at the time of proposal that would have allowed us to proceed with a quantitative analysis. We have since issued our Mercury Study Report to Congress, a study that has been subject to extensive peer review, and the Utility Study Report to Congress.[322] [323] With today's rule, we conclude that sufficient technical basis exists for conducting a quantitative assessment of mercury risks from hazardous waste combustors. We recognize, however, that significant uncertainties remain and the results of our mercury analysis should be interpreted with caution and be used only qualitatively.

Although the mercury analysis that accompanies today's rule is patterned after the analysis done for the Mercury Study, there are differences between the two studies in the methods used. The model we used for evaluating the fate and transport of mercury in lakes is the same as the IEM–2M model used in the Mercury Study Report to Congress. However, modifications were made to adapt it for use with rivers and streams.[324] Both studies used the ISC air dispersion model for modeling wet deposition of mercury. However, for the Mercury Study the ISC model was modified to include dry deposition of mercury vapor whereas, for the current analysis, we used a simplified treatment of dry vapor deposition. In the Mercury Study, air modeling was carried out to a distance of 50 kilometers whereas, for the current analysis, air modeling (and, therefore, the effective size of the modeled watersheds) was limited to a distance of 20 kilometers. Long-range transport of mercury emissions (beyond 50 kilometers) was considered in the Mercury Study but was not included in the current analysis. In the Mercury Study, a large number of different sources were investigated to identify whether reductions in anthropogenic or environmental sources of mercury would reduce the total exposures of mercury to the general population. The current analysis was designed to assess what reductions may occur in incremental exposures from specific industrial sources of mercury to specific individuals rather than what reductions would occur in total exposures of mercury. Also, the Mercury Study modeled exposures under varying background assumptions, but the current analysis did not assess the impact that variable background concentrations would have on the risk results. In addition, the Mercury Study received external peer review, whereas we have not conducted an external peer review of the current analysis.

In addition, there are a variety of uncertainties related to the fate and transport of mercury in the environment, such as the deposition of mercury emitted to the atmosphere via wet and dry removal processes, the transport of mercury deposited in upland areas of a watershed to a body of water, and the disposition of mercury in the water body itself, including methylation and demethylation processes, sequestering in the water column and sediments, and uptake in aquatic organisms. Furthermore, the form of mercury emitted by a given facility is thought to be a determining factor in the fate and transport of mercury in the atmosphere. Only limited data are available on the form of the mercury emitted from hazardous waste combustors. A more complete discussion of the uncertainties related to the fate and transport of mercury may be found in the Mercury Study Report to Congress.

Also important to consider is that the reference dose for methyl mercury represents a ''no-effects'' level that is presumed to be without appreciable risk. We used an uncertainty factor of 10 to derive the reference dose for methyl mercury from a benchmark dose that represents the lower 95% confidence level for the 10% incidence rate of neurologic abnormalities in children.[325] Therefore, there is a margin of safety between the reference dose and the level corresponding to the threshold for adverse effects, as indicated by the human health data. Furthermore, we applied the reference dose, which was developed for maternal exposures, to childhood exposures. This introduces additional uncertainty in the risk estimates for children. Additional uncertainties associated with assessing individual mercury risks to nonsubsistence populations and subsistence receptors are discussed under the ''Human Health Risk Characterization'' section below.

We do not know the direction or magnitude of many of the uncertainties discussed above and did not attempt to quantify the overall uncertainty of the analysis. Thus, the cumulative impact of these uncertainties is unknown, and the uncertainties implicit in the quantitative mercury analysis continue to be sufficiently great so as to limit its ultimate use for decision-making. Therefore, we have used the quantitative assessment to make qualitative judgments about the risks from mercury but have not relied on the quantitative assessment (nor do we believe it is appropriate) to draw quantitative conclusions about the risks associated with particular national emissions standards.

F. How Were Risks From Dioxins Evaluated?

Few changes have been made to the methods used for assessing risk from dioxins since proposal. Some commenters thought we should modify the toxicity equivalence factors that are used to characterize the relative risk from 2,3,7,8-chlorine substituted congeners relative to that from 2,3,7,8,-tetrachlorodibenzo(p)dioxin. As a matter of policy, we continue to use the international consensus values that were published by EPA in 1989. We are aware that revisions to the toxicity equivalence factors are being considered by the international scientific community. However, we have not adopted revised values and continue to use the 1989 toxicity equivalence factors.

We have changed the data being relied upon to characterize the bioaccumulation of dioxins in fish. Specifically, we believe that the biota-

[322] ''Mercury Study Report to Congress, Volume III: Fate and Transport of Mercury in the Environment,'' U.S. Environmental Protection Agency, EPA–452/R–97–005, December 1997.

[323] ''Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units—Final Report to Congress,'' U.S. Environmental Protection Agency, EPA–453/R–98–004a and b, February 1998.

[324] For a discussion of the mercury surface water model, see the background document, ''Human Health and Ecological Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Document—Final Report,'' July, 1999.

[325] The uncertainty factor is intended to cover three areas of uncertainty: Lack of data from a two-generation reproductive assay; variability in the human population, in particular the wide variation in the distribution and biological half-life of methyl mercury; and lack of data on long term sequelae of developmental effects.

sediment accumulation factors used at proposal, which were derived from data for the Great Lakes, significantly understate the bioaccumulation potential in aquatic systems that have recent and ongoing contamination. Studies in Sweden and elsewhere show that where contamination is ongoing, biota-sediment accumulation factors may be higher by as much as an order of magnitude or more relative to the Great Lakes and other aquatic systems where levels in biota are influenced primarily by past contamination. For the risk assessment for today's rule, biota-sediment accumulation factors were derived from data collected by the Connecticut Department of Environmental Protection. The Connecticut study, which is discussed in detail in the dioxin reassessment, involved extensive monitoring of soils, sediments, and fish near resource recovery facilities operating in the state.[326] The data show biota-sediment accumulation factors that are a factor of two to nine times higher (depending on the individual congener) than those used previously.

G. How Were Risks from Lead Evaluated?

Risks from exposures to lead were assessed at proposal by comparing model-predicted lead levels in soil to a health-based soil benchmark criterion. Commenters pointed out that there are pathways of exposure other than those related to soils and that we should look at the overall impact of lead emissions on blood lead levels in children. We agree with these comments and have modified the risk assessment to include other pathways of exposure such as inhalation and dietary exposures, in addition to soil ingestion. The revised assessment employs the Intake/Exposure Uptake BioKinetic model to assess the incremental impact of lead intake on blood lead levels in children. The results of the blood lead modeling are used together with information on background levels of blood lead in the general population to estimate the number of children whose blood levels exceed 10 micrograms per deciliter. Our goal is to reduce children's blood lead to below this level.

H. What Analytical Framework Was Used To Assess Human Exposures and Risk?

As a result of the public and peer review comments received on the risk assessment at proposal, we modified the analysis to focus on the entire population of persons that are exposed to facility emissions rather than persons living on a few individual farms and residences. A study area was defined for each sample facility as the area surrounding the facility out to a distance of 20 kilometers (or about 12 miles). All persons residing within the study area were included in the analysis.[327] The study area was divided up into sixteen (16) sectors defined by the intersection of rings at two, five, ten and twenty kilometers and radii extending to the north, south, east, and west. For each sector, census data were used to estimate the population of those persons living in farm households by type of farm and the population of those persons living in non-farm households. Census data were also used to determine the age of all household members. Four age groups were delineated: Preschoolers (0 to 5 years), preteens (6 to 11 years), adolescents (12 to 19 years) and adults (20 years and older).

Within each study area, three or four bodies of water were chosen for analysis based on their proximity to the sample facility and the likelihood of their being used for recreational purposes, as indicated by factors such as size and accessibility. Water bodies were also chosen if they were used to supply drinking water to the surrounding community. The watershed of each water body was delineated out to a distance of 20 kilometers from the facility.

We conducted a multi-pathway exposure analysis for all the human receptors considered in the risk assessment. Household members regardless of the type of household were assumed to be exposed to facility emissions through direct inhalation and incidental ingestion of soil. In addition, in study areas where surface waters are used for drinking water, household members were also assumed to be exposed through tap water ingestion. A portion of non-farm households were assumed to engage in home gardening based on the prevalence of home gardening in national surveys. Farm households were assumed to consume the primary food commodity produced on the farm. This contrasts with the subsistence farmer who was assumed to consume predominantly home-produced foods, including meat, milk, poultry, fish, and eggs, as well as fruits and vegetables. For the purpose of characterizing the range of risks that could result from subsistence farming, it was assumed that a subsistence farm was located in every sector in a given study area. A portion of the households in each study area were assumed to engage in recreational fishing based on the prevalence of recreational fishing in national surveys. It was assumed that individual recreational anglers would fish at all of the water bodies delineated in a given study area. In contrast, households engaged in subsistence fishing were assumed to consume fish from only a single body of water. For the purpose of characterizing the range of risks that could result from subsistence fishing, the assumption was made that every body of water delineated in a given study area was used for subsistence fishing.

Air dispersion and deposition modeling were performed for each study area at all sample facilities using facility-specific information on stack configuration and emissions, along with site-specific meteorological data, terrain data (in areas of elevated terrain), and land use data. Air modeling was conducted to a distance of 20 kilometers. Long-range transport of emissions beyond this distance was not considered. Bioaccumulation in the terrestrial food chain was modeled from estimates of deposition and uptake in plants and subsequent uptake in agricultural livestock from consumption of forage and silage. Bioaccumulation in the aquatic food chain was modeled from estimates of deposition to watershed soils (and subsequent soil erosion and runoff) and direct deposition to water bodies and subsequent uptake in fish. Surface water modeling was conducted for each body of water using site-specific information relative to watershed size, surface runoff, soil erosion, water body size, and dilution flow.

Exposure modeling was performed using central tendency exposure factors (*e.g.*, duration of exposure and daily food intake) for all receptor populations. As noted below, an exposure variability analysis was also performed for selected constituents and receptor populations using exposure factor distributions. Exposure pathways varied depending on the particular human receptor and the types of activities that lead to human exposures. Age-specific rates of mean daily food intake and media contact rates, in conjunction with sector-specific media concentrations and concentrations in food, were used

[326] "Estimating Exposure to Dioxin-Like Compounds, Volume III: Site-Specfic Assessment Procedures, U.S. Environmental Protection Agency, External Review Draft, EPA/600/6–88/005Cc, June 1994

[327] Because the analysis at proposal indicated that exposures beyond 20 kilometers were well below levels of concern, we did not consider persons exposed to facility emissions that are transported beyond 20 kilometers. Also, as discussed elsewhere, the risk assessment was peer reviewed in accordance with EPA guidelines, and peer reviewes did not comment that the range of the local scale study area was insufficient (or recommend that it be increased to 50 or more kilometers).

to calculate the total (administered or potential) dose from all exposure pathways combined. Lifetime average daily dose was used as the exposure metric for assessing cancer risk and average daily dose (reflecting less than lifetime exposure) was used for assessing risks of non-cancer effects.

We estimated the risk of developing cancer from the estimated lifetime average daily dose and the slope of the dose-response curve. A cancer slope factor is derived from either human or animal data and is taken as the upper bound on the slope of the dose-response curve in the low-dose region, generally assumed to be linear, expressed as a lifetime excess cancer risk per unit exposure. Total carcinogenic risk was determined for each receptor population assuming additivity. The same approach was used for estimating cancer risks in both adults and children. This is also the same approach we used at proposal for estimating lifetime cancer risks stemming from childhood exposures. However, individuals exposed to carcinogens in the first few years of life may be at increased risk of developing cancer. For this reason, we recognize that significant uncertainties and unknowns exist regarding the estimation of lifetime cancer risks in children. Although the risk assessment at proposal was externally peer reviewed, EPA's charge to the peer review panel did not specifically identify the issue of cancer risk in children and the peer review panel did not address it.

To characterize the potential risk of non-cancer effects, we compared the average daily dose (reflecting less than lifetime exposure) to a reference dose and expressed the result as a ratio or hazard quotient. The reference dose is an estimate of a daily exposure to the human population, including sensitive subgroups, that is likely to be without an appreciable risk of deleterious effects during a lifetime. The hazard quotient, by indicating how close the average daily dose is to the reference dose, is a measure of relative risk. However, the hazard quotient is not an absolute measure of risk. For inhalation exposures, we compared modeled air concentrations to a reference concentration and expressed the result as a ratio or inhalation hazard quotient. The reference concentration is an estimate of a concentration in air that is likely to be without an appreciable risk of deleterious effects in the human population, including sensitive subgroups, from continuous exposures over a lifetime. In addition, inhalation and ingestion hazard indices were generated for each receptor population by adding the constituent-specific hazard quotients by route of exposure. The hazard index is an indicator of the potential for risk from exposures to chemical mixtures.

For dioxins, we used a margin of exposure approach to assess the potential risks of non-cancer effects. The average daily dose, in terms of 2,3,7,8-TCDD toxicity equivalents (TEQ), was compared to background TEQ exposures in the general population and expressed as a ratio or incremental margin of exposure. An incremental margin of exposure was generated for infants exposed through intake of breast milk and for other age groups exposed through dietary intake and other pathways of exposure. For lead, we characterized the risk of adverse effects in children by modeling body burden levels in blood that result from intake of lead in the diet, direct inhalation, and incidental soil ingestion and comparing these levels to levels at which community-wide efforts aimed at prevention of elevated blood levels are indicated.

Distributions of individual risk were generated for a given category of sources by weighting the individual risks using sector-specific population weights and facility-specific sampling weights. Such distributions, which were derived using central tendency exposure factors, were generated for all constituents and receptor populations. In addition, for those receptor populations and chemical constituents that exhibited risks within an order of magnitude of a potential level of concern (using central tendency exposure factors), we performed an exposure variability analysis. Normalized, age-specific distributions of food intake and exposure duration were used to adjust the risk estimates to generate a distribution of risks in each sector. For children, food intake changes significantly with age, which can affect the lifetime average daily dose. To adjust for this, a life table analysis was conducted in which individuals were followed over the duration of exposure to arrive at an age adjustment factor. The individual sector distributions were combined for a given source category using Monte Carlo sampling and the appropriate sector-specific population weights and facility-specific sampling weights.

Estimates of population risk, or the incidence of health effects in the exposed population, were made for selected receptor populations and chemical constituents. Local excess cancer incidence was estimated from the mean individual risk for a given sector and the number of persons who reside in a sector. These sector-specific cancer incidence rates were then adjusted using facility-specific sampling weights and summed for a given category of sources. Cancer incidence associated with the consumption of dioxin contaminated beef, pork, and milk by the general population was estimated at the sector level from the number of dairy cattle and the number of beef cattle and hogs slaughtered annually, adjusted using facility-specific sampling weights, and summed by source category. Excess incidence of lead poisoning in children (over and above background) was estimated at the sector level from the intake of lead in the diet, direct inhalation, and incidental soil ingestion, adjusted using facility-specific sampling weights, and summed.

Generally speaking, incidence rates for non-cancer effects can be estimated from the number of persons exposed above the reference dose (*i.e.*, the number of exceedances) and the annual turnover in the exposed population. However, non-cancer incidence rates of interest, such as the incidence of exceedances of the methyl mercury reference dose from consumption of freshwater fish, could not be estimated due to the difficulty in determining the number and frequency of visits made by recreational anglers to a given body of water. However, by making certain assumptions, it was possible to make an estimate of the portion of recreational anglers who consume fish from local water bodies that may be at risk.[328]

Due to concerns of commenters about the representativeness of the risk assessment, we also made estimates of confidence intervals about the risk estimates. Estimation of confidence intervals was made possible by virtue of the sampling design used for facility selection. The confidence intervals quantify the magnitude of the uncertainty of the risk estimates associated with sampling error only. We emphasize that the confidence intervals do not reflect other sources of uncertainty, which may be of considerably greater magnitude.

In addition to the risk estimates for individual chemical constituents, we estimated the incidence of excess mortality and morbidity associated with particulate matter emissions. Mortality and morbidity estimates were made for children and the elderly, as well as the general population, using concentration-response functions derived from human epidemiological studies. Incidence rates

[328] The assumption is that fishing activity typical of recreational fishing takes place only at the particular water bodies delineated in the analysis.

in a given sector were estimated from the size of the exposed population, including susceptible populations such as children and the elderly, and either annual mean PM_{10} and $PM_{2.5}$ concentrations or distributions of daily PM_{10} and $PM_{2.5}$ concentrations. Morbidity effects include respiratory and cardiovascular illnesses requiring hospitalization, as well as other illnesses not requiring hospitalization, such as acute and chronic bronchitis, acute upper and lower respiratory symptoms, and asthmatic attacks. As with other incidence estimates, sector-specific incidence rates were adjusted using facility-specific sampling weights and summed for a given source category.

I. What Analytical Framework Was Used to Assess Ecological Risk?

Public comments on the ecological assessment at proposal expressed the view that we should expand the assessment beyond water quality criteria. We agree with these commenters and have extended the ecological analysis to include the use of soil and sediment criteria, in addition to water quality criteria. Also, the analysis was expanded to include additional metals that are of ecological concern, such as mercury and copper.

The ecological assessment represents a screening level analysis that uses media-specific ecological criteria thought to be protective of a range of ecological receptors. Modeled surface water concentrations were compared to water quality criteria protective of aquatic life, such as algae, fish, and aquatic invertebrates, as well as piscivorous wildlife. Similarly, modeled soil concentrations were compared to soil criteria protective of the terrestrial soil community, as well as terrestrial plants and mammalian and avian wildlife. Modeled sediment concentrations were compared to sediment criteria protective of the benthic aquatic community. As a screening level analysis, we did not attempt to determine whether the specific ecological receptors upon which the media-specific criteria are based are actually present at a given site. Furthermore, we did not ascertain the occurrence of threatened or endangered species at individual sites. However, the ecological receptors upon which the media-specific criteria are based are commonly occurring species and may not be any less sensitive than other species and may be more sensitive than some, including perhaps threatened or endangered species.[329]

II. How Were Human Health Risks Characterized?

This section describes the conclusions of the human health risk assessment. For a full discussion of the methodology and the results of the assessment, see the background document for today's rule.[330]

A. What Potential Health Hazards Were Evaluated?

This section summarizes the potential health hazards from exposures to emissions from hazardous waste combustors, in particular the human health hazards associated with the chemical constituents evaluated in the risk assessment, including dioxins, mercury, lead, other metals, hydrogen chloride and chlorine, and particulate matter.

1. Dioxins

A large body of evidence demonstrates that chlorinated dibenzo(p)dioxins and dibenzofurans can have a wide variety of health effects, ranging from cancer to various developmental, reproductive and immunological effects. Dioxins are persistent and highly bioaccumulative in the environment and most human exposures occur through consumption of foods derived from animal products such as meat, milk, fish, poultry, and eggs. In 1985, we developed a carcinogenic slope factor for 2,3,7,8-TCDD of 1.56e–4 per picogram per kilogram body weight per day.[331] The slope factor represents the 95 percent upper confidence limit estimate of the lifetime excess cancer risk. Re-analysis of data from laboratory animals and cancer in humans lends support to the slope factor derived in 1985, and we continue to use the 1985 estimate pending completion of our dioxin reassessment.[332] [333]

For non-cancer effects, we believe it is inappropriate to develop a reference dose, or level which is without appreciable risk, using standard uncertainty factors. This is due to the high levels of background exposures in the general population and the low levels at which effects have been seen in laboratory animals. Instead, we have chosen to use a margin of exposure approach in which the average daily dose from a given facility is compared to the average daily dose in the general population. The ratio of the two represents the incremental margin of exposure and, as such, measures the relative increase in exposures over background.

2. Mercury

The most bioavailable form of mercury is methyl mercury, and most human exposures to methyl mercury occur through consumption of fish. Methyl mercury is known to cause neurological and developmental effects in humans at low levels. The most susceptible human population is thought to be developing fetuses. We have developed a reference dose for methyl mercury of 0.1 microgram per kilogram body weight per day that is presumed to be protective of the most sensitive human populations.[334] The reference dose is based on neurotoxic effects observed in children exposed *in utero*. Although epidemiological studies in fish-eating populations are ongoing, we believe that the reference dose is the best estimate at the present time of a daily exposure that is likely to be without an appreciable risk of deleterious effects. However, because it was derived from maternal exposures, application of the reference dose to assess children's exposures carries with it additional uncertainty beyond that otherwise related to the data and methods used for its development.

3. Lead

Exposures to lead in humans are associated with toxic effects in the nervous system at low doses and at higher doses in the kidneys and cardiovascular system. Infants and children are particularly susceptible to

[329] Multiple ecological criteria were available for most constituents and the lowest criteria were used to establish the media-specific values that were in the eco-analysis. In addition, ecotoxicological benchmarks for mammals and birds were typically derived from studies involving measures of reproductive success.

[330] ''Human Health and Ecological Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Document—Final Report,'' July 1999.

[331] USEPA, ''Health Assessment Document for Polychlorinated Dibenzo-p-Dioxins,'' EPA/600/8–84–014F, September 1985.

[332] USEPA, ''Health Assessment Document for 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds,'' External Review Draft, EPA/600/BP–92/001b, June 1994.

[333] USEPA, ''Dose Response Modeling of 2,3,7,8–TCDD,'' Workshop Review Draft, EPA/600/P–92/100C8, January 1997.

[334] USEPA, ''Mercury Study Report to Congress,'' EPA–452/R–97–007, December 1997.

[335] For a complete description of the derivation of the chronic toxicity benchmark for chlorine, see the

the effects of lead due to behavioral characteristics such as mouthing behavior, heightened absorption in the respiratory and gastrointestinal tracts, and the intrinsic sensitivity of developing organ systems. Symptoms of neurotoxicity include impairment in psychomotor, auditory, and cognitive function. These effects extend down to levels in blood of at least 10 micrograms lead per deciliter. Impairment of intellectual development, as measured by standardized tests, is thought to occur at levels below 10 micrograms per deciliter. Maternal lead exposure has been shown to be a risk factor in premature infant mortality, lead being associated with reduced birth weight and decreases in gestational age. Lead has also been associated with hypertension in both men and women and, as such, may be a risk factor for coronary disease, stroke, and premature mortality. Although dose-response relationships have been developed between blood lead levels and many of these health effects, EPA has not applied the relationships in the HWC risk analysis due to uncertainties related to the relatively small changes in blood lead expected to occur as a consequence of the MACT standards and the uncertain significance of any health benefits that might be attributed to such changes. Instead, our characterization of risks from lead focuses on the reductions in blood levels themselves and EPA's goal of reducing blood lead in children to below 10 micrograms per deciliter.

4. Other Metals

Metals that pose a risk for cancer include arsenic, cadmium, and chromium. Human epidemiological studies have shown an increase in lung cancer from inhalation exposures to arsenic, primarily in occupationally exposed individuals, and multiple internal cancers (such as liver, lung, kidney, and bladder), as well as skin cancer, from exposures to arsenic through drinking water. Human epidemiological studies have also shown an association between exposures to cadmium and lung cancer in occupational settings. These studies have been confirmed by animal studies which have shown significant increases in lung tumors from inhalation exposures to cadmium. However, cadmium administered orally has shown no evidence of carcinogenic response. A strong association between occupational exposures to chromium and lung cancer has been found in multiple studies. Although workers were exposed to both trivalent and hexavalent chromium, animal studies have shown that only hexavalent chromium is carcinogenic. There have been no studies that have reported that either hexavalent or trivalent chromium is carcinogenic by the oral route of exposure.

Other metals may pose a risk of noncancer effects. For example, in animal studies thallium has been shown to have ocular, neurological, and dermatological effects and effects on blood chemistry and the reproductive system. Signs and symptoms of similar and other effects have been observed in occupational studies of thallium exposures.

5. Hydrogen Chloride

Data on the effects of low-level inhalation exposures to hydrogen chloride are limited to studies in laboratory animals. Based on a lifetime study in rats which showed histopathological changes in the nasal mucosa, larynx, and trachea associated with exposures to hydrogen chloride, we estimated a reference concentration of 0.02 milligrams per cubic meter. The reference concentration was derived from a human equivalent lowest observed adverse effects level of 6 milligrams per cubic meter using an uncertainty factor of 300 to account for extrapolation from a lowest observed adverse effects level to a no observed adverse effects level, as well as extrapolation from animals to humans (including sensitive individuals).

6. Chlorine

Chlorine gas is a potent irritant of the eyes and respiratory system. Based on a lifetime study in rats and mice which showed histopathological changes affecting all airway tissues in the nose, we derived an interim chronic toxicity benchmark for chlorine gas of 0.001 milligrams per cubic meter. This value was derived from a human equivalent no observed adverse effects level of 0.04 milligrams per cubic meter and an uncertainty factor of 30 to account for extrapolation from animals to humans (including sensitive individuals). The human equivalent no observed adverse effects level from this study is also supported by a year-long study in monkeys.[335]

[335] For a complete description of the derivation of the chronic toxicity benchmark for chlorine, see the background document, ''Human Health and Ecological Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background—Final Report,'' July, 1999.

B. What Are the Health Risks to Individuals Residing Near HWC Facilities?

In this section, we address risks to populations that could be enumerated using estimation methods based on U.S. Census data and Census of Agriculture data. Estimates of the population of persons residing within 20 kilometers of hazardous waste combustion facilities were made for beef, dairy, produce, and pork farming households and for non-farm households. The number of home gardeners was estimated using national survey data on the portion of households that engage in home gardening. Estimates were made for each of four different age groups. In addition, population estimates were made for recreational anglers age 16 and older based on U.S. Fish and Wildlife Service survey data on recreational fishing and hunting.[336]

The risks to individuals of carcinogenic effects are expressed as the estimated increase in the probability that an individual will develop cancer over a lifetime. For non-cancer effects, risks are expressed as a hazard quotient, which is the ratio of an estimate of an individual's exposure to a health benchmark thought to be without appreciable risk. Both cancer and non-cancer risks are summarized in terms of percentiles of the national distribution of risks to individuals across a combustor category. High end risks are represented by the 90th to 99th percentiles of the distribution. Distributions for only the most highly exposed receptor populations are discussed here. The most highly exposed population varies depending on the particular chemical constituent, its fate and transport in the environment, and the pathways that lead to human exposures. Also, 90 percent confidence limits are estimated for each percentile. The size of the confidence interval reflects sampling error which is introduced by not sampling all the facilities in a given category of sources.[337] In some instances, estimates of the 90 percent confidence limits could not be made either because there were too few data points or there was insufficient spread in the data. For lightweight aggregate kilns, there is no sampling error because the sample included all known

[336] However, it was not possible to determine the number of recreational anglers that fish specifically at water bodies located in the vicinity of hazardous waste combustion facilities, such as those that were selected for modeling analyses.

[337] A 90 percent confidence interval indicates that there is a 10 percent chance that the actual value could lie outside the interval indicated, either higher or lower.

hazardous waste burning lightweight aggregate kilns.

1. Dioxins

For dioxins, our analysis shows that the most exposed population is children of dairy farmers who consume home-produced milk. High exposures were estimated for this population due to the relatively high consumption of milk by households that consume home-produced milk, the relatively high intake of milk by children compared to other age groups, and the tendency of chlorinated dioxins and furans to bioaccumulate in milk fat. A distribution of cancer risks for dioxins was generated which reflects variability in individual exposures due to site-specific differences in dioxin emissions, location of exposure, and other factors, as well as differences between individuals in exposure factors such as the length of exposure and the amount of milk consumed.

As a result of today's rule, we project that high end lifetime excess cancer risks will be reduced in this population from 2 in 100,000 (99th percentile) for both lightweight aggregate kilns and incinerators with waste heat recovery boilers to below one in one million (99th percentile) for lightweight aggregate kilns and 1 in one million (99th percentile, 90 percent upper confidence limit of 2 in one million) for incinerators with waste heat recovery boilers. For cement kilns, high end lifetime excess cancer risks are reduced only slightly, from 7 in one million (99th percentile) to 5 in one million (99th percentile). These reductions, which represent the reduction in the increment of exposure that results from dioxin emissions from hazardous waste combustors, are relatively small in relation to background exposures to dioxins generally. Considering that the number of individuals in the affected population is relatively small, only a few individuals may benefit from such reductions.

We also project that the incremental margin of exposure relative to background will be reduced in the same population from 0.2 (99th percentile for lightweight aggregate kilns) and 0.3 (99th percentile for incinerators with waste heat recovery boilers, 90 percent upper confidence limit of 0.5) to below 0.1 across all categories of combustors. Therefore, the risks associated with non-cancer effects from hazardous waste combustors are an order of magnitude or more lower than any (unknown and unquantifiable) risks that may be attributable to background exposures.

Unlike the distribution of cancer risks, the distribution of the margin of exposure reflects only site-to-site differences and does not reflect differences between individuals in the amount of milk consumed. Therefore, the exposures at the upper percentiles are likely to be underestimated.[338] Additional uncertainty is introduced because background exposures to dioxins in children have not been well characterized.

Other uncertainties include milk consumption rates and the limitations of the data available to assess consumption of home-produced milk. In addition, there are a variety of uncertainties related to the fate and transport of dioxins in the environment, including partitioning behavior into vapor and particle phases following release to the atmosphere and subsequent deposition via various wet and dry removal processes, uptake in plants such as forage and silage used by dairy cows for grazing and feeding, and the factors which affect the disposition of dioxins in dairy cattle and the extent of bioaccumulation in cow's milk.

2. Mercury

For mercury, our analysis shows that the most exposed population is recreational anglers and their families who consume recreationally-caught freshwater fish. This is because methyl mercury is readily formed in aquatic ecosystems and bioaccumulates in fish. Children have the highest exposures due to their higher consumption of fish, relative to body weight, compared to adults. Risks from exposures to methyl mercury are expressed here in terms of a hazard quotient, which is defined as the ratio of the modeled average daily dose to our reference dose. Although the reference dose was developed to be protective of exposures *in utero*, we applied the reference dose not just to maternal exposures but also to non-maternal adult and childhood exposures based on the presumption that the reference dose should be protective of neurological and developmental effects in these populations as well.

A distribution of hazard quotients was generated that reflects variability in individual exposures due to site-specific differences in mercury emissions, location of water bodies, and other factors, as well as differences between individuals in the amount of fish consumed. Other factors, such as water body-specific differences in the extent of methylation of inorganic mercury and the age and species of fish consumed were not reflected in the risk distribution. However, it is unclear what effect such factors would have on the distribution given the high degree of variability that is attributable to the factors that were considered in our analysis.

The results of our quantitative analysis for mercury are as follows. For cement kilns, we project that high end hazard quotients in adults will be reduced from a range of 0.09 to 0.4 (90th percentile, upper confidence limit of 0.1, and 99th percentile, respectively) at baseline to a range from 0.06 to 0.2 under today's rule (90th percentile, upper confidence limit of 0.08, and 99th percentile, respectively). In children, high end hazard quotients are projected to be reduced from a range of 0.2 to 0.8 (90th percentile, upper confidence limit of 0.3, and 99th percentile, respectively) at baseline to a range of 0.2 to 0.6 under today's rule (90th percentile, upper confidence limit of 0.2, and 99th percentile, respectively). For lightweight aggregate kilns, high end hazard quotients in both adults and children are below 0.1 at baseline and under today's rule. For incinerators, high end hazard quotients are below 0.01 in adults and below 0.1 in children at baseline and under today's rule. Taken together, these results appear to suggest that risks from mercury emissions (on an incremental basis) are likely to be small, although we cannot be certain of this for the reasons discussed below.

The risk results for mercury are subject to a considerable degree of uncertainty. In addition to the uncertainties discussed above in ''Overview of Methodology—Mercury'', there are other uncertainties when assessing individual mercury risks to nonsubsistence populations. In order to assess exposures to mercury emissions, we assumed that recreational anglers fish only at the water bodies within a given study area that were selected for modeling (and at no other water bodies) and that the extent of fishing activity at a given water body is related to the size of the water body.[339] As a result, in those situations where relatively low fish concentrations were modeled (and particularly if the water body was relatively large), a large portion of fish were assumed to have relatively low levels of mercury contamination and, therefore, recreational anglers who consume relatively large amounts of recreationally-caught fish were estimated to have relatively low levels

[338] The precise extent of underestimation at the upper percentiles associated with variability in milk consumption is unknown but is expected to be a factor of two.

[339] Ideally, detailed information on the fishing activities of individual anglers, including the size of the catch taken from individual locations, would be used to better assess exposures from consumption of recreationally-caught fish.

of exposure. In reality, some portion of the fish consumed by recreational anglers is likely to be contaminated with mercury at levels typical of background conditions. The effect of such background exposures is to increase actual exposures, except perhaps at the high end of the exposure distribution.[340]

We believe that the uncertainties implicit in the quantitative mercury analysis continue to be sufficiently great so as to limit its ultimate use for decision-making. Therefore, we have used the quantitative analysis to make qualitative judgments about the risks from mercury but have not relied on the quantitative analysis (nor do we believe it is appropriate) to draw quantitative conclusions about the risks associated with the MACT standards.

3. Lead

For lead, children are the population of primary concern for several reasons, including behavioral factors, absorption, and the susceptibility of the nervous system during a child's development. We have chosen to use blood lead level as the exposure metric, consistent with the U.S. Centers for Disease Control criteria for initiating intervention efforts. Lead exposures occur through a variety of pathways, including inhalation, incidental ingestion of soil and household dust, and dietary intake. Our analysis indicates that the population having the highest exposures are children who consume home-produced fruits and vegetables. However, children who do not consume home-produced foods also have relatively high exposures due to incidental ingestion of soil and household dust.

Blood lead distributions were generated that represent incremental exposures to lead emissions from hazardous waste combustors. These distributions reflect variability in individual exposures due to site-specific differences in lead emissions, location of exposure, and other factors, as well as differences between individual children in behavior patterns, absorption, and other pharmacokinetic factors. The IEUBK model that was used to estimate blood lead levels considers inter-individual variability in behavior related to lead exposure, such as mouthing activity. However, the model does not explicitly consider variability for the specific dietary pathways assessed for children of home gardeners, that is, consumption of home-produced fruits and vegetables. Therefore, the blood lead distributions may not fully reflect inter-individual variability that results from such individual differences.

Modeled blood lead (PbB) levels can be compared with background exposures in the same age group (children ages 0 to 5 years) in the general population. The median blood lead level in children in the general population is 2.7 micrograms per deciliter (μg/dL), and 4.4 and 1.3 percent of children have blood lead levels that exceed 10 and 15 μg/dL, the levels at which community wide prevention and individual intervention efforts, respectively, are recommended.[341] However, the percentages vary widely depending on such factors as race, ethnicity, income, and age of the housing units occupied. Children whose blood lead levels are already elevated are the most susceptible to further increases in blood lead levels.

As a result of today's rule, we project that high end (90th to 99th percentile) incremental blood lead (PbB) levels in children will decrease from 0.24 to 0.50 micrograms per deciliter to 0.02 to 0.03 μg/dL for cement kilns. For incinerators, incremental PbB levels are projected to decrease from 0.6 to 1.2 μg/dL (90th to 99th percentile) to 0.02 to 0.03 μg/dL. For lightweight aggregate kilns, incremental PbB levels are projected to decrease from 0.02 to 0.03 μg/dL (90th to 99th percentile) to less than 0.01 μg/dL under the MACT standards. Although these reductions in incremental exposures represent only a fraction of the PbB level of concern (10 μg/dL), they can be significant in children with PbB levels that are already elevated from exposures to other sources of lead. In addition, there is evidence that effects on the neurological development of children may occur at blood lead levels so low as to be essentially without a threshold. Under the MACT standards, blood lead levels attributable to HWCs will be one percent or less of background levels typical of children in the general population.

4. Other Metals

We assessed both direct and indirect human exposures to a dozen different metals in addition to mercury. Exposures to non-mercury metals are generally quite low. Under today's rule, we project that lifetime excess cancer risks from exposures to carcinogenic metals (i.e., arsenic) will be below 1 in 10 million for all source categories. Hazard quotients for all source categories are projected to be at or below 0.01 (99th percentile) for all non-mercury metals under the MACT standards. These risks reflect variability in individual exposures due to site-specific differences in emissions, location of exposure, and other factors. However, the risks do not reflect differences between individuals in exposure factors such as the length of exposure and the amount of food ingested. Therefore, we may have underestimated risks at the upper percentiles of the distribution.[342] A full exposure factor variability analysis was not carried out because the risks using mean exposure factors are comparatively low. Risks from exposure to metals are also subject to uncertainty related to modeling of fate and transport in the environment such as deposition of airborne metals to soils, forage, and silage and subsequent uptake in farm animals.

5. Inhalation Carcinogens

We also assessed the combined cancer risk associated with inhalation exposures to all inhalation carcinogens, assuming additivity of the risks from individual compounds. The populations that have the highest inhalation exposures are adult farm or non-farm residents. Adults have the longest exposure duration relative to other age groups and adult farmers have less mobility and, therefore, longer durations of exposure than non-farm residents. However, depending on the location of farms and non-farm households, adult non-farm residents can have lifetime average exposures that are as high as adult farm residents.

Under today's rule, we project that lifetime excess cancer risks from inhalation exposures will be below 1 in 10 million for all source categories. The risks for inhalation carcinogens reflect variability in individual exposures due to site-specific differences in metals emissions, location of exposure, and other factors. However, they do not reflect differences between individuals

[340] We have previously estimated that median exposures to methyl mercury in the general population from seafood consumption are in the range of 0.01 to 0.03 μg/kg BW/day (Mercury Study Report to Congress, December 1997). These exposures correspond to hazard quotients of 0.1 to 0.3, values which (except for cement kilns) are higher than the 90th to 99th percentile hazard quotients estimated here for incremental exposures among recreational anglers.

[341] Data from the Centers for Disease Control's National Health and Nutrition Examination survey (NHANES III, phase 2) conducted from October 1991 to September 1994.

[342] For dioxins, inclusion of exposure factor variability increased the risk of cancer at the upper (90th to 99th) percentiles by less than a factor of two to a factor of five. However, the effect on the distribution of risks could differ for metals depending on the health effect of concern (i.e., cancer versus non-cancer), the pathway of exposure, and relative differences in the site-to-site variability of emissions.

in the length of exposure or other exposure factors. Therefore, we may have underestimated risks at the upper percentiles of the distribution.[343] A full exposure factor variability analysis was not carried out for inhalation carcinogens because the risks using mean exposure factors are comparatively low.

Estimates of inhalation risks are subject to a number of uncertainties. Individuals spend a majority of their time indoors and it is uncertain how representative modeled, outdoor, ambient air concentrations are of concentrations indoors. Also, the daily activities of individuals living in the vicinity of a given facility will tend to moderate actual exposures compared to modeled exposures at a fixed location. Meteorological information was generally obtained from locations well removed from modeled facilities and, therefore, may not be representative of conditions in the immediate vicinity of the stack. Limited information was available on the size of structures located near or adjacent to stacks at the modeled facilities. Building downwash, that can result from the presence of such structures, may significantly increase ground-level ambient air concentrations, particularly at locations that are relatively close to the point of release. In addition, the effect of elevated terrain was only considered when the terrain rose above the height of the stack. However, elevated terrain below stack height can lead to an increase in ground-level concentrations depending on the distance from the stack. Nevertheless, our projections of inhalation cancer risks are sufficiently low that we do not believe the uncertainties introduced by these factors impacts our conclusion that these risks are relatively low.

6. Other Inhalation Exposures

Of the compounds we evaluated that are not carcinogenic, the highest inhalation exposures are for hydrogen chloride and chlorine gas. We express the risks from these in terms of an inhalation hazard quotient, which is defined as the ratio of the modeled air concentration to our reference concentration. The receptor population with the highest inhalation hazard quotients is variable and depends on site-to-site differences in the location of farm and non-farm households and differences in emissions. A distribution of hazard quotients was generated that reflects variability in individual exposures due to site-specific differences in chlorine emissions, location of exposure, and other factors. However, the distribution does not reflect individual differences in activity patterns or breathing rates.[344] Also, because the reference concentration is intended to be protective of long-term, chronic exposures over a lifetime, the distribution does not reflect temporal variations in exposure.[345]

Under today's rule, we project that inhalation hazard quotients will be at or below 0.01 for both hydrogen chloride and chlorine gas for all source categories. The same uncertainties related to indoor versus outdoor concentrations and atmospheric dispersion modeling are also applicable to hydrogen chloride and chlorine. However, our projections of non-cancer inhalation risks are sufficiently low that we do not believe the uncertainties impact our conclusion that these risks are relatively low.

C. What Are the Potential Health Risks to Highly Exposed Individuals?

We also assessed exposures to individuals that could be more highly exposed than the populations that could be characterized using census data. These include persons engaged in subsistence activities such as farming and fishing. Although the frequency of these activities is unknown, such activities do occur in some segments of the U.S. population, and we believe that it is important to evaluate risks associated with such activities. In addition, risks associated with subsistence farming place a bound on potential risks to farmers who raise more than one type of livestock. Information on the numbers of farms that produce more than one food commodity (*e.g.*, beef and milk) is not available from the U.S. Census of Agriculture. Therefore, in assessing risks to farm populations, we may have underestimated the risks to farmers and their families that consume more than one type of home-produced food commodity.

We assumed that subsistence farmers obtain substantially all of their dietary intake from home-produced foods, including meats, milk, poultry, fish, and fruits and vegetables. We used data on the mean rate of consumption of home-produced foods in households that consume home-produced foods to estimate the average daily intakes from subsistence farming. For subsistence fishing, we used data on the mean rate of fish consumption among Native American tribes that rely on fish for a major part of their dietary intake.

We do not have specific information on the existence or location of subsistence farms or water bodies used for subsistence fishing at sites where hazardous waste combustors are located. Therefore, we hypothetically assumed that subsistence farming does occur at each of the modeled facilities and, furthermore, that it occurs within each of the sixteen sectors within a study area. We also assumed that subsistence fishing takes places at each of the modeled water bodies. The results of the analysis are summarized in the form of frequency distributions of individual risk. The distributions must be interpreted in relation to the frequency of the modeled scenarios and not the likelihood of such exposures actually occurring.[346]

The risk results for subsistence receptors are highly uncertain, primarily due to the lack of information on the location of subsistence farms (or even the occurrence of subsistence farms within the study area of a given facility) and the assumption that individuals engaged in subsistence farming obtain essentially their entire dietary intake from home-produced foods.

1. Dioxins

Under today's rule, we project that lifetime excess cancer risks from dioxin exposures associated with subsistence farming will be below 1 in 100,000 for all categories of combustors, with the exception of cement kilns at the lowest frequency of occurrence. The lifetime excess cancer risk for cement kilns is estimated to be 2 in 100,000 at a frequency of 1 percent. This indicates that only 1 in 100 sectors are expected to have risks of this magnitude or greater, assuming that subsistence farms are located in all sectors at all hazardous waste burning cement kilns. However, because the sectors increase in size with increasing distance, the probability that a subsistence farm would be exposed to

[343] The precise extent of underestimation at the upper percentiles associated with variability in the duration of exposure is unknown but is expected to be a factor of three or less.

[344] Differences in breathing rates are not considered because the exposure factors used in deriving the reference concentration are fixed.

[345] Although short-term exposures to hydrogen chloride and chlorine gas resulting from routine releases can be significantly higher than long-term exposures, we do not believe that such exposures are high enough to pose a health concern because the threshold for acute effects is quite high in comparison to that for chronic effects.

[346] Moreover, the modeled scenarios cannot be considered equally probable because the sectors in which farms were located are of unequal area, being much smaller closer to a facility and much larger farther away and because any particular sector may be more or less likely to support farming activities depending on soils, precipitation, existing land uses, and other conditions. Similarly, the modeled water bodies may be more or less likely to support intensive fishing activity depending on their size, productivity, and other characteristics.

this level of risk is probably considerably less than 1 percent.

We project that the incremental margin of exposure relative to background will be reduced to 0.1 or below for incinerators under today's rule except at the lowest frequency of occurrence (*i.e.*, 1 percent) for which a margin of exposure of 0.2 is projected. However, the incremental margins of exposure for cement kilns and lightweight aggregate kilns are projected to remain above 0.1 at a frequency of 10 percent or greater (ranging up to 0.2 at a frequency of 5 percent for lightweight aggregate kilns and 0.7 at a frequency of 1 percent for cement kilns). This indicates that more than 1 in 10 sectors are expected to have risks associated with non-cancer effects that are within an order of magnitude of any (unknown and unquantifiable) risks that may be attributable to background exposures. However, for the reasons stated previously, the probability that a subsistence farm would be exposed to this level of risk is probably considerably lower than indicated by the number of sectors.

Under today's rule, we project lifetime excess cancer risks from dioxin exposures associated with subsistence fishing will be below 1 in one million for incinerators and lightweight aggregate kilns. For cement kilns, high end cancer risks under today's rule range from 3 in one million to 4 in one million (at frequencies of 10 and 5 percent, respectively) in adults and from 2 in one million to 4 in one million (at frequencies of 10 and 5 percent, respectively) in children (6 to 11 years of age). We project that the incremental margin of exposure relative to background will be below 0.1 for subsistence fishing for both children and adults for all categories of combustors under today's rule.

2. Metals

Our analysis indicates that the highest risks from metals (other than mercury) are from arsenic, thallium, and lead. Under today's rule, we project that lifetime excess cancer risks from arsenic exposures associated with subsistence farming will be below 1 in one million for all source categories. Hazard quotients for thallium are projected to be at or below 0.01 (99th percentile) under today's rule, except for cement kilns. For cement kilns, hazard quotients for thallium are projected to range from 0.03 to 0.4 (90th to 99th percentiles). Incremental blood lead levels are projected to be at or below 0.03 µg/dL for all source categories under today's rule. Blood lead at these levels are about one percent of background levels typical of children in the general population.

3. Mercury

From the results of our quantitative analysis we project that, under today's rule, hazard quotients for incremental exposures to mercury associated with subsistence fishing will be at or below 1 in both adults and children. These results apply to incinerators, lightweight aggregate kilns, and cement kilns at the very lowest frequency of occurrence that was analyzed (*i.e.*, 1 percent).

The risk results for mercury are subject to a considerable degree of uncertainty. In addition to the uncertainties discussed above in ''Overview of Methodology—Mercury'', there are other uncertainties when assessing individual mercury risks to subsistence receptors. We assumed that individuals engaged in subsistence fishing obtain all the fish they consume from a single water body. To the extent that individuals may fish at more than one water body, the effect of this assumption may be to exaggerate the risk from water bodies having relatively high modeled fish concentrations.

The uncertainties implicit in the quantitative mercury analysis continue to be sufficiently great so as to limit its ultimate use for decision-making. Therefore, we have used the quantitative analysis to make qualitative judgments about the risks from mercury but have not relied on the quantitative analysis (nor do we believe it is appropriate) to draw quantitative conclusions about the risks associated with the MACT standards.

D. What Is the Incidence of Adverse Health Effects in the Population?

We estimated the overall risk to human receptor populations for those chemical constituents that posed the highest individual risks and whose populations could be enumerated. These included excess cancer incidence in the general population from the consumption of agricultural commodities produced in the vicinity of hazardous waste burning facilities, excess cancer incidence in the local population, and excess incidence of children with elevated blood lead levels. In addition, we estimated the avoided incidence of mortality and morbidity in the local population associated with reductions in exposures to particulate matter emissions.[347]

Incidence is generally expressed in terms of the annual number of new cases of disease in the exposed population. However, for diseases such as cancer which have a long latency period, the annual incidence represents the lifetime incidence associated with an exposure of one year. For diseases with recurring symptoms, the annual incidence represents the number of episodes of disease over a year's time.

1. Cancer Risk in the General Population

Agricultural commodities produced in the vicinity of hazardous waste combustors may be consumed by the general population (*i.e.*, individuals who reside outside the study area). Commodities such as meat and milk may be contaminated with dioxins and, therefore, pose some risk to individuals that consume them. We estimated the amount of ''diet accessible'' dioxin in meat and milk produced at hazardous waste combustors that would be consumed by the general population and estimated the number of additional cancer cases that could result from such exposures. The approach is predicated on the assumption that cancer risks follow a linear, no-threshold model in the low dose region.

Our agricultural commodity analysis indicates that, as a result of today's rule, annual excess cancer incidence in the general population will be reduced from 0.5 cases per year (90 percent confidence interval, 0.4 to 0.6) to 0.1 cases per year (90 percent confidence interval, 0.1 to 0.2). Most of the risk is associated with the consumption of milk and other dairy products. The combustor categories that contribute most to the reduction are incinerators with waste heat recovery boilers and lightweight aggregate kilns.

2. Cancer Risk in the Local Population

Individuals that live and work in the vicinity of hazardous waste combustors are exposed to a number of compounds that are carcinogenic by oral or inhalation routes of exposure or both. These include dioxin, arsenic, beryllium, cadmium, chromium, and nickel. We estimated the annual cancer incidence in each of the enumerated receptor populations based on the mean individual risk in each sector and sector-specific population estimates. The resulting incidence estimates were weighted using facility-specific sampling weights and summed.

Our analysis of cancer risks in the local population indicates that, as a result of today's rule, annual excess

[347] Excess incidence refers to the incidence of disease beyond that which would otherwise be observed in the population, absent exposures to the sources in question. Avoided incidence is the reduction in incidence of disease in the population that would be expected from a reduction in exposures to the sources in question.

cancer incidence will be reduced from 0.1 cases per year (90 percent confidence interval, 0.08 to 0.2) to 0.02 cases per year (90 percent confidence interval, 0.01 to 0.03). Nearly all of the risk reduction, which occurs almost entirely among non-farm residents, is attributable to incinerators and results mainly from reductions in emissions of metals, primarily arsenic, cadmium, and chromium.

3. Risks From Lead Emissions

Children that live near hazardous waste combustor are exposed to lead emissions through the diet and through inhalation and incidental soil ingestion. Children that already have elevated blood lead levels may have their levels further increased as a result of such exposures, some of whom may have their blood lead levels increased beyond 10 µg/dL. We estimated the increase, or excess incidence, of elevated blood levels above 10 µg/dL by estimating the number of children in each sector with blood lead levels above 10 µg/dL as a result of background exposure and subtracting that from the number of children above 10 µg/dL as a result of both background exposure and incremental exposures from hazardous waste combustors. This estimate represents the annual rate of increase in the number of children with elevated blood lead beyond background.

Our analysis indicates that, as a result of today's rule, the excess incidence of elevated blood lead will be reduced from 7 cases per year to less than 0.1 cases per year. The reduction is primarily attributable to incinerators, although a small reduction (0.4 cases per year) is attributable to cement kilns. These reductions occur entirely among non-farm residents. Children of minority and low income households generally have higher background exposures to lead and are more likely to have blood levels elevated above 10 µg/dL than children from other demographic groups and, therefore, are more likely to benefit from reductions in lead exposures. However, our analysis did not consider the influence of such socioeconomic factors. For this reason, we believe that we may have underestimated the reductions in excess incidence of elevated blood lead levels, including potential reductions attributable to cement kilns and lightweight aggregate kilns.

4. Risks From Emissions of Particulate Matter

Human epidemiological studies have demonstrated a correlation between community morbidity and mortality and ambient levels of particulate matter, particularly fine particulate matter (below 2.5 or 10 microns in diameter, depending on the study), across a wide variety of geographic settings. Lower particulate matter is associated with lower mortality, lower rates of hospital admissions, and a lower incidence of respiratory disease. Concentration-response functions for various health endpoints have been derived from these studies, and we used these functions to estimate the reduction in the incidence of mortality and morbidity associated with a reduction in emissions of particulate matter.

Our analysis indicates that, as a result of today's rule, there will be between 1 and 4 fewer premature mortalities per year associated with particulate matter emissions (depending on which study is used). In addition, we project there will be 6 fewer hospitalizations, 25 fewer cases of chronic bronchitis, 180 fewer cases of lower respiratory disease, per year.

The mortality estimates are subject to some uncertainty due to the fact that the lower estimate (which is derived from long-term studies) assumes no threshold for effects and the upper estimate (which is derived from short-term studies) may include mortalities that are premature by as little as a few days. The no threshold assumption may be appropriate, however, considering that the reduction in mortality is projected to occur entirely from incinerators, especially on-site incinerators. Such incinerators are located at manufacturing facilities that are likely to have other particulate matter emissions and both on-site, and commercial incinerators are typically located in industrial areas where there may be many other sources of particulate matter emissions, resulting in ambient particulate matter levels that are well above any threshold. Also, because the particulate matter modeling was conducted to 20 rather than 50 kilometers, the inhalation risks may be understated, especially from PM that is 2.5 microns in diameter and smaller which can be transported over long distances from HWCs.

III. What Is the Potential for Adverse Ecological Effects?

The ecological assessment is based on a screening level analysis in which model-estimated media concentrations are compared to media-specific ecotoxicological criteria that are protective of multiple ecological receptors. The analysis used an ecological hazard quotient as the metric for assessing ecological risk. The ecological hazard quotient is the ratio of the model-estimated media concentration to the ecotoxicological criterion. Hazard quotients above 1 suggest that a potential for adverse ecological effects may exist. Ecotoxicological criteria for soils, surface waters, and sediments were used in the analysis. Ecotoxicological criteria for soil are intended to be broadly protective of terrestrial ecosystems, including the soil community, terrestrial plants, and consumers such as mammals and birds. Ecotoxicological criteria for surface water are intended to be protective of the aquatic community, including fish and aquatic invertebrates, primary producers such as algae and aquatic plants, and fish-eating mammals and birds. Sediment criteria are intended to be protective of the benthic community. The analysis was conducted for dioxins, mercury, and fourteen other metals. Only the results for dioxins and mercury are discussed here. Very low or no potential for ecological risk was found for the other metals.[348] For a full discussion of the ecological assessment, see the background document for today's rule.[349]

A. Dioxins

A variation on the general screening level approach was used for assessing ecological risks from dioxins in surface water. Rather than basing the assessment on ambient water quality criteria for the protection of wildlife, ecotoxicological benchmarks for 2,3,7,8-tetrachlorodibenzo(p)dioxin (TCDD) for fish-eating birds and mammals (i.e., no observed adverse effects levels) were used to make a direct comparison with estimated intakes of dioxins in fish in terms of 2,3,7,8–TCDD toxicity equivalents (TEQ). This approach accounts for the different rates of bioaccumulation of the various 2,3,7,8 dibenzo(p)dioxin and dibenzofuran congeners and avoids the conservatism of comparing an ambient water quality criterion for 2,3,7,8–TCDD to model-estimated water concentrations in terms of 2,3,7,8–TCDD TEQs. The results of our analysis indicate no exceedances of the ecotoxicological benchmarks for 2,3,7,8–TCDD for any category of hazardous waste combustors. One limitation of the ecological assessment for dioxins is that water quality criteria for the protection of aquatic life are not

[348] Although minor exceedances of the ecotoxicological criteria for lead were noted for incinerators, the exceedances were eliminated under today's rule.

[349] ''Human Health and Ecological Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Wastes: Background Document—Final Report,'' July, 1999.

available. However, fish and aquatic invertebrates are generally less sensitive to dioxins than mammals and birds.

For assessing the potential for ecological risk in terrestrial ecosystems, soil criteria developed for 2,3,7,8–TCDD for the protection of mammals and birds were compared to model-estimated soil concentrations in terms of 2,3,7,8–TCDD TEQs. Because the more highly chlorinated 2,3,7,8 dibenzo(p)dioxin and dibenzofuran congeners are expected to bioaccumulate in prey species more slowly than 2,3,7,8–TCDD, the potential for ecological risk is likely to be overstated. Our analysis indicates that, at baseline, less than one percent of the study areas surrounding hazardous waste combustors have the potential for ecological risk from dioxins in soil. Under today's rule, we project no exceedances of the ecotoxicological criteria for dioxins in soil. The soil ecotoxicological criterion for dioxins is derived from studies of reproductive and developmental effects in mammals. Potential impacts to terrestrial plant and soil communities could not be evaluated due to a lack of sufficient ecological toxicity data. However, vertebrates such as mammals and birds are known to be more sensitive to dioxin exposure than invertebrates. Therefore, we consider the potential for risk to invertebrate receptors to be low.

B. Mercury

The ecological assessment of mercury is based on water quality criteria for the protection of wildlife that were developed for the Mercury Study Report to Congress. The assessment used the lowest of the available water quality criteria for individual fish-eating avian and mammalian wildlife species. The frequency distribution of ecological hazard quotients for total mercury indicates the potential for adverse ecological effects for cement kilns. Our analysis indicates that, for cement kilns, exceedances of the ecotoxicological criteria for total mercury may occur over 40 percent of study area surface waters at baseline. Above a hazard quotient of 1, the frequency of exceedances drops off quickly, with hazard quotients above 2 occurring at a frequency of 1 percent. The ecological hazard quotients remain essentially unchanged under today's rule. However, we project no exceedances of the ecotoxicological criteria for methyl mercury. Because methyl mercury is the form of mercury that is of greatest concern for fish-eating mammals and birds, the lack of exceedances suggests that the potential for ecological effects is relatively low. Our analysis also suggests relatively low potential for ecological effects for incinerators and lightweight aggregate kilns. Although our analysis indicates that exceedances of the ecotoxicological criteria for total mercury may occur over 22 percent of study area surface waters for lightweight aggregate kilns and 6 percent for incinerators at baseline, these are reduced to no exceedances and less than 1 percent, respectively, under today's rule. Moreover, we project no exceedances of the ecotoxicological criteria for methyl mercury. The significance of these results must be judged in the context of the considerable uncertainties related to the fate and transport of mercury in the environment, as discussed elsewhere in today's notice, the presence of background levels of mercury, and the level of protection afforded by the underlying ecotoxicological criteria.

For soils, our analysis indicates that less than one percent of the study areas surrounding hazardous waste combustors have the potential for ecological risk at baseline. Under today's rule, we project no exceedances of the ecotoxicological criteria for mercury for incinerators and lightweight aggregate kilns. For cement kilns, we project exceedances at a frequency of much less than one percent. The soil ecotoxicological criterion for mercury is derived from studies of the reproductive capacity of earthworms. Although earthworms serve a vital function in the soil community, given the redundancy and abundance of soil organisms and the low frequency of exceedances, we believe that adverse impacts to the terrestrial ecosystem, including higher trophic levels such as terrestrial mammals, are unlikely.

As a screening level analysis, the ecological assessment is subject to a number of limitations. The analysis assumes the occurrence of the ecological receptors on which the ecotoxicological criteria are based in all modeled sectors and water bodies. Although the ecological receptors included in the analysis are commonly occurring species, they may not be present in the same locations at which exceedances are predicted due to a lack of suitable habitat or other factors. Furthermore, the range of predator and prey species may exceed the spatial extent of the estimated exceedances. Many primary and secondary consumers are opportunistic feeders with substantial variability in both the type of food items consumed as well as the seasonal patterns of feeding and foraging. These behaviors can be expected to moderate exposures to chemical contaminants and reduce the potential for risk. On the other hand, gaps exist in the ecotoxicological data base such that not all combinations of chemical constituents and ecological receptors could be evaluated. In addition, media concentrations could not be estimated for all habitats that may be important to ecological receptors, such as wetlands. Also, our analysis did not consider the possible impact of background concentrations. Therefore, although as a screening level analysis the ecological assessment has a tendency toward conservatism, we cannot say for certain that no potential exists for ecological risks that fall beyond the scope of the assessment.

Part Eight: Analytical and Regulatory Requirements

I. Executive Order 12866: Regulatory Planning and Review (58 FR 51735)

Is This a Significant Regulatory Action?

Under Executive Order 12866 (58 FR 51735, October 4, 1993), we must determine whether a regulatory action is ''significant'' and, therefore, subject to OMB review and the requirements of the Executive Order. The Order defines ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more, adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

Under the terms of Executive Order 12866, we have reviewed today's rule and determined that it does not represent an ''economically significant'' regulatory action, as defined under point one above. The aggregate annualized social costs for this rule are under $100 million (ranging from $50 to $63 million for the final standards). However, it has been determined that this rule is a ''significant regulatory action'' because it may raise novel legal or policy issues (point four above). As such, this action was submitted to OMB for review. Changes made in response to OMB suggestions or recommendations will be documented in the public record.

We have prepared economic support materials for today's final action. These documents are entitled: Assessment of the Potential Costs, Benefits, and Other Impacts of the Hazardous Waste Combustion MACT Standards—Final Rule, and, Addendum To The Assessment of the Potential Costs, Benefits, and Other Impacts of the Hazardous Waste Combustion MACT Standards—Final Rule. The Addendum and Assessment documents were designed to adhere to analytical requirements established under the Executive Order, and corresponding Agency and OMB guidance; subject to data, analytical, and resource limitations.

This part of the Preamble is organized as follows: I. Executive Order 12866 (as addressed above), II. What Activities have Led to Today's Rule?—presenting a summary of the analytical methodology and findings from the 1996 RIA for the proposed action, and, a summary of substantive peer review and public stakeholder comments on this document, with Agency responses, III. Why is Today's Rule Needed?—justifying the need for Federal intervention, IV. What Were The Regulatory Options?—presenting a brief discussion of the scope of alternative regulatory options examined, V. What Are the Potential Costs and Benefits of Today's Rule?—summarizing methodology and findings from the final Assessment document, VI. What Considerations Were Given to Issues Like Equity and Children's Health?, VII. Is Today's Rule Cost-Effective?, VIII. How Do the Costs of Today's Rule Compare to the Benefits?, IX. What Consideration Was Given to Small Businesses? X. Were Derived Air Quality and Non-Air Impacts Considered? XI. Is Today's Rule Subject to Congressional Review?, XII. How is the Paperwork Reduction Act Considered in Today's Rule?, XIII. Was the National Technology Transfer and Advancement Act Considered?, and, XIV. Were Tribal Government Issues Considered? (Executive Order 13084).

The RCRA docket established for today's final rulemaking maintains a copy of the complete final Assessment and Addendum documents for public review. Readers interested in these economic support materials are strongly encouraged to read both documents to ensure full understanding of the methodology, data, findings, and limitations of the analysis.

II. What Activities Have Led to Today's Rule?

In May of 1993, we introduced a draft Waste Minimization and Combustion Strategy designed to reduce reliance on the combustion of hazardous waste and encourage reduced generation of these wastes. Among the key objectives of the strategy was the reduction of health and ecological risks posed by the combustion of hazardous wastes. As part of this strategy, we initiated the development of MACT emissions standards for hazardous waste combustion facilities.

On April 19, 1996, we published the proposal, which included revisions to standards for hazardous waste incinerators and hazardous waste burning cement kilns and lightweight aggregate kilns. These proposed MACT standards were designed to address a variety of hazardous air pollutants, including dioxins/furans, mercury, semivolatile and low volatile metals, and chlorine. We also proposed to use emissions of carbon monoxide and hydrocarbons as surrogates for products of incomplete combustion.

A. What Analyses Were Completed for the Proposal?

We completed an economic analysis in support of the proposal. This Regulatory Impact Assessment (RIA), examined and compared the costs and benefits of the proposed standards, as required under Executive Order 12866. Industry economic impacts, environmental justice, waste minimization incentives, and other impacts were also examined. This RIA also fulfilled the requirements of the Regulatory Flexibility Act by evaluating the effects of regulations on small entities. This document, Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards (November 13, 1995), Appendices (November 13, 1995), and two Addenda (November 13, 1995 and February 12, 1996) are available in the docket established for the proposed action.

Throughout the development of the proposal, we considered many alternative regulatory options. A full discussion of the methodology and findings of all options considered is in the Regulatory Impact Assessment (RIA). Only the floor option and our preferred option (*i.e.*, the floor option and beyond-the-floor options for selected hazardous air pollutants) are discussed in this summary.

1. Costs

To develop industry compliance cost estimates, we categorized or modeled combustion units based on source category and size and estimated engineering costs for the air pollution control devices needed to achieve the proposed standards. Based on current emissions and air pollution control device information, we developed assumptions regarding the type of upgrades that units would require. This ''model plants'' engineering cost analysis was used because our data were limited.

Total annual compliance cost estimates for the floor option and the beyond-the-floor standards ranged from $93 million to $136 million, respectively, beyond the baseline. For the floor option, on-site incinerators represented 55 percent of total nationwide costs, cement kilns represented 29 percent, commercial incinerators represented 14 percent, and lightweight aggregate kilns represented 2 percent. Of the total beyond-the-floor costs, on-site incinerators represented 50 percent, cement kilns represented 32 percent, commercial incinerators represented 15 percent, and lightweight aggregate kilns represented 3 percent. For the incremental impacts of going from the floor to beyond-the-floor, lightweight aggregate kilns were projected to experience a 100 percent increase in compliance costs, cement kilns would experience a 63 percent increase, commercial incinerators and on'site incinerators, at 54 and 34 percent, respectively. Overall, compliance costs associated with the proposed action were projected to result in significant economic impacts to the combustion industry.

The RIA also examined average total annual compliance costs per combustion unit. This indicator was designed to assess the relative impact of the rule on each facility type in the combustion universe. Findings projected that cement kilns were likely to incur the greatest average incremental cost per unit, totaling $770,000 annually at the floor and $1.1 million annually for the proposed beyond-the-floor standards. The costs for LWAKs ranged from $490,000 to $825,000. The costs for on-site incinerators ranged from $340,000 to $486,000. The costs for commercial incinerators ranged from $493,000 to $730,000. These costs assume no market exits. Once market exit occurs, average per unit costs may be significantly lower, particularly for on-site incinerators.

The analysis also examined the floor and proposed beyond-the-floor impacts on a per ton basis. In the baseline, average prices charged to burn hazardous waste were estimated to be $178 per ton for cement kilns, $188 per ton for lightweight aggregate kilns, $646 per ton for commercial incinerators, and $580 per ton for on-site incinerators (approximate internal transfer price).

Baseline burn costs (before consolidation) for these facilities were found to average $104 per ton for cement kilns, $194 per ton for lightweight aggregate kilns, $806 per ton for commercial incinerators, and $28,460 per ton for on-site incinerators.[350] Incremental compliance costs at the floor and proposed BTF levels were estimated to be $23 to $31 per ton for commercial incinerators, $40 to $50 per ton for cement kilns, $39 to $56 per ton for lightweight aggregate kilns, and $47 to $57 per ton for on-site incinerators.

From comparison of these prices and baseline burn costs, some high-cost facilities, especially commercial and on-site incinerators, appeared to be burning below break-even levels. The incremental compliance costs of the proposal would make these facilities even less competitive. The RIA estimated that, of the facilities which are currently burning hazardous waste, three cement kilns, two lightweight aggregate kilns, six commercial incinerators, and eighty-two on-site incinerators would likely stop burning hazardous waste over the long term. These were incremental to projected baseline market exits estimated at the time of proposal. Most of the facilities that exit the market were ones that burned smaller amounts of hazardous waste.

We also conducted a generalized cost effectiveness analysis for the proposal. We found that the cost per hazardous air pollutant is often difficult to estimate because the air pollution control devices often control more than one pollutant. Therefore, it was not feasible to estimate precise costs per pollutant. Once the compliance expenditures had been estimated, the total mass emission reduction achieved when facilities comply with the standards option was estimated. The total incremental cost per incremental reduction in pollutant emissions was then estimated. Considering all facilities together, dioxin, mercury, and metals costs per unit reduction are quite high because small amounts of the dioxin and metals are released into the environment. For other pollutants, expenditures per ton are much lower. Please refer to the November 13, 1995 draft RIA for a complete discussion of the methodology and findings.

[350] Baseline costs were calculated by identifying all costs of hazardous waste burning. For commercial incinerators and on-site incinerators, all costs of construction, operation and maintenance are included. This also includes RCRA permits and existing air pollution control devices. The costs for on-site burners are extremely high because the costs are distributed across the small amount of hazardous waste burned. For cement kilns and lightweight aggregate kilns, only the incremental costs of with burning hazardous waste are included (e.g., permits). The cost of the actual units (which are primarily for producing cement or aggregate) are not included in the baseline.

2. Benefits

Our evaluation showed that background levels of dioxin in beef, milk, pork, chicken, and eggs were approximately 0.50, 0.07, 0.30, 0.20, and 0.10 parts per trillion fresh weight, respectively, on a toxicity equivalent (TEQ) basis. These background levels and information on food consumption were then used to estimate dietary intake in the general population. That estimate was 120 picograms TEQ per day. We also collected background data on dioxins in fish, taken from 388 locations nationwide. At 89 percent of the locations, fish contained detectable levels of at least two of the dioxin and furan compounds for which analyses were conducted. We then estimated total dioxin emissions from hazardous waste combustors at 0.94 kg TEQ per year. This represented about 9 percent of total anthropogenic emissions of dioxins in the U.S. at the time. The dioxin estimates have been revised since then.

While no one-to-one relationship between emissions and risk exists, it was inferred that hazardous waste-burning sources were likely to contribute significantly to dioxin levels in foods. In the proposal, we estimated that these dioxin emissions would be reduced to 0.07 kg TEQ per year at the floor levels and to 0.01 kg TEQ per year at the beyond the floor levels. We estimated this to result in decreases of approximately 8 and 9 percent in total estimated anthropogenic U.S. emissions, respectively. Our position at proposal was that reductions in these emissions, in conjunction with reductions from other dioxin-emitting sources, would help reduce dioxin levels in foods over time and, therefore, reduce the likelihood of adverse health effects, including cancer.

Mercury is a concern in both occupational and environmental settings. Human exposures to methyl mercury occur primarily from ingestion of fish. Mercury contamination results in routine fish consumption bans or advisories in over two thirds of the States. At the proposal, we estimated a safe exposure level to methyl mercury (the reference dose) at 0.0001 mg per kg per day. We collected data on chemical residues in fish from 388 locations nationwide and found that fish contained detectable levels of mercury at 92 percent of the locations. Similar results have been obtained in other studies, strongly suggesting that long-range atmospheric transport and deposition of anthropogenic emissions is occurring. Our research found that, for persons who eat significant amounts of freshwater fish, exposures to mercury may be significant compared to the threshold at which effects may occur in susceptible individuals.

Our estimates for the proposal indicated that hazardous waste combustors emitted a total of 10.1 Mg of mercury per year, representing about 4 percent of the U.S. anthropogenic total. Implementation of the floor levels were estimated to reduce mercury emissions from all hazardous waste-burning sources to 3.3 Mg per year. The proposed beyond-the-floor levels would drop this to an estimated 2.0 Mg per year. Such reductions were estimated to lower total anthropogenic U.S. emissions by approximately 3 percent. Reductions in these mercury emissions, in conjunction with the Agency's efforts to reduce emissions from other mercury-emitting sources, would help diminish mercury levels in fish over time and, therefore, reduce the likelihood of adverse health effects occurring in fish-consuming populations.

Other benefits we investigated for the proposal included ecological benefits, property value benefits, soiling and material damage, aesthetic damages, and recreational and commercial fishing impacts. Overall, the analysis of the ecological risk suggested that water quality criteria may be exceeded only in small watersheds located near waste combustion facilities. Furthermore, such exceedances would occur only when assuming very high emissions. The preliminary analysis for the proposal indicated that property value impacts may be very significant because of emission reductions from hazardous waste combustion facilities. A detailed review of this analysis, as well as other benefits (*e.g.,* avoided clean-up as result of reduced particulate matter releases), is presented in chapter 5 of the November 13, 1995 Regulatory Impact Assessment.

3. Other Regulatory Issues

We also examined other issues associated with the proposal. These included environmental justice, unfunded federal mandates, regulatory takings, and waste minimization.

a. Environmental Justice. We completed an analysis of demographic characteristics of populations near cement plants and commercial hazardous waste incinerators and compared them to county and state populations. This analysis focused on spatial relationships between these

facilities and the adjacent minority and low income populations. The study did not describe the actual health status of these populations nor how their health might be affected in proximity to hazardous waste facilities. Results indicated that 27 percent of all cement plants and 37 percent of the sample of incinerators had minority percentages within a one mile radius which exceed the corresponding county minority percentages by more than five percentage points. Eighteen percent of all cement plants and 36 percent of the sample of incinerators had poverty percentages which exceed the county poverty percentages by more than five percentage points. Please see chapter seven of the November 13, 1995 RIA for a full discussion of the environmental justice methodology and findings conducted for the proposal.

b. Unfunded Federal Mandates. Our analysis of compliance with the Unfunded Mandates Reform Act (UMRA) of 1995 found that the proposal contained no State, local, tribal government, or private sector Federal mandates as defined under the regulatory provisions of Title II of UMRA. We concluded that the rule implements requirements specifically set forth by Congress, as stated in the CAA and RCRA. The proposed standards were not projected to result in mandated annualized costs of $100 million or more to any state, local, or tribal government. Furthermore, the proposed standards would not significantly or uniquely affect small governments.

c. Regulatory Takings. We found no indication that the proposed MACT standards would be considered a taking, as defined by legislation being considered by Congress at the time. Property would not be physically invaded or taken for public use without the consent of the owner. Also, the proposed standards would not deprive property owners of economically beneficial or productive use of their property or reduce the property's value.

d. Incentives for Waste Minimization and Pollution Prevention. We briefly examined the potential for waste minimization in the proposal. Preliminary results suggested that generators have a number of options for reducing or eliminating waste. To evaluate whether facilities would adopt applicable waste minimization measures, a simplified pay back analysis was used. Using information on per-facility capital costs for each technology, we estimated the time period required for the cost of the waste minimization measure to be returned in reduced combustion expenditures. Our assessment of waste minimization found that approximately 630,000 tons of waste may be amenable to waste minimization. For a complete description of the analysis please see the November 13, 1995 Regulatory Impact Assessment.

4. Small Entity Impacts

The Regulatory Flexibility Act (RFA) of 1980 requires Federal agencies to consider impacts on small entities throughout the regulatory process. Section 603 of the RFA calls for an initial screening analysis to determine whether small entities will be adversely affected by the regulation. If affected small entities are identified, regulatory alternatives must be considered to mitigate the potential impacts. Small entities, as described by the Act, are only those ''businesses, organizations, and governmental jurisdictions subject to regulation.'' We used information from Dunn & Bradstreet, the American Business Directory, and other sources to identify small businesses. Based on the number of employees and annual sales information, we identified eleven firms which might be considered directly affected small entities. We found that directly affected small entities were unlikely to be significantly affected and that over one-third of those that were considered small, while having a relatively small number of employees, had annual sales in excess of $50 million per year. Also, small entities impacted by the proposal were found to be those that burn very little waste and hence face very high cost per ton burned. These facilities were expected to discontinue burning hazardous waste rather than complying with the proposal. These costs of discontinuing waste burning would not be so high as to be a significant impact. Thus, we found that the proposal may, at most, have a minor impact on a limited number of affected small businesses.

B. What Major Comments Were Received on the Proposal RIA?

The November 13, 1995 Regulatory Impact Assessment (RIA) received comment from many concerned stakeholders. We also conducted a formal peer review of the RIA. We appreciate all comments received and incorporated many of the suggestions into the final Assessment document to improve the analysis. A summary of the key issues presented by stakeholders and the peer reviewers is presented below, along with our responses. You are requested to review the complete documents: Comment Response Document—Addressing The Public Comments Received On: Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards, Draft, November 13, 1995, and, Peer Review Response Document—Addressing The Peer Review Received On: Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards, Draft, November 13, 1995. These documents, available in the RCRA docket established for today's action, present complete responses to all substantive comments received on the 1995 RIA.

1. Public Comments

We received several general comments on the accuracy of the baseline and compliance costs applied in the RIA. Several commenters suggested that we revise baseline and compliance costs to improve their accuracy, which we did. Instead of using a model plant approach for assigning compliance and baseline costs to modeled combustion facilities, costs for today's rule have been estimated using combustion system-specific parameters including gas flow rate, baseline emissions, air pollution control devices currently in place, total chlorine in feed, stack moisture, and temperature at the inlet to the air pollution control device. These system-specific baseline and compliance costs allow for greater accuracy in estimating national costs and predicting which facilities are likely to stop burning hazardous waste. Also, the baseline costs include clinker production penalties at cement kilns and use updated incinerator capital costs, labor requirements, and ash disposal costs.

Various commenters were concerned that the consolidation routine in the economic modeling was unrealistic. For the final economic assessment, we revised the consolidation routine to incorporate capacity constraints that affect the ability of combustion facilities to consolidate wastes into fewer systems at a given facility. Maximum capacity rates (tons per year) were derived by using the feed rates in OSW's database (pounds per year) and assuming 8,000 hours per year of operation. Wastes are assumed to be consolidated into fewer combustion systems at a single facility to the extent that the capacity constraints allow the systems to absorb the displaced hazardous wastes.

Many commenters felt that the waste minimization analysis of the 1995 RIA was unrealistic and overestimated gains. They suggested that the waste minimization analysis be improved to reflect other constraints faced by waste generators. For the 1999 Assessment, we conducted an expanded and significantly improved analysis of waste

minimization alternatives, using a more detailed decision framework for evaluating waste minimization investment decisions. This framework attempts to capture the full inventory of costs, savings, and revenues, including indirect, less tangible items typically omitted from waste minimization analysis, such as liability and corporate image. For each alternative that was identified as viable for currently combusted waste streams, cost curves were developed for a range of waste quantities, as cost varies by waste quantity. These cost curves were then used to determine whether a waste generator would shift from combustion to waste minimization alternatives as combustion prices rise.

Some commenters suggested that we model waste markets to reflect segmentation across waste types, instead of simply applying different prices for kilns and incinerators. In response, we have developed a revised pricing approach that covers seven categories of waste types and prices. The economic model used for the 1999 Assessment incorporates these seven different waste types and prices. Waste management prices depend on several factors: Waste form (solid/liquid/sludge), heat content, method of delivery (*e.g.*, bulk versus drum), and contamination level (*e.g.*, metals or chlorine content). In addition, regulatory constraints (*e.g.*, prohibitions against burning certain types of wastes) and technical constraints (*e.g.*, adverse effects of certain waste streams on cement product quality) also influence combustion prices. Although data limitations prevent the inclusion of all factors, the information on heat content and constituent concentrations from EPA's National Hazardous Waste Constituent Survey (NHWCS) allowed us to enhance the characterization of combusted waste.

A few commenters indicated that the baseline costs of waste burning for cement kilns should include the shared joint costs of cement production. We do not include cement production costs in the costs of waste burning because they are not part of the incremental costs introduced by hazardous waste burning at kilns. We believe this assumption is appropriate, given that cement production is the principal activity of cement kilns that burn hazardous waste. Furthermore, that same kiln would be required in the production of cement regardless of hazardous waste combustion activities. We did, however, evaluate whether some of the more economical marginal kilns may be covering cement production costs with hazardous waste burning revenues. These findings are reported in the 1999 Assessment document.

Some were concerned that shutdown costs and environmental risks associated with combustion facility closures were not accounted for in the 1995 economic analysis. We found that many of the facilities that are expected to close are those that are were operating significantly below capacity in the baseline. This suggests that such facilities may not have been fully recovering their capital costs and are likely to close, even in the absence of the MACT standards. Therefore, while closure is not costless, closure costs attributable directly to the MACT standards are likely to be relatively small. With regard to increased risks from transportation of hazardous wastes, the incremental health risks will be minimal since these facilities are burning small quantities of waste. In fact, we estimate that less than 1.5 percent of the wastes currently burned at combustion facilities will be reallocated due to facility closure. Moreover, spills and other accidents caused by trucking hazardous waste (the most common means of shipment for hazardous materials) generally are considered low-probability events, especially relative to the total number of accidents occurring within transportation overall.

Some commenters felt that potential impacts on generators and fuel blenders were not adequately addressed. In the 1995 RIA, we considered these costs and determined that hazardous waste generators and fuel blenders would likely see price increases for combusted waste streams, though the magnitude of the price increase will depend on the type of waste and the non-combustion waste management alternatives available for that waste type. The price increase faced by generators was estimated at 10 percent of market prices.

The major hazardous waste burning sectors frequently presented alternative views regarding various key waste burning issues. These included: Facility market exits, revenues, impacts resulting from waste feedrate modifications, impacts from alternative fuel usage, price impacts, and available practical capacity. We have reviewed and evaluated the substantiative information submitted by all concerned stakeholders and believe our final Assessment and Addendum documents reflect a fair and balanced representation of baseline conditions and post-rule incremental economic impacts.

2. Peer Review

The peer reviewers suggested that we clarify the aims, objectives, and organizing principles for the 1995 RIA. They stated that, while the 1995 RIA generally meets the requirements set forth by OMB's Guidance regarding the economic analysis of federal regulations under Executive Order 12866, the RIA would be substantially improved if it fully conformed with OMB's Guidance, especially with regard to organization and statement of objectives. For the 1999 Assessment, we have tried to restructure the document to be more in line with OMB's 1996 Guidance for conducting Economic Analysis of Federal Regulations Under Executive Order 12866. The 1999 Assessment includes the following elements in the first chapter to address concerns of the reviewers: the objectives of the Economic Assessment, the analytical requirements the document fulfills, the rationale for regulatory action, an examination of alternative regulatory options, the anticipated effect of the MACT standards, and the analytic approach and organization for the subsequent chapters.

The peer reviewers also suggested that the compliance costs need to be clearly distinguished from social costs, as defined by the theory of applied welfare economics. For the 1999 Assessment, we have been careful to clarify the difference between compliance costs and social costs and explain how the rule will likely affect producers and consumers. The final Assessment explicitly lays out the economic framework for the social cost analysis and distinguishes these from compliance cost estimates. The hazardous waste combustion market is diverse, dynamic, and segmented. Because data are not adequate to support a full econometric analysis at this level of complexity, we have applied a simplified approach that brackets the welfare loss attributable to today's rule. This approach bounds potential economic welfare losses by considering two scenarios: (1) Compliance costs assuming no market adjustments (the upper bound) and (2) market adjusted compliance costs (the lower bound).

The peer reviewers also suggested that the benefits analysis was not fully responsive to the requirements of Executive Order 12866. For the 1999 Assessment, we have applied results from an extensive multi-pathway risk assessment to develop human health and ecological benefit estimates. For the human health analysis, benefits are estimated from cancer and noncancer

risk reductions. Cancer risk reduction estimates are monetized by applying the value of a statistical life (VSL) to the risk reduction expected to result from the MACT standards. Monetary values are assigned to noncancer benefits using a direct-cost approach which focuses on the expenditures averted by decreasing the occurrence of an illness or other health effect. Ecological benefits are also included in the 1999 Assessment.

The peer reviewers suggested that easily burned waste streams would command lower prices and that this should be reflected in the economic modeling. They also indicated that certain combustion sectors may only handle these easy-to-burn waste types and that this should be reflected in baseline costs for these combustors. The pricing approach used in the 1999 Assessment assigns different prices to different types of wastes. Waste management prices depend on several factors, which include: waste form (solid/liquid/sludge), heat content, method of delivery (*e.g.*, bulk versus drum), and contamination level (*e.g.*, metals or chlorine content). In addition, regulatory constraints (*e.g.*, prohibitions against burning certain types of wastes) and technical constraints (*e.g.*, adverse effects of certain waste streams on cement product quality) also influence combustion prices. Although data limitations prevent us from accounting for all factors, the information on heat content and constituent concentrations from EPA's National Hazardous Waste Constituent Survey (NHWCS) allowed us to enhance the characterization of combusted waste. In addition to pricing refinements, the 1999 Assessment adjusts baseline costs to reflect differences in the performance and capabilities across combustion systems.

The peer reviewers were also concerned that the 1995 RIA applied outdated data in the analysis. The most recent available data were used in the 1995 RIA. The 1999 Assessment, once again, applies the most recently available, and verified data.

The peer reviewers suggested that fully-loaded cost-per-ton estimates should be provided for each waste minimization alternative so that these could be compared with combustion prices. For the 1999 Assessment, we conducted an expanded and significantly improved analysis of waste minimization alternatives. This analysis used a more detailed decision framework for evaluating waste minimization investment decisions that captures the full inventory of costs, savings, and revenues, including indirect, less tangible items typically omitted from waste minimization analysis, such as liability and corporate image. For each viable waste minimization alternative for currently combusted waste streams, cost curves were developed for a range of waste quantities because cost varies by waste quantity. These cost curves were then used to determine whether a waste generator would shift from combustion to waste minimization alternatives as combustion prices rise.

III. Why Is Today's Rule Needed?

Today's rule will reduce the level of several hazardous air pollutants, including dioxins and furans, mercury, semi-volatile and low volatile metals, and chlorine gas. Carbon monoxide, hydrocarbons, and particulate matter will also be reduced. Most hazardous waste combustion facilities are currently operating with some air pollution control devices in place. However, existing pollutants from these facilities are still emitted at levels found to result in risks to human health and the environment. Human exposure to these combustion air toxics occurs both directly and indirectly and leads to cancer, respiratory diseases, and possibly developmental abnormalities. A preliminary screening analysis suggests that ecosystems are also at risk from these air pollutants.

The hazardous waste combustion industry operates in a dynamic market. Several combustion facilities and systems have closed or consolidated over the past several years and this trend is likely to continue. These closures and consolidations may lead to reduced air pollution, in the aggregate, from hazardous waste facilities. However, the ongoing demand for hazardous waste combustion services will ultimately result in a steady equilibrium as the market adjusts over the long-term. We therefore expect that air pollution problems from these facilities, and the corresponding threats to human health and ecological receptors, will continue if today's rule were not implemented.

The market has generally failed to correct the air pollution problems resulting from the combustion of hazardous wastes. This has occurred for several reasons. First, there exists no natural market incentive for hazardous waste combustion facilities to incur additional costs implementing control measures because the individuals and entities who bear the negative human health and ecological impacts associated with these actions have no direct control over waste burning decisions. This may be referred to as an environmental externality, where the private industry costs of combustion do not fully reflect the human health and environmental costs of hazardous waste combustion. Second, the parties injured by the combusted pollutants are not likely to have the resources or technological expertise to seek compensation from the damaging entity (combustion facility) through legal or other means. Finally, emissions from hazardous waste combustion facilities directly affect a ''public good,'' the air. Improved air quality benefits human health and the environment. These benefits cannot be limited to just those who pay for reduced pollution. The absence of government intervention, therefore, will result in a free market that does not provide the socially optimal quantity and quality of public goods, such as air.

We recognize the need for federal regulation as the optimal means of correcting market failures leading to the negative environmental externalities resulting from the combustion of hazardous waste. The complex nature of the pollutants, waste feeds, waste generators, and the diverse nature of the combustion market would limit the effectiveness of a non-regulatory approach such as taxes, fees, or an educational-outreach program. Furthermore, requirements for MACT standards under the Clean Air Act, as mandated by Congress, has compelled us to select today's regulatory approach.

IV. What Were the Regulatory Options?

We carefully assembled and evaluated all data and relevant information acquired since the proposal. We considered several alternative MACT options since the proposal, ultimately leading to today's rule. Please refer to Part Four of this preamble for more detail on option development and the specific approach and methodology used in developing the final standards. This section of today's preamble briefly discusses and assesses the final regulatory levels and two primary options. The final regulatory levels, as discussed in Part Four, establish a combination of floor and beyond-the-floor standards for the pollutants of concern. Of the options analyzed, one addresses a floor only scenario and the other examines beyond-the-floor levels for dioxins/furans and mercury, based on activated carbon injection (ACI). The reader may wish to examine the Assessment document for a complete discussion of the analytical methodology, costs, benefits, and other projected impacts of today's rule and options. This Assessment document is available in the RCRA docket for today's rule.

V. What Are the Potential Costs and Benefits of Today's Rule?

A. Introduction

The value of any regulatory policy is traditionally measured by the net change in social welfare that it generates. Our economic assessment for today's rule evaluates costs, benefits, economic impacts, and other impacts such as environmental justice, children's health, unfunded mandates, waste minimization incentives, and small entity impacts. To conduct this analysis, we examined the current combustion market and practices, developed and implemented a methodology for examining compliance and social costs, applied an economic model to analyze industry economic impacts, quantified (and, where possible, monetized) benefits, and followed appropriate guidelines and procedures for examining equity considerations, children's health, and other impacts. The data we used in this analysis were the most recently available at the time of the analysis. Data verification, relevance, and public disclosure issues prevented us from incorporating data from certain sources. Furthermore, because our data were limited, the estimated findings from these analyses should be viewed as national, not site specific impacts.

B. Combustion Market Overview

The hazardous waste industry comprises three key segments: hazardous waste generators, fuel blenders and intermediaries, and hazardous waste incinerators. Hazardous waste is combusted at three main types of facilities: Commercial incinerators, on-site incinerators, and waste burning kilns (cement kilns and lightweight aggregate kilns). Commercial incinerators are generally larger in size and designed to manage virtually all types of solids, as well as liquid wastes. On-site incinerators are more often designed as liquid-injection systems that handle liquids and pumpable solids. Waste burning kilns burn hazardous wastes to generate heat and power for their manufacturing processes.

As of the date of our analysis, 172 combustion facilities are permitted to burn hazardous waste in the United States. On-site incinerators (private and government) represent 129 facilities (or 75 percent of this total), commercial incinerators represent 20 facilities, cement kilns represent 18 facilities, and lightweight aggregate kilns represent five facilities. A facility may have one or more combustion systems. Companies that generate large quantities of uniform hazardous wastes generally find it more economical and efficient to combust these wastes on-site using their own noncommercial systems. Commercial incineration facilities manage a wide range of waste streams generated in small to medium quantities by diverse industries. Cement kilns and lightweight aggregate kilns derive heat and energy by combining clean burning (solvents and organics) high-Btu liquid hazardous wastes with conventional fuels. The EPA Biennial Reporting System (BRS) reports a total demand for all combusted hazardous waste, across all three types of facilities, at nearly 3.3 million tons in 1995.

Most of the waste managed by combustion comes from a relatively narrow set of industries. The entire chemical industry in 1995 generated 74 percent of all combusted waste. Within this sector, the organic chemicals subsector was the largest source of waste sent to combustion, providing about 32 percent of all combusted waste. The pesticide and agricultural chemical industry generated 12 percent of the total. No other single sector generated more than 10 percent of the total.

Regulatory requirements, liability concerns, and economics influence the demand for combustion services. Regulatory forces influence the demand for combustion by mandating certain hazardous waste treatment standards (land disposal restriction requirements, etc.). Liability concerns of waste generators affect combustion demand because combustion, by destroying organic wastes, greatly reduces the risk of future environmental problems. Finally, if alternative waste management options are more expensive, hazardous waste generators will likely choose to send their wastes to combustion facilities in order to increase their overall profitability.

Throughout much of the 1980s, hazardous waste combustors enjoyed a strong competitive position and generally maintained a high level of profitability. During this period, EPA regulations requiring combustion greatly expanded the waste tonnage for this market. In addition, federal permitting requirements, as well as powerful local opposition to siting of new incinerators, constrained the entry of new combustion systems. As a result, combustion prices rose steadily, ultimately reaching record levels in 1987. The high profits of the late 1980s induced many firms to enter the market, in spite of the difficulties and delays anticipated in the permitting and siting process. Hazardous waste markets have changed significantly since the late 1980s. In the early 1990s, substantial overcapacity resulted in fierce competition, declining prices, poor financial performance, numerous project cancellations, and some facility closures. Since the mid 1990s, several additional combustion facilities have closed, while many of those that have remained open have consolidated their operations. There still remains significant overcapacity throughout the hazardous waste combustion industry.

C. Baseline Specification

Proper and consistent baseline specification is vital to the accurate assessment of incremental costs, benefits, and other economic impacts associated with today's rule. The baseline essentially describes the world absent today's rule. The incremental impacts of today's rule are evaluated by predicting post MACT compliance responses with respect to the baseline. The baseline, as applied in this analysis, is the point at which today's rule is promulgated. We recognize that the baseline should not simply describe a point in time, but rather should describe the state of the world over time, absent today's rule. The Assessment describes the data sources used in specifying the baseline and examines how each of these factors are likely to change over time in the absence of today's rule. Finally, because this analysis precedes final rule promulgation, data sources used to determine the baseline will necessarily predate the point of rule promulgation. A full discussion of baseline specification is presented in the Assessment document for today's rule.

D. Analytical Methodology and Findings—Engineering Compliance Cost Analysis

The total compliance costs for existing hazardous waste combustion facilities are developed using engineering models that assign pollution control measures and costs to each modeled combustion system. The engineering model also incorporates other compliance costs, such as monitoring requirements, permit modifications, sampling and analyses, and other recordkeeping and reporting requirements. We applied the same basic approach in developing compliance costs for new sources as was used for existing sources. Please see the Assessment document for a complete discussion of the analytical methodology applied for existing and new facilities.

Compliance costs presented in this section are based on a static analysis assuming no market adjustments.

Results from this static analysis should therefore be considered ''high-end'' estimates. The engineering compliance cost analysis reveals that each combustion system will likely comply with the final standards through a different combination of pollution control measures. This is likely to result in widely diverse per system compliance costs across combustion sectors. The average annualized per system costs, across all sectors, are projected to range from about $0.16 to $0.72 million for compliance with the final standards. Per system costs at the floor are estimated to range from $0.16 to $0.68 million, while these costs under the beyond-the-floor activated carbon injection (ACI) option would range from $0.36 to $0.99 million. Cement kilns were generally found to experience the highest per system compliance costs, while the commercial and on-site incinerators would generally experience the lowest per system costs. The compliance costs per ton of hazardous waste burned are projected to increase from 31 to 41 percent for cement kilns and about 35 percent for lightweight aggregate kilns. The increase for commercial incinerators is estimated at 20 percent of the baseline burn costs. The regulated community is also likely to experience some cost savings as a result of the streamlined administrative procedures established through today's final rule.

The compliance cost analysis contains a variety of uncertainties. The most significant include: The limited availability of emissions data upon which engineering controls are based, lack of baseline air pollution control device data for a number of facilities, and the difficulty in determining the extent to which feed control may be used as a feasible alternative method of compliance. While uncertainties are acknowledged, we do not believe that the above data limitations significantly bias the results either upward or downward.

In addition to costs incurred by the private sector, today's rule is also likely to result in incremental costs and savings to government regulatory entities at different levels as they administer and enforce the new emissions standards and related requirements. EPA Regional offices, state agencies, as well as some local agencies may incur some combination of incremental costs associated with permitting. Modifications of the permitting process related to Clean Air Act provisions could cost governmental entities, nationwide, approximately $330,000 per year. Potential government activities could also include the state rulemaking efforts necessary for agencies to modify their RCRA permitting processes as part of the ''Fast-Track'' provisions. State rulemakings and authorization of the modified procedures could cost states between $500,000 and $700,000, nationwide. Streamlined RCRA permit modification procedures may also result in aggregate savings ranging from $0.4 to $2.1 million. Overall economic impacts on particular governmental regulatory entities will depend on a variety of factors that are difficult to characterize with precision. Furthermore, economic impacts associated with governmental activities will differ in the way in which a particular governmental entity may choose to implement the requirements.

E. Analytical Methodology and Findings—Social Cost Analysis

We examined social cost impacts potentially associated with today's rule. Total social costs include the value of resources used to comply with the standards by the private sector, the value of resources used to administer the regulation by the government, and the value of output lost due to shifts of resources to less productive uses. To evaluate these shifts in resources and changes in output requires predicting changes in behavior by all affected parties in response to the regulation, including responses of directly-affected entities, as well as indirectly-affected private parties.

For this analysis, social costs are grouped into two categories: economic welfare (changes in consumer and producer surplus), and government administrative costs. The economic welfare analysis conducted for today's rule uses a simplified partial equilibrium approach to estimate social costs. In this analysis, changes in economic welfare are measured by summing the changes in consumer and producer surplus. This simplified approach bounds potential economic welfare losses associated with the rule by considering two scenarios: Compliance costs assuming no market adjustments, and market adjusted compliance costs.

Social costs presented in this section assume market adjustments. Under this scenario, increased compliance costs are examined in the context of likely incentives combustion facilities would have to continue burning hazardous wastes and the competitive balance in different combustion sectors. Furthermore, combustion facilities are likely to try to recover these increased costs by charging higher prices to generators and fuel blenders. This scenario estimates market adjusted compliance costs by assessing baseline profitability, profitability post-rule using different price increase scenarios, and waste management alternatives in order to help predict combustion price increases.

Overall, the difference in aggregate compliance costs for all sectors of the existing regulated community to meet any of the examined scenarios is not substantial. Total annualized market adjusted costs for all sectors are estimated to range from $44 to $50 million under the floor option. Under the beyond-the-floor (ACI) option, these costs are estimated to range from $98 to $107 million. For all sectors to meet the final standards, our best estimate of total annualized costs ranges from $50 to $63 million, depending upon level of price pass-through. All cost estimates are incremental to the baseline. These estimates, however, are not incremental to any mutual requirements potentially associated with cement kilns meeting standards established under the nonhazardous waste burner cement kiln rule.

Cement kilns ($17–24 million) and private on-site incinerators ($20–24 million) make up about 76 percent of aggregate national costs under the final standards. For cement kilns, this is due primarily to the high costs per system. For private on-site incinerators, the high costs are primarily due to the large number of combustion systems. Total costs are less for commercial incinerators ($5–6 million, or 10 percent) because of lower costs per system relative to cement kilns and due to the limited number of commercial units relative to on-site incinerators. Lightweight aggregate kilns ($3 million) represent about 5 to 6 percent of the total costs, due primarily to the limited number of units. Government on-site units make up the remainder.

F. Analytical Methodology and Findings—Economic Impact Analysis

Various market adjustments are expected in response to the increased costs of hazardous waste combustion associated with today's rule. Economic impacts may be measured through numerous factors. This analysis examines market exit estimates, waste reallocations, employment impacts, combustion price increases, industry impacts, and the multirule or joint impacts analysis. Economic impacts presented in this section are distinct from the social costs analysis, which represents only the monetary value of market disturbances.

1. Market Exit Estimates

The hazardous waste combustion industry operates in a dynamic market, with a number of systems/facilities projected to exit the hazardous waste burning market under baseline conditions (see Section V. B of this Part). As a result, this analysis presents market exit estimates expected to result under the baseline, as well as from today's rule. This approach is developed in an effort to present a more accurate estimate of ''real-world'' incremental impacts resulting from the final standards. Market exit estimates are derived from a breakeven analysis designed to determine system and facility viability. This analysis is subject to several assumptions, including: engineering cost data on the baseline costs of waste burning, cost estimates for pollution control devices, prices for combustion services, and assumptions about the waste quantities burned at these facilities. It is important to note that, for most sectors, exiting the hazardous waste combustion market is not equivalent to closing a plant. (Actual plant closure would only be expected in the case of an exit from the hazardous waste combustion market of a commercial incinerator closing all its systems.)

A relatively small percentage of facilities (including no lightweight aggregate kilns) are projected to stop burning hazardous waste as a result of the incremental requirements associated with today's rule. Those facilities that do exit were found to be marginally profitable in the baseline, burning low quantities of hazardous waste. The economic model post-consolidation results indicate that, in response to today's rule, the following number of combustion facilities are expected to cease burning hazardous waste in the short term: Cement kilns, zero out of 18 facilities; lightweight aggregate kilns, zero out of five facilities; commercial incinerators, zero out of 20 facilities; and private on-site incinerators, 16 out of 111 facilities.

The number of anticipated market exits increases in the long term due to the necessity of recovering the capital costs of combustion. However, because this also holds true in the baseline, an increased number of projected long-term baseline market exits may, in some cases, actually decrease the number of incremental long-term exits. There remain zero incremental market exits for LWAKs and commercial incinerators over the long-term. Incremental market exits for cement kilns, however, increase from zero in the short-term to up to two over the long-term. Incremental market exits for private on-site incinerators decline from 16 in the short-term to 13 over the long-term. This is due to a 62 percent increase in baseline market exits from the short-term to the long-term.

2. Quantity of Waste Reallocated

Combustion systems that can no longer cover costs (i.e., those below the dynamic breakeven quantity) are projected to stop burning hazardous waste. Hazardous wastes from these systems will likely be reallocated to other viable combustion systems at the same facility if there is sufficient capacity, alternative combustion facilities that continue burning, or waste management alternatives (*e.g.*, solvent reclamation). Because combustion is likely to remain the lowest cost option, we expect most reallocated wastes will continue to be managed at combustion facilities.

The economic model indicates that, in response to today's rule, between 14,000 to 42,000 tons of currently burned hazardous waste could be reallocated to other facilities or waste management alternatives. This estimate represents between 0.4 and 1.3 percent of the total quantity of combusted hazardous wastes and is incremental to projected long-term baseline reallocations of approximately 100,000 tons. Currently, there is more than adequate capacity within the remaining sources of the combustion market to accommodate this reallocated waste, even at the high-end estimate.

3. Employment Impacts

Today's rule is likely to cause employment shifts across all of the hazardous waste combustion sectors. These shifts will occur as specific combustion facilities find it no longer economically feasible to keep all of their systems running, or to stay in the hazardous waste market at all. When this occurs, workers at these locations may lose their jobs. At the same time, the rule may result in employment gains, as new purchases of pollution control equipment stimulate additional hiring in the pollution control manufacturing sector and as additional staff are required at combustion facilities for various compliance activities.

a. Employment Impacts—Losses. Primary employment losses in the combustion industry are likely to occur when combustion systems consolidate the waste they are burning into fewer systems or when a facility exits the hazardous waste combustion market altogether. Operation and maintenance labor hours are expected to be reduced for each system that stops burning hazardous waste. For each facility that completely exits the market, employment losses will likely also include supervisory and administrative labor.

Total incremental employment dislocations potentially resulting from the final standards range from approximately 100 to 230 full-time-equivalent (FTE) jobs under the floor and the recommended options. Under the beyond-the-floor (ACI) option the high-end estimate of employment dislocations increases by almost 9 percent to approximately 250 FTEs. Among the different sectors, on-site incinerators are responsible for most of the total estimated number of job losses. Their significant share of the losses is a function of both the large number of on-site incinerators in the universe as well as the relatively high number of expected exits within this sector. Cement kilns are responsible for the second largest number of expected employment losses due to the number of systems that consolidate waste-burning at these facilities.

b. Employment Impacts—Gains. In addition to employment losses, today's rule will also lead to job gains as firms invest to comply with the various requirements of the rule and add additional operation and maintenance personnel for the new pollution equipment and other compliance activities, such as new reporting and record keeping requirements.

The total annual employment gains (without particulate matter continuous emission monitors) associated with the floor and recommended final standards are approximately 300 FTEs. The beyond-the-floor (ACI) option may increase the high-end employment gain estimate to as much as 620 FTEs. About one-third to one-half of all estimated job gains are projected to occur in the pollution control equipment industry. The remaining job gains will occur at the combustion facilities as additional personnel are hired for operation and maintenance and permitting requirements.

While it may appear that this analysis suggests overall net job creation under particular options and within particular combustion sectors, such a conclusion would be inappropriate. Because the gains and losses occur in different sectors of the economy, they should not be added together. Doing so would mask important distributional effects of the rule. In addition, the employment gain estimates reflect within sector impacts only and therefore do not account for job displacement across sectors as

investment funds are diverted from other areas of the larger economy.

4. Combustion Price Increases

All combustion facilities that remain in operation will experience increased operational costs under today's rule. To protect their profits, each facility will have an incentive to pass these increased costs on to their customers (generators and blenders) in the form of higher combustion prices. Generators and blenders are expected to pay these higher prices unless they have less expensive waste management alternatives.

Under the theory of market price adjustments, as applied in the economic model, waste would be sent to the least expensive alternatives first, all else being equal. At the same time, prices would rise to the point at which all demand for waste management is met. In theory, the last tons would be managed by substituting non-combustion or waste minimization alternatives. The most efficient waste management substitute for these wastes would cap price increases, resulting in a new market price. Combustion facilities, in turn, would each set their prices at this market price in order to maximize profits. Less efficient waste management scenarios may earn just enough to stay in business over the short term, but would not recover capital costs. Combustion systems operating above the market price would lower their prices or exit the market. In reality, the hazardous waste combustion marketplace is very complex, and the determination of an adjusted market price would be an ongoing process affected by numerous factors, including price differentials among regions, waste stream types, and generators.

Available economic data on the cost of waste management alternatives for combusted hazardous waste, including source reduction and other waste minimization options, are not precise enough to allow for an accurate estimate of the maximum price increase that combustors may pass through to generators and fuel blenders. However, available data do indicate that the demand for hazardous waste combustion is relatively inelastic and that combustion facilities are likely to pass through approximately 75 percent of compliance costs in the least-cost sector. High-cost sectors, however, may pass through less than the 75 percent estimate. We also analyzed a 25 percent price pass through scenario. Under the recommended final standards, the weighted average combustion price per ton is projected to increase anywhere from about 0.5 to 11 percent, depending upon sector and scenario. Prices were found to increase by as much as 25 percent under the beyond-the-floor (ACI) option.

5. Industry Profits

Hazardous waste-burning profits for all combustion sectors, on average, are expected to decline post-rule. This decline, however, will not be consistent across sectors. Hazardous waste-burning profits for cement kilns are projected to decrease by no more than 10 percent, while profits for commercial incinerators would decrease by no more than 2 percent. These profit margin estimates are based on a simple calculation that subtracts projected operating costs from revenues. These estimates provide relative measures of profit changes and should not be used to predict absolute profit margins in these industries.

Compliance costs associated with meeting today's rule are estimated to represent less than 2 percent of the pollution control expenditures in industries that contain facilities with on-site incinerators. For cement kilns, however, compliance costs are expected to increase total pollution control expenditures by no more than 60 percent at waste-burning facilities.

To comply with today's rule, many facilities will need to purchase additional pollution control equipment. From the perspective of the pollution control industry, these expenditures will translate into additional revenues and profits. Total profits for the air pollution control industry are likely to increase as a result of today's rule.

6. National-Level Joint Economic Impacts

Analyzing national-level economic impacts in a market context provides an opportunity to assess the distributional effects on cement producers, lightweight aggregate kilns, and commercial incinerators. As a supplement to today's analysis, we used the model developed for the Portland Cement MACT rulemaking to estimate national-level economic impacts of today's Hazardous Waste Combustion (HWC) MACT rule in an interactive market context. This analysis was conducted to estimate joint impacts of today's rule in conjunction with the Portland Cement MACT rule and the Cement Kiln Dust rule. The Portland Cement MACT model incorporates compliance costs for each affected cement kiln, lightweight aggregate kiln, and commercial incinerator and then projects national level impacts associated with these facilities and for the general Portland cement market. On-site incinerators were not included in this analysis because they do not generally compete in the commercial hazardous waste combustion market. Results from this analysis are separated into three categories: Market-, industry-, and social-level impacts associated with imposition of the recommended final standards and the two HWC MACT options (floor and beyond-the-floor (ACI)).

Joint national-level economic impact results combining the HWC MACT options with the Portland Cement MACT and Cement Kiln Dust Rule are summarized in this section. Market, industry, and social cost impacts are discussed. This analysis assumes simultaneous implementation of all three rules.

Market-level impacts for this joint scenario, assuming the floor option, result in increased costs of cement production and burning hazardous waste at affected cement kilns. The national market price of Portland cement is projected to increase by about 2.0 percent, while domestic production would decline by about 4.0 percent. Market impacts for the joint scenario with the recommended final standards and the beyond-the-floor (ACI) option were found to be generally equivalent to results under the floor option. The extent to which domestic cement producers face competition from foreign cement imports will limit the degree of domestic price increases. Furthermore, the U.S. cement market is regionally specific. While nationwide average market price and production impacts are estimated to be relatively minor, producers in selected regions may experience significant revenue and production impacts, either positive or negative.

Under the joint scenario with the floor option, the market prices for both liquid and solid hazardous waste incineration are projected to increase by about 8.6 percent and 1.4 percent, respectively. The price change for liquids is higher than that observed for the floor only, while the price change for solids is virtually the same. For cement kilns, the increased costs associated with all three regulations, combined with their reductions in cement production, is projected to cause their supply of hazardous waste incineration services to fall by around 11.0 percent for both liquids and solids. In response to the regulatory costs, lightweight aggregate kilns also reduce their supply of liquid hazardous waste incineration by around 9.0 percent. For commercial incinerators, the supply of hazardous waste incineration increases by nearly 6.0 percent for liquids and close to 3.0

percent for solids. The market impacts for the joint scenario, using the recommended final standards and the beyond-the-floor (ACI) alternative, were found to be similar to those for the floor option. One exception is the market price for liquids, which increases by a greater percentage under the joint scenario with the beyond-the-floor (ACI) alternative. This results in a greater reduction in liquid hazardous waste burned at cement kilns and lesser decreases in liquids incinerated at commercial incinerators.

Industry-level impacts under the joint impacts scenario with the floor option indicate that Portland cement plants may see total gross revenues decline by nearly 3.0 percent from their current baseline. This decline in total revenue results from foregone revenues associated with producing less Portland cement and lost revenues from burning hazardous waste. The total net costs for these cement plants are also projected to decrease, reflecting the increase in costs associated with burning hazardous waste, plus the increase in cement kiln dust management costs, and the decrease in costs associated with producing less cement. The net result, indicates a decline in aggregate nationwide earnings before interest and taxes (EBIT) of about 5.5 percent from the current baseline. Lightweight aggregate kilns are also projected to incur a decline in hazardous waste-related EBIT of about 5.5 percent. Alternatively, as a group, the commercial incinerators are expected to experience a net gain of around 11.0 percent in annual earnings under this joint scenario with the floor option. These joint industry-level impacts on EBIT indicate a similar pattern across each regulatory scenario, except for lightweight aggregate kilns under the beyond-the-floor (ACI) option, where EBIT declines by nearly 14.0 percent. Industry-level impacts under the joint impact analysis also includes estimates of plant or system closures. The joint analysis under each hazardous waste combustion scenario indicates that three cement plants and 14 to 15 kilns may cease production. Furthermore, five cement kilns are projected to stop burning hazardous waste. The analysis also indicates that one lightweight aggregate kiln may discontinue burning hazardous waste and one to two commercial incinerators may close operations and stop burning hazardous waste with the joint implementation of all three rules. These market exit estimates include projected baseline closures.

Social-level impacts, or social costs, under the joint scenarios indicate that, for both Portland cement and hazardous waste incineration services, consumers are worse off due to the increase in prices and reductions in consumption. For producers of Portland cement and incineration services, cement kilns and lightweight aggregate kilns are worse off (on a nationwide basis) due to the decline in market share, while commercial incinerators are better off due to the increase in prices and market share.

Refer to the final Assessment document and appendices for a complete discussion of joint impacts.

G. Analytical Methodology and Findings—Benefits Assessment

This section discusses the benefits assessment for today's rule. Results from our multi-pathway human health and ecological risk assessment are used to evaluate incremental benefits to society of emission reductions at hazardous waste combustion facilities.[351] Total monetized benefits are estimated at $19.2 million. This section also summarizes how today's rule may lead to changes in the types and quantities of wastes generated and managed at combustion facilities through increased waste minimization.

1. Human Health and Ecological Benefits

a. Risk Assessment Overview. The basis for the benefits assessment is our multi-pathway risk assessment model. This model estimates baseline risks from hazardous waste combustion emissions, as well as expected risks after today's rule is implemented. The model examines both inhalation and ingestion pathways to estimate human health risks. A less detailed screening-level analysis is used to identify the potential for ecological risks. The risk assessment is carried out for the regulatory baseline (no regulation), the final recommended standards, and the two MACT options (floor and beyond-the-floor (ACI)). The assessment uses a case study approach in which 76 hazardous waste combustion facilities and their site-specific land uses and environmental settings are characterized. The randomly selected facilities in the study include 43 on-site incinerators, 13 commercial incinerators, 15 cement kilns, and five lightweight aggregate kilns.

The pollutants analyzed in the risk assessment are dioxins and furans, selected metals, particulate matter, chlorine, and hydrogen chloride. The metals modeled in the analysis include antimony, arsenic, barium, beryllium, cadmium, chromium, copper, cobalt, lead, manganese, mercury, nickel, selenium, silver, and thallium. The fate and transport of the emissions of these pollutants is modeled to arrive at concentrations in air, soil, surface water, and sediments. To assess human health risks, these concentrations can be converted to estimated doses to the exposed populations using exposure factors such as inhalation and ingestion rates. These doses are then used to calculate cancer and noncancer risks, if the appropriate health benchmarks are available. To assess potential ecological risks, soil, surface water and sediment concentrations are compared with eco-toxicological criteria representing protective screening values for ecological risks. Because these criteria are based on *de minimis* ecological effects and thus represent conservative values, an exceedance of the eco-toxicological criteria does not necessarily indicate ecological damages. It simply suggests that potential damages cannot be ruled out.

To characterize the cancer and noncancer risks to the populations listed above, the risk assessment breaks down the area surrounding each modeled combustion facility into 16 polar grid sectors. For each polar grid sector, risk estimates can be developed for different age groups and receptor populations (*e.g.*, 0 to 5 year old children of subsistence fishers). This approach is used because geographic and demographic differences across polar grid sectors leads to sectoral variation in individual risks. Thus, individual risk results are aggregated across sectors to generate the distribution of risk to individuals in the affected area. An additional Monte Carlo analysis was conducted to incorporate variability in other exposure factors such as inhalation and ingestion rates for three scenarios that were thought to comprise the majority of the risk to the study area population. These scenarios address cancer risk from dioxin exposure to beef and dairy farms and noncancer risk from methyl mercury exposure to recreational anglers.

b. Human Health Benefits—Methodology. Human health benefits are assessed by identifying those pollutants for which emission reductions are expected to result in improvements to human health or the

[351] The RIA for the proposal included results from a screening analysis designed to assess the potential magnitude of property value benefits caused by the MACT standards. This analysis is not included in the Economic Assessment for the Final Rule due to limitations of the benefits transfer approach and because property value benefits likely overlap with human health and ecological benefits. Including property value benefits would result in double-counting.

environment. The relevant results from the risk assessment for the pollutants of concern are then examined, focusing on population risk results based on central tendency exposure parameters. The risk assessment data are expressed as indicators of potential benefits, such as reduced cancer incidence or reduced potential for developing particular illnesses or abnormalities. Where possible, monetary values are assigned to these benefits using a benefits transfer approach.

To assign monetary values to cancer risk reduction estimates, we apply the value of a statistical life to the risk reduction expected to result from the MACT standards. The value of a statistical life is based on an individual's willingness to pay to reduce a risk of premature death or their willingness to accept increases in mortality risk. Because there are many different estimates of value of a statistical life in the economic literature, we estimate the reduced mortality benefits using a range of value of a statistical life estimates from 26 policy-relevant value-of-life studies. The estimated value of a statistical life figures from these studies range from $0.7 million to $15.9 million (adjusted to 1996 dollars), with a mean value of $5.6 million. The expected number of annual premature statistical deaths avoided are multiplied by the value of a statistical life estimate to determine the estimated monetary value of the mortality risk reductions.

A variety of approaches are used to evaluate the benefits associated with noncancer risk reductions. For particulate matter, both morbidity and mortality benefits are estimated. Particulate matter is the only non-carcinogen in the risk assessment for which there is sufficient dose-response information to estimate numbers of cases of disease and deaths from exposures. For lead and mercury, upper bound estimates of the population at risk are used. This is because information is only available on the potential of an adverse effect, with no estimates available on the likelihood of these effects.

We assign monetary values to noncancer benefits using a direct cost approach which focuses on the expenditures averted, and the opportunity cost of time spent in the hospital, by decreasing the occurrence of an illness or other health effect. While the willingness to pay approach used for valuing the cancer risk reductions is conceptually superior to the direct cost approach, measurement difficulties, such as estimating the severity of various illnesses, precludes us from using this approach here. Direct cost measures are expected to understate true benefits because they do not include cost of pain, suffering, and time lost. On the other hand, because we use upper bound estimates of the population at risk, we cannot conclude that the results are biased in one direction or the other.

c. Human Health Benefits—Results. Human health benefits are expected from both cancer and noncancer risk reductions. Less than one cancer case per year is expected to be avoided due to reduced emissions from combustion facilities. The majority of the cancer risk reductions are linked to consumption of dioxin-contaminated agricultural products exported beyond the boundaries of the study area. Less than one-third of the cancer risk reductions occur in local populations living near combustion facilities. Cancer risks for local populations are attributed primarily to reductions in arsenic and chromium emissions. These pollutants account for almost 85 percent of total local cancer incidences in the baseline. By applying value of a statistical life estimates to these cases, the total annual cancer risk reductions (benefits) in going from the baseline to the final standards, are valued at between $0.13 and $9.9 million, with a best estimate of approximately $2.02 million.

Across all receptor populations, individual cancer risks are greatest for subsistence farmers. Dioxin is the primary pollutant that drives the cancer risk for this sensitive receptor population. A lack of population data prevented us from quantifying benefits for this sub-population. It is possible, however, to characterize the reduction in risk from baseline to implementation of today's rule. With the exception of one particular scenario, the cancer risk for all subsistence farmers is reduced to below levels of concern after implementation of today's rule. Today's rule is also expected to result in lower cancer risks for children of subsistence farmers.

Most of the noncancer human health benefits from today's rule come from reductions in particulate matter. Some additional noncancer benefits come from reduced blood lead levels in children living near combustion facilities. Total annual noncancer benefits from quantifiable sources are valued at between $9.85 and $73.8 million, with a best estimate of about $17.2 million. Uncertainties implicit in the quantitative mercury analysis continue to be sufficiently great so as to limit its ultimate use in the monetization of noncancer benefits. Please review the Addendum and chapter six of the Assessment document for a complete discussion of human health benefits resulting from today's rule.

d. Ecological Benefits—Methodology. Ecological benefits are based on a screening analysis for ecological risks that compares soil, surface water, and sediment concentrations with eco-toxicological criteria based on *de minimis* thresholds for ecological effects. Because these criteria represent conservative values, an exceedance of the eco-toxicological criteria only indicates the potential for adverse ecological effects and does not necessarily indicate ecological damages. For this reason, benefits of avoiding adverse ecological impacts are discussed only in qualitative terms.

The basic approach for determining whether ecosystems or biota are potentially at risk consists of five steps: (1) Identify susceptible ecological receptors that represent relatively common species and communities of wildlife, (2) develop eco-toxicological criteria for receptors that represent acceptable pollutant concentrations, (3) estimate baseline and post-rule pollutant concentrations in sediments, soils, and surface waters of the study areas, (4) for each land area or water body modeled, compare the modeled media concentrations to ecologically protective levels to estimate eco-toxicological hazard quotients, and (5) total the land and water areas containing hazard quotients exceeding one and compare this number for the baseline and post-rule scenario. The reduction in the land and water area potentially at risk indicates a potential for avoiding adverse ecological impacts. Monetary values are not assigned to these potential benefits.

e. Ecological Benefits—Results. Ecological benefits are attributable primarily to reductions in dioxin and mercury for terrestrial ecosystems. For these ecosystems, hazard quotients are reduced to acceptable levels for approximately 115 to 150 square kilometers of land located within 20 kilometers of all combustion facilities. Ecological benefits associated with freshwater aquatic ecosystems are attributable to reductions in lead, with hazard quotients reduced to acceptable levels for approximately 35 to 40 square kilometers of these surface waters. These reductions of ecological risk criteria below levels of concern only indicates a potential for ecological improvement.

2. Waste Minimization Benefits

While many facilities may implement end-of-pipe controls such as fabric

filters and high-energy scrubbers to achieve MACT control, emission reductions may also be accomplished by reducing the volume or toxicity of wastes currently combusted. In addition, generators may also consider waste management alternatives such as solvent recycling. For purposes of this analysis, these types of responses will be referred to as ''waste minimization.'' This section summarizes the potential waste minimization benefits resulting from implementation of today's rule.

As today's rule is implemented, the costs of burning hazardous waste will increase, resulting in market incentives for greater waste minimization. To predict the quantity of waste that could be reallocated from combustion to waste minimization due to economic considerations, we conducted a comprehensive waste minimization analysis that considered in-process recycling, out-of-process recycling, and source reduction. The objective of the analysis was to predict the quantity of hazardous wastes that may be reallocated to these waste minimization alternatives under different combustion price increase scenarios.

Overall, the analysis shows that a variety of waste minimization alternatives are available for managing those hazardous waste streams that are currently combusted. The quantity projected to be reallocated from combustion to waste minimization alternatives, however, depends upon the expected price increase for combustion services. At potential price increases ranging from $10 to $20 per ton, as much as 240,000 tons of hazardous waste may be reallocated from combustion to waste minimization alternatives. This represents approximately 7 percent of the total quantity of hazardous waste currently combusted.

VI. What Considerations Were Given to Issues Like Equity and Children's Health?

By applicable statute and executive order, we are required to complete an analysis of today's rule with regard to equity considerations and other regulatory concerns. This section assesses the potential impacts of today's rule as it relates to environmental justice, children's health issues, and unfunded federal mandates. Small entity impacts are examined in a separate section.

A. Executive Order 12898, ''Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations'' (February 11, 1994)

This Order is designed to address the environmental and human health conditions of minority and low-income populations. To comply with the Executive Order, we have assessed whether today's rule may have disproportionate effects on minority populations or low-income populations. We have analyzed demographic data presented in the reports ''Race, Ethnicity, and Poverty Status of the Populations Living Near Cement Plants in the United States'' (EPA, August 1994) and ''Race, Ethnicity, and Poverty Status of the Populations Living Near Hazardous Waste Incinerators in the United States'' (EPA, October 1994). These reports examine the number of low-income and minority individuals living near a relatively large sample of cement kilns and hazardous waste incinerators and provide county, state, and national population percentages for various sub-populations. The demographic data in these reports provide several important findings when examined in conjunction with the risk reductions projected from today's rule.

We find that combustion facilities, in general, are not located in areas with disproportionately high minority and low-income populations. However, there is evidence that hazardous waste burning cement kilns are somewhat more likely to be located in areas that have relatively higher low-income populations. Furthermore, there are a small number of commercial hazardous waste incinerators located in highly urbanized areas where there is a disproportionately high concentration of minorities and low-income populations within one and five mile radii. The reduced emissions at these facilities due to today's rule could represent meaningful environmental and health improvements for these populations. Overall, today's rule should not result in any adverse environmental or health effects on minority or low-income populations. Any impacts on these populations are likely to be positive due to the reduction in emissions from combustion facilities near minority and low-income population groups. The Assessment document available in the RCRA docket established for today's rule presents the full Environmental Justice Analysis.

B. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks (62 FR 19885, April 23, 1997)

Executive Order 13045: ''Protection of Children from Environmental Health Risks and Safety Risks'' (62 FR 19885, April 23, 1997) applies to any rule that: (1) Is determined to be ''economically significant'' as defined under E.O. 12866, and (2) concerns an environmental health or safety risk that EPA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, the Agency must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the Agency.

Today's final rule is not subject to the Executive Order because it is not economically significant as defined under point one of the Order, and because the Agency does not have reason to believe the environmental health or safety risks addressed by this action present a disproportionate risk to children.

The topic of environmental threats to children's health is growing in regulatory importance as scientists, policy makers, and village members continue to recognize the extent to which children are particularly vulnerable to environmental hazards. Recent EPA actions including today's rule, are in the forefront of addressing environmental threats to the health of children. The risk assessment conducted in support of today's rule indicates that children are the beneficiaries of much of the reduction in potential illnesses and other adverse effects associated with combustion facility emissions. The risk assessment used a multi-pathway and multi-constituent evaluation in order to examine potential effects of combined exposures on children. Setting environmental standards that address combined exposures and that are protective of the heightened risks faced by children are both goals named within EPA's ''National Agenda to Protect Children's Health from Environmental Threats.'' Areas for potential reductions in risks and related health effects that were identified by the risk assessment are all targeted as priority issues within EPA's September 1996 report, Environmental Health Threats to Children.

A few significant physiological characteristics are largely responsible for children's increased susceptibility to

environmental hazards. First, children eat proportionately more food, drink proportionately more fluids, and breathe more air per pound of body weight than do adults. As a result, children potentially experience greater levels of exposure to environmental threats than do adults. Second, because children's bodies are still in the process of development, their immune systems, neurological systems, and other immature organs can be more easily and considerably affected by environmental hazards. The connection between these physical characteristics and children's susceptibility to environmental threats are reflected in the higher baseline risk levels for children living near hazardous waste combustion facilities. The risk assessment addresses threats to children's health associated with hazardous waste combustion by evaluating reductions in risk for children as well as for adults and the population overall. For all exposed sub-populations, the assessment evaluated risks to four different age groups: 0 to 5 years, 6 to 11 years, 12 to 19 years, and adults over 20 years. Where possible, the risk assessment has provided both population and individual risk results for children. Both cancer and noncancer risks are examined across the age groups of children, focusing on the most susceptible sub-populations. The combined effects of several carcinogens, one of the goals named within the Agency's ''National Agenda to Protect Children's Health from Environmental Threats,'' were examined.

The key findings from the risk assessment indicate that children do not face significant cancer risks from hazardous waste combustion emissions. Only in the case of children of subsistence farmers do baseline cancer risks exceed 1×10^{-5} for the most highly exposed children. Implementation of the final standards would reduce these risks below levels of concern [352].

The analysis also found that much of the noncancer risk reductions resulting from implementation of today's rule may benefit children specifically. These are projected as a result of lower exposures to mercury, lead, and particulate matter, three types of pollutants addressed in the noncancer risk reductions which primarily affect children. Mercury emission reductions may reduce risks of developmental abnormalities in potential future offspring of recreational anglers and subsistence fishermen. In addition, particulate matter reductions may prevent some asthma attacks affecting children, but these benefits have not been quantified. Finally, reduced lead exposures for children are expected from today's rule. This benefit may help prevent cognitive and nervous system developmental abnormalities for children of the most highly exposed sub-populations, including subsistence fishermen and beef and dairy farmers. Analytical and data limitations prevented reasonable monetization of these findings.

C. Unfunded Mandates Reform Act of 1995 (UMRA) (Pub. L. 104–4)

Executive Order 12875, ''Enhancing the Intergovernmental Partnership'' (October 26, 1993), calls on federal agencies to provide a statement supporting the need to issue any regulation containing an unfunded federal mandate and describing prior consultation with representatives of affected state, local, and tribal governments. Signed into law on March 22, 1995, the Unfunded Mandates Reform Act (UMRA) supersedes Executive Order 12875, reiterating the previously established directives while also imposing additional requirements for federal agencies issuing any regulation containing an unfunded mandate.

Today's rule is not subject to the requirements of sections 202, 204 and 205 of UMRA. In general, a rule is subject to the requirements of these sections if it contains ''Federal mandates'' that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100 million or more in any one year. Today's final rule does not result in $100 million or more in expenditures. The aggregate annualized social costs for today's rule are projected to range from $50 to $63 million under the final standards.

For rules that are subject to the requirements of these sections, key requirements include a written statement with an analysis of benefits and costs; input from state, local and tribal governments; and selection of the least burdensome option (if allowed by law) or an explanation for the option selected. We recognize the potential for aggregate one-time capital expenditures to exceed $100 million in any one year should various industry sectors choose not to amortize capital expenditures. Under this scenario, the Assessment document for today's rule meets analytical requirements established under UMRA.

Today's rule is not subject to the requirements of section 203 of UMRA. Section 203 requires agencies to develop a small government Agency plan before establishing any regulatory requirements that may significantly or uniquely affect small governments, including tribal governments. EPA has determined that this rule will not significantly or uniquely affect small governments. The small entity impacts analysis, presented in Appendix G of the final Assessment, found that no hazardous waste combustion units are owned by small governments.

Finally, because we are issuing today's rule under the statutory authority of the Clean Air Act, the rule should be exempt from all relevant requirements of the UMRA. In addition, compliance with the rule is voluntary for nonfederal governmental entities since state and local agencies choose whether or not to apply to EPA for the permitting authority necessary to implement today's rule.

VII. Is Today's Rule Cost Effective?

We have developed a cost-effectiveness measure that examines cost per unit reduction of emissions for each hazardous air pollutant, pollutant group, or surrogate. Cost-effectiveness measures are useful for comparing across different air pollution regulations. Moreover, we have typically used cost-effectiveness measures (defined as ''dollar-per-unit of pollutant removed'') to assess the decision to go beyond-the-floor for MACT standards.

Developing cost-effectiveness estimates for individual air pollutants assists us in making beyond-the-floor decisions for individual pollutants. The two analytic components of the individual cost-effectiveness analysis are: (1) Estimates of emission control expenditures per air pollutant for each regulatory option, and (2) estimates of emission reductions under each regulatory option. Individual cost-effectiveness measures for each MACT option are calculated as follows:

- HWC MACT Floor—Costs and emission reductions are incremental to the baseline,
- HWC MACT Final Standards—Costs and emission reductions are incremental to the MACT Floor, and
- Beyond-the-Floor—Activated Carbon Injection (ACI) MACT—Costs and emission reductions are incremental to the MACT Floor.

Single-level cost-effectiveness results across all HWC MACT options range

[352] Also, the analysis used the same approach to estimate cancer risks in both adults and children. However, individuals exposed to carcinogens in the first few years of life may be at increased risk of developing cancer. For this reason, we recognize that significant uncertainties and unknowns exist regarding the estimation of lifetime cancer risks in children. We also note that this analysis of cancer risks in children has not been externally peer reviewed.

from seven hundred dollars to $34.3 million per megagram reduced for all pollutants, individually, except dioxin. Dioxin control ranges from $25,000 to $903,000 per gram reduced. Dioxin control for incinerators to meet the floor standard is estimated at $903,000 per gram, with an additional $368,000 per gram to go from the floor to the final BTF TEQ standard. The control of SVM emitted from cement kilns is estimated to cost $67,000 per megagram from the baseline to the floor. Moving from the floor standard to the final BTF SVM standard for cement kilns is estimated to cost $502,000 per megagram. These results indicate that the more highly toxic pollutants such as dioxin are often much more expensive to control on a per-gram basis.

We did not apply cost-effectiveness alone in establishing beyond-the-floor levels for selected constituents regulated under the final HWC MACT standards. Several other measurement factors were incorporated into the beyond-the-floor decision, including: health benefits (especially those for children), regulatory precedent, cost-effectiveness of other MACT standards, and reliability of baseline data.

The method for calculating cost-effectiveness makes several simplifying assumptions. The two most important address the metrics employed for measuring cost-effectiveness and the actual methodology used to estimate the cost and emission reduction figures. Alternative measurement criteria for different constituents may lead to perceived distortions in scope. The cost-effectiveness methodology assumes that all facilities continue operating and install pollution control equipment or implement feed reductions to comply with the MACT standards. Both of these limiting assumptions may lead to overstatement or understatement of results. Other limitations that will influence these cost-effectiveness estimates include: (1) The feed control costing approach, which may lead to the overstatement of expenditures per pollutant due to the assumption of upper-bound cost estimates, (2) apportionment of costs, which are currently assigned according to the percentage reduction required to meet the standard for each pollutant controlled by the device, and (3) the assumption that units control emissions to the 70 percent design level.

VIII. How Do the Costs of Today's Rule Compare to the Benefits?

Comparing overall costs and benefits may help provide an assessment of this rule's overall efficiency and impacts on society. This section compares the total social costs of today's rule with its total monetized and nonmonetized benefits. The total annual monetized benefits of today's rule are estimated at $19.2 million (undiscounted) for the recommended final standards. These monetized benefits, however, may represent only a subset of potential avoided health effects, both cancer and noncancer cases. In comparison, the total annualized social costs of the rule are projected to range from $50 to $63 million. Social costs also include government administrative costs.

Across regulatory options, costs exceed monetized benefits more than two-fold. However, today's rule is expected to provide benefits that cannot be readily expressed in monetary terms. These benefits include health benefits to sensitive sub-populations such as subsistence anglers and improvements to terrestrial and aquatic ecological systems. When these benefits are taken into account, along with equity-enhancing effects such as environmental justice and impacts on children's health, the benefit-cost comparison becomes more complex but also more favorable. Consequently, the final regulatory decision becomes a policy judgment which takes into account efficiency as well as equity concerns and the positive direction of real, but unquantifiable, benefits.

IX. What Consideration Was Given to Small Businesses?

A. Regulatory Flexibility Act (RFA) as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), 5 USC 601 et seq.

This Act generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small not-for-profit enterprises, and small governmental jurisdictions.

We have determined that hazardous waste combustion facilities are not owned by small entities (local governments, tribes, etc.) other than businesses. Therefore, only businesses were analyzed. For the purposes of the impact analyses, small entity is defined either by the number of employees or by the dollar amount of sales. The level at which a business is considered small is determined for each Standard Industrial Classification (SIC) code by the Small Business Administration.[353]

Affected individual waste combustors (incinerators, cement kilns, and lightweight aggregate kilns) will bear the impacts of today's rule. These units will incur direct economic impacts as a result of today's rule. While not required under the Act and guidelines, we have also examined potential secondary impacts on small business units potentially affected by today's rule, such as hazardous waste generators and fuel blenders. Although hazardous waste combustors are the only group that would bear direct economic impacts from today's rule, this ''secondary impacts'' analysis was conducted because we assume that some portion of the burden would be passed on to customers of combustion facilities through price increases. This section describes the small entity analysis we conducted in support of today's rule.

B. Analytical Methodology

For combustors and blenders, we conducted facility-by-facility analyses of small businesses. We examined company data on employment and sales and then compared these data to statutory small business thresholds based on employment or annual sales, as defined for its industry by the Small Business Administration in 13 CFR part 121. Combustion or blender units where the facility or parent company data fell below the small business thresholds were classified as small businesses. The analysis was more complex for generators, however, because the rule may indirectly affect more than 11,000 generators. Given the large number of generators who would be affected by today's rule, it was necessary to conduct an initial, broad screening analysis to identify small business generators that might face significant secondary impacts. This screening analysis involved assigning each facility to an industry group, identifying industry groups that are dominated by small businesses, and then assuming that all generators in those small business dominated industries are small. Further analyses were then conducted on these groups or specific facilities.

We next compiled compliance cost data in an effort to establish a threshold for measuring ''significant economic impact.'' This threshold was set where compliance costs exceed one percent of

[353] SIC codes are used rather than the new NAICS codes because waste generator, blender, and combustor data were only available according to SIC code. However, a general conversion table containing NAICS codes for each reported SIC code is presented in the Assessment document.

facility gross sales. If costs do not exceed one percent of sales, then the regulation is unlikely to have a significant economic impact on small businesses within the category examined. Finally, we examined whether the significant economic impact (if any) would be borne by a ''substantial number'' of small businesses. If the regulation results in required compliance costs exceeding one percent of gross sales for more than 100 small businesses or 20 percent of all small businesses within the industry category examined, then the ''substantial number'' threshold is exceeded.

The cost of compliance with the new standards will determine the severity of impacts on small businesses. The costs to combustors used in this analysis coincide with the 70 percent engineering standard analyzed in the full economic assessment. The price increases experienced by generators and blenders were calculated on a per ton basis of waste shipped using 25 and 75 percent price pass-through scenarios. The price impacts were assumed to be uniform across facility types, with both generators and blenders experiencing the price pass-through effect. In practice, this pass through would likely be split between the two, depending on market factors. Note that the impacts from these price increases are indirect effects, as only hazardous waste combustors bear direct economic impact of today's rule.

C. Results—Direct Impacts

Only six facilities, out of the total universe of 172 hazardous waste combustion facilities, met the definition of small businesses. Of these six, two were found to experience annual compliance costs exceeding one percent of sales. Both of these facilities are owned by a common parent that qualifies as a small business. Therefore, this final rule affects a very limited number of small business combustors and has effects of greater than one percent on only two of these facilities (one business).

While the significant economic impact threshold was exceeded for two facilities (one corporation), these impacts do not extend to a substantial number of small entities. With just two facilities exceeding the one percent threshold, neither a substantial number of facilities nor a substantial fraction of an affected industry would face these impacts. After considering the economic impacts of today's final rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities.

Although this final rule will not have a significant economic impact on a substantial number of directly impacted small entities, EPA nonetheless has assessed the potential of this rule to adversely impact small entities subject to the rule.

D. Results—Indirect Impacts

Direct impacts of the rule extend only to combustors of hazardous waste. To supplement our analysis, indirect impacts on generators and blenders were also examined. We understand that some portion of the combustor's compliance costs would most likely be passed on to generators and blenders, and we have made an effort to analyze these impacts in the spirit of the legislation.

We found that indirect economic effects on generators would not impose a significant impact on a substantial number of small generators. Under both price pass-through scenarios (25 and 75 percent), some generators exceeded the one percent cost as percentage of sales threshold for ''significant impacts.'' In no case, however, was the ''substantial number'' threshold exceeded. Under the 25 percent pass-through scenario, 18 generators had a cost as percentage of sales greater than one percent, but that accounts for only 0.85 percent of all small business generators. While the impact threshold was exceeded by 58 generators in the 75 percent pass through scenario, this is still less than the 100 entity threshold established for a substantial number. You should note that the sales thresholds were selected conservatively as the average sales for the smallest establishments in the SIC code.

Like generators, blenders do not incur direct costs as a result of the rule. However, they may bear a portion of its impact indirectly as costs are passed through from combustors. A total of 21 small business blenders were identified. Depending on the pass-through assumption, between six and 14 blenders exceed the significant impact threshold. Impacts for some of these facilities were found to represent a significant share of their annual gross sales.

Under the 25 percent price pass-through scenario, the number of blenders exceeding the cost as percentage of sales threshold do not represent a substantial number of facilities, either in absolute number or as a percentage of total blenders. Under the 75 percent scenario, however, the 14 establishments with cost as percentage of sales greater than one percent represent just over 20 percent of the 67 blenders identified for this analysis. In a few cases, the cost as percentage of sales could exceed 10 percent.

E. Key Assumptions and Limitations

This analysis was based on several simplifying assumptions. Four key assumptions may have the most significant impact on findings. First, not all small generators may be captured in our analysis of small business dominated industries. This exclusion may be offset by the fact that some generators who are not small may be incorporated in the small business dominated industries. Second, to calculate the benchmark sales for generators, we used average sales by four-digit SIC code for firms with fewer than 20 employees. This may understate economic impacts for the smallest firms in the industry while overstating impacts for larger firms. Third, compliance costs were assumed to be passed through almost completely to the shipper of the waste. This may overstate the impact on generators and blenders. Finally, we assumed that all waste currently managed by combustion continues to be disposed of in this manner. Impacts on combustors, generators, and blenders may be overstated if waste minimization or other lower cost alternatives are available.

Results from this report should also be evaluated within the context of some key analytical limitations. For example, in recent years there has been significant volatility in market behavior and pricing practices in the hazardous waste combustion industry. Furthermore, combustion prices have experienced a general downward tend since 1985 as a result of overcapacity in the market and slow growth in the generation of hazardous waste. Accounting for this price trend, the increase expected under today's rule may affect generators and blenders less significantly than anticipated. Finally, many hazardous waste generators may be more concerned about other aspects of waste management than with prices.

X. Were Derived Air Quality and Non-Air Impacts Considered?

The final Combustion MACT standards are projected to result in the reallocation and diversion of relatively small amounts of hazardous waste resulting in an unspecified increase in the level of fossil fuel substitution. This substitution with nonhazardous waste fuel sources may result in marginal increases in the annual number of mining and transport injuries, in addition to potential increased emissions of criteria pollutants (SO_x, NO_x, and CO_2). We recognize these

concerns but feel any potential non-air impacts are largely addressed through alternative regulatory or market scenarios. First, some of the hazardous waste reallocated from current combustors will likely be sent to other waste-burning facilities, thereby off-setting primary or supplementary fossil fuel usage. Even if fossil fuel burning does increase to some degree, these SO_2 and NO_x emissions are expected to be regulated under existing standards, *e.g.*, criteria pollutant emissions are currently addressed by the Clean Air Act. Finally, we find that even if fossil fuel use is increased, the risks to miners (primarily coal miners) are voluntary risks. Miners are compensated for these increased risks through wage premiums established in response to market dynamics and recurrent negotiations between union and corporate representatives.

While the primary environmental impact of the MACT standards are improvements in air quality resulting from emissions reductions at combustion facilities, other non-air environmental impacts also result from the rule. Namely, use of some air pollution control equipment and shifts in waste burning result in increased water, solid waste, and energy impacts. We did not assess the monetary costs of these impacts because we expect the incremental costs will be small relative to the total compliance costs of the rule. You are requested to review the Addendum prepared in support of today's final rule for an expanded discussion of these impacts.

XI. The Congressional Review Act (5 U.S.C. 801 et seq., as Added by the Small Business Regulatory Enforcement Fairness Act of 1996)

Is Today's Rule Subject to Congressional Review?

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A Major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a ''major rule'' as defined by 5 U.S.C. 804(2). This rule will be effective September 30, 1999.

XII. Paperwork Reduction Act (PRA), 5 U.S.C. 3501–3520

How Is the Paperwork Reduction Act Considered in Today's Rule?

The Office of Management and Budget (OMB) has approved the information collection requirements (ICR) contained in this rule under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.* and has assigned OMB control numbers 2050–0073 (''New and Amended RCRA Reporting and Recordkeeping Requirements for Boilers and Industrial Furnaces Burning Hazardous Waste'') for the RCRA provisions and 2060–0349 (''New and Amended Reporting and Recordkeeping Requirements for National Emissions Standards for Hazardous Air Pollutants from Hazardous Waste Combustors'') for the CAA provisions.

EPA is required under section 112(d) of the Clean Air Act to regulate emissions of HAPs listed in section 112(b). The requested information is needed as part of the overall compliance and enforcement program. The ICR requires that affected sources retain records of parameter and emissions monitoring data at facilities for a period of five years, which is consistent with the General Provisions to 40 CFR part 63 and the permit requirements under 40 CFR part 70. All sources subject to this rule will be required to obtain operating permits either through the State-approved permitting program or, if one does not exist, in accordance with the provisions of 40 CFR part 71, when promulgated. Section 3007(b) of RCRA and 40 CFR part 2, subpart B, which defines EPA's general policy on the public disclosure of information, contain provisions for confidentiality.

The public reporting burden for this collection of information for the CAA provisions under OMB control number 2060–0349 is estimated to average 297 hours per respondent per year for an estimated 229 respondents. The annual public reporting and record keeping burden for collection of information is estimated to be 67,977 hours and a cost of approximately $1.6 million. The total annualized capital costs and total annualized operation and maintenance costs associated with these requirements are $15,000 and nearly $1.6 million, respectively.

The estimates for RCRA provisions under OMB control number 2050–0073 include an annual public reporting and record keeping burden *reduction* for collection of information of 131,228 hours and a cost burden *reduction* of $4.9 million. The reductions in total annualized capital costs and total annualized operation and maintenance costs associated with these requirements are $2.1 million and $2.8 million, respectively. The negative cost represents the reduced burden on 25 facilities getting out of the hazardous waste combustor universe due to the comparable fuels exemption. A further reduction in this RCRA information collection requirement burden will occur after three years when the combustors will start reporting under the CAA information collection requirements.

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

An Agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR Chapter 15. EPA is amending the table in 40 CFR part 9 of currently approved ICR control numbers issued by OMB for various regulations to list the information requirements contained in this final rule.

XIII. National Technology Transfer and Advancement Act of 1995 (Pub L. 104–113, § 12(d) (15 U.S.C. 272 Note)

Was the National Technology Transfer and Advancement Act Considered?

The rulemaking involves technical standards. Therefore, EPA conducted a search to identify potentially applicable voluntary consensus standards (VCS). However, we identified no such standards, and none were brought to our attention in the comments, that would ensure consistency throughout the regulated community. Our response-to-comments document discusses this determination. Therefore, we have decided to use the Air Methods contained in part 60, appendix A.

As noted in the proposed rule, the National Technology Transfer and Advancement Act of 1995 (NTTAA) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.*, materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

In the proposal, we discussed the manual emission test methods that would be required for emission tests and calibration of continuous emission monitors and relied heavily on the BIF methods in 40 CFR part 266, appendix IX. On December 30, 1997, we published a NODA which in part questioned whether the task of determining the appropriate manual method tests to be used for compliance should be simplified. The stack sampling and analysis methods for hazardous waste combustors are under the current BIF and incinerator rules for compliance tests (with a few exceptions) that are located in SW–846. For compliance with the New Source Performance Standard and other air rules, methods are located in 40 CFR part 60, appendix A. Potentially, you could be required to perform two identical tests, one for compliance with MACT or RCRA and one for compliance with other air rules, using identical test methods simply because one method is an ''SW–846'' method and the other an ''air method.'' Further, the NODA stated that stack test methods hazardous waste combustors use for compliance should be found in one place to facilitate compliance. Therefore, we stated our intention to reference 40 CFR part 60, appendix A (Except for dioxin/furans, where we stated method 0023A of SW–846.), when it requires a specific stack-sampling test method.

Since the time of the proposal, we instituted the ''Performance-Based Measurement System.'' This system identifies performance related criteria that can be used to evaluate alternative methods. Methods determined to contain criteria or are a ''Methods-Based Parameters'' method are required, and are the only methods that can be used for regulatory tests.

Commenters generally supported use of the Air Methods contained in part 60, appendix A, or their ''SW–846'' equivalent. Furthermore, because these methods were used to establish the final standards contained in today's rulemaking, application of non approved methods would result in unreliable and inconsistent measurements. Therefore, today's rule will require the use of the Air Methods contained in part 60, appendix A. Section 63.7 describes procedures for the use of alternative test methods for MACT sources. This procedure involves using Method 301 of part 63, appendix A, to validate an alternate test method and submitting the data to us. We then decide if the proposed method is acceptable. Absent this approval under § 63.7 procedures, alternate methods cannot be used.

Today's rule, by requiring the use of only part 60, appendix A methods (method 0023A of SW–846 for dioxin/furans) for compliance determinations and particulate matter continuous emission monitor correlations, would maintain national consistency with the selection of specific manual stack sampling methods. We have determined that this approach would facilitate ease of implementation with today's ''self implementing'' MACT rule. Again, alternate methods may be approved by the Administrator via the provisions of § 63.7(f) and part § 63, appendix A, Method 301, Field Validation or Pollutant Measurement Methods from Various Waste Media.

XIV. Executive Order 13084: Consultation and Coordination With Indian Tribal Governments (63 FR 27655)

Were Tribal Government Issues Considered?

The requirements of section 3(b) of Executive Order 13084 do not apply to this rule. They apply to rules that are not required by statute, that significantly or uniquely affect the communities of Indian tribal governments, and that impose substantial direct compliance costs on those communities. EPA cannot issue those rules unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by the tribal governments, or EPA consults with those governments and gives required information to OMB. But today's rule does not significantly or uniquely affect the communities of Indian tribal governments.

For many of the same reasons described in the Unfunded Mandates Reform Act discussion (section VI.C above), the requirements of Executive Order 13084 do not apply to today's rule. Promulgation of today's rule is under the statutory authority of the CAA. Also, while Executive Order 13084 does not provide a specific gauge for determining whether a regulation ''significantly or uniquely affects'' an Indian tribal government, today's rule does not impose substantial direct compliance costs on tribal governments and their communities. Tribal communities are not predominantly located near hazardous waste combustion facilities, when compared with other communities throughout the nation. Finally, tribal governments will not be required to assume any permitting responsibilities associated with this final rule because permitting authority is voluntary for nonfederal government entities.

Shortly after forming the regulatory workgroup for this rulemaking in April 1994, we looked for ways to obtain the input of state, local, and tribal governments into the rulemaking process. As a result, representatives from four State environmental agencies agreed to participate in the workgroup. These representatives were asked to consider the impacts of this rule of the state, local, and tribal level. These representatives served on the workgroup until Final Agency Review in November 1998. As members of the workgroup, they participated in workgroup meetings and conference calls resulting in the development of rulemaking issues and their solutions. They also provided written comments on our work products on several occasions, including the proposal, the May 1997 NODA, and the Final Agency Review package.

In their comments on the proposal and subsequent notices of data availability, these representatives raised concerns over the following issues:

—Use of site-specific risk assessments under RCRA
—Continuous emissions monitors
—Manual sampling methods
—Compliance schedule
—Use of test data to establish operating limits
—Automatic waste feed cutoffs
—Performance testing schedule
—Recordkeeping requirements
—Permitting issues
—Assessment of potential costs and benefits
—Human health benefits
—Area sources
—Notification and reporting requirements
—Protectiveness of human health as required by RCRA
—Redundant requirements
—State authorization
—Public participation
—CAAA and RCRA coordination