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Municipal Waste Combustion: Background Information for Promulgated Standards and Guidelines - Summary of Public Comments and Responses

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Municipal Waste Combustion: Background Information for Promulgated Standards and Guidelines — Summary of Public Comments and Responses

Emission Standards Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina

December 1990

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ENVIRONMENTAL PROTECTION AGENCY

Background Information Document
for New and Existing Municipal Waste Combustors

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January 11, 1991

1. The Standards of performance limit emissions of Municipal Waste Combustor (MWC) emissions (i.e., MWC organics, MWC metals, and MWC acid gases) and nitrogen Oxides (NO_X) from all new MWC's at plants with aggregate capacities to combust greater than 225 megagrams per day (Mg/day) (225 tons per day [tpd]). The emission guidelines for existing MWC's set levels for control of MWC emissions from all existing MWC's at plants with capacities above 225 Mg/day (250 tpd). Section 111 of the Clean Air Act (42 U.S.C. 7411), as amended, directs the Administrator to establish standards of performance for any category of new stationary source of air pollution that "...causes or contributes significantly to air pollution which may reasonably be anticipated to endanger public health or welfare."

2. Copies of this document have been sent to the following Federal Departments: Office of Management and Budget, Commerce, Interior, and Energy; the National Science Foundation; and the Council on Environmental Quality. Copies have also been sent to members of the State and Territorial Air Pollution Program Administrators; the Association of Local Air Pollution Control Officials; EPA Regional Administrators; and other interested parties.

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1.0 SUMMARY

A consent decree required the Administrator of the U. S. Environmental Protection Agency (EPA) to sign proposed standards for new municipal waste combustors (MWC's), and emission guidelines for existing MWC's by November 30, 1989. The standards were signed on schedule and were published in the FEDERAL REGISTER on December 20, 1989 (54 FR 52251 and 52209) under authority of Section 111 of the Clean Air Act (CAA). The consent decree also required the Administrator to sign final standards by December 31, 1990. This consent decree was subsequently modified to extend the deadline until January 11, 1991.

Public comments were requested on the proposed standards and guidelines. There were over 300 written comments received, mainly from industrial representatives, municipalities, and private citizens. Also commenting were environmental groups, State agencies, and industrial trade associations. Public hearings were held in Boston, Massachusetts, on January 22 and 23, 1990; in Detroit, Michigan, on January 25 and 26, 1990; and in Seattle, Washington, on January 30 and 31, 1990. These hearings were open to the public and over 100 commenters commented on the proposed standards at these meetings. The written comments that were submitted and verbal comments made at the public hearings, along with responses to these comments, are summarized in this document. The summary of comments and responses serves as the basis for the revisions made to the standards and guidelines between proposal and promulgation.

On November 15, 1990, the CAA Amendments of 1990 were adopted and they included, among other things, a new

Section 129 that applies to solid waste incinerators. Section 129 applies to a range of solid waste incinerators including MWC's, medical waste incinerators, infectious waste incinerators, and industrial waste incinerators. For MWC's, Section 129 directs that the new source performance standards (NSPS) and guidelines be broadened beyond their present form and specifies the schedule for revision. First, Section 129 authorizes EPA to promulgate NSPS and guidelines applicable to MWC units larger than 225 megagrams per day (Mg/day) (250 tons per day [tpd]) unit capacity on schedule, as required by the consent decree. The standards and guidelines currently being promulgated comply with that requirement. Second, Section 129 directs EPA to review and revise the current NSPS and guidelines within one year, to be fully consistent with Section 129. This may result in a number of changes to the NSPS and guidelines including the addition of numerical emission limits for mercury, cadmium, and lead. Third, Section 129 directs that NSPS and guidelines, fully consistent with Section 129, be promulgated for MWC's of less than 225 Mg/day (250 tpd) unit capacity within two years.

1.1 SUMMARY OF CHANGES SINCE PROPOSAL

Substantial changes have been made to the standards and guidelines in response to comments and additional analyses completed since proposal. The major changes are summarized below.

1.1.1 Applicability

To be consistent with the CAA Amendments of 1990, Sections 60.50a of the NSPS and Section 60.32a of the guidelines have been modified to specify that only MWC units with capacities greater than 225 Mg/day (250 tpd) of MSW are affected by the NSPS and guidelines. Proposed emission levels for smaller MWC's have been deleted from the regulations. Both the NSPS and the guidelines have been modified to exempt two specific classes of combustors. A new paragraph has been added to both the NSPS in Section 60.50a and the guidelines in Section 60.32a which will exempt dedicated MWC's combusting only tires or fuel derived solely from tires from all provisions of the standards or guidelines except an initial report. Additionally, as a result of comments received, a new paragraph has been added to exempt cofired combustors that fire fuel streams containing 30 percent or less MSW (by weight, daily basis) from all provisions of the standards and guidelines except the initial report and records and reports of the daily weight of MSW and each other fuel combusted. Another paragraph has been added that clarifies that combustion of segregated medical waste in MWC's above 225 Mg/day (250 tpd) capacity is not subject to the NSPS. Also, a new subsection has been added to the NSPS in Section 60.58a providing procedures for calculating MWC unit capacity and providing default design heating values to be used in this calculation. Finally, the materials separation provisions have been deleted.

1.1.2 Definitions

Several minor changes to definitions, as well as some additions, have been made in both Section 60.51a of the standards and Section 60.31a of the guidelines to improve clarity. The more significant changes are revisions to the definition of MSW and the revision of the definitions of large MWC plant and very large MWC plant in the guidelines.

The definition of MSW provided in Section 60.51a of Subpart Ea has been revised to clarify that it is the source and nature of the discarded material that is critical, rather than the percent composition of the waste stream. In general, discards from residential, commercial, and institutional facilities, whether single materials or mixtures, are considered MSW, but industrial process and manufacturing wastes are not considered MSW. Greater detail about what materials are not included in this definition has also been provided.

Large MWC plant in the final guidelines will apply to plants with aggregate capacity to combust more than 225 Mg/day (250 tpd) of MSW, but less than or equal to 1,000 Mg/day (1,100 tpd), and very large MWC plant will apply to those MWC plants with capacities above 1,000 Mg/day (1,100 tpd). This definition of a very large plant replaces the proposed definition of a "regional" MWC plant. (The NSPS applies the same standards to all MWC units larger than 225 Mg/day [250 tpd] and so does not apply different standards based on aggregate plant capacity.)

Definitions for batch MWC, cofired combustor, Federally-enforceable, maximum demonstrated particulate matter control device temperature, maximum demonstrated MWC unit load, and standard conditions have been added for clarity. The meaning and use of these terms is explained either in the regulations and/or in the responses to comments in Chapters 3.0 through 9.0.

1.1.3 Materials Separation

The final regulations do not include requirements for materials separation. Although the materials separation provisions have been deleted, this document addresses many of the generic issues raised during the public comment period relating to generic issues associated with materials separation programs in conjunction with municipal waste combustion (see especially chapters 4 and 8).

1.1.4 Standards and Guidelines for Municipal Waste Combustor Emissions

The final standards for MWC organic emissions from new MWC's with unit capacities above 225 Mg/day (250 tpd) have been set at 30 nanograms per dry standard cubic meter (ng/dscm) [12 grains per billion dry standard cubic foot (gr/billion dscf)] total dioxins/furans in Section 60.53a(c) of Subpart Ea. In the final guidelines, the emission level for MWC's with unit capacities above 225 Mg/day (250 tpd) at very large MWC plants has been set at 60 ng/dscm (24 gr/billion dscf) in Section 60.34a of Subpart Ca. The MWC organic emission level for MWC's at existing large plants has not changed since proposal. The reasons for these changes are described in Chapters 3.0 and 7.0.

The final standards for MWC acid gases from new MWC's has been revised from an 85-percent reduction in potential sulfur dioxide (SO_2) emissions to an 80-percent reduction (24-hour geometric mean) in Section 60.54a(c) of Subpart Ea. Changes have also been made in the final guidelines for MWC acid gas emissions from existing designated MWC's at very large MWC plants in Section 60.35a. The percent reduction for SO_2 emissions has been revised from 85 to 70 percent (24-hour geometric mean), and the percent reduction for hydrogen chloride (HCl) emissions has been changed from 95 to 90 percent for existing designated MWC's at very large plants. These changes are based on analyses described in Chapters 3.0 and 7.0.

Additionally, the standards and guidelines for MWC operating practices in Sections 60.56a and 60.35a have been revised somewhat. The carbon monoxide (CO) levels and averaging times have been revised for certain types of MWC's. The uniform maximum particulate matter (PM) control device inlet temperature has been changed to a requirement that a site-specific maximum temperature be established at each MWC during the dioxin/furan compliance test.

Finally, the standard for nitrogen oxides (NO_x) in Section 60.55a has been set at 180 parts per million by volume (ppmv). This applies only to new MWC's with unit capacities above 225 Mg/day (250 tpd). (The proposal included a range of 120 to 200 ppmv.)

Compliance provisions for calculating the 24-hour geometric mean percent reduction for SO_2 have been added to Reference Method 19.

1.1.5 Recordkeeping and Reporting

The provisions for recordkeeping and reporting in Section 60.59a of the standards and Section 60.39a of the emission guidelines have been revised to support the changes enumerated in the previous sections. The only significant change involves appropriate recordkeeping and reporting provisions for NO_x emissions consistent with the emission limit established. The reporting requirements associated with the proposed materials separation requirements have been deleted.

1.2 SUMMARY OF IMPACTS OF PROMULGATED ACTION

1.2.1 Alternatives to Promulgated Action

The regulatory alternatives are discussed in the proposal preamble and the background information documents (BID's) for the proposed standards and guidelines. (52 FR 52251 and 52209). These regulatory alternatives reflect the different levels of emission control from which one was selected that represents the best demonstrated technology, considering costs, nonair quality health and environmental impacts and energy requirements associated with MWC's. These alternatives remain substantially the same as at proposal.

1.2.2 Environmental Impacts of Promulgated Action

The preambles to the proposed standards and guidelines discussed the environmental impacts likely to result from these regulations. The estimated impacts have changed as a result of changes in the final regulations.

Air Emissions. In the fifth year after adoption, the standards for MWC emissions would reduce emissions of dioxins/furans from affected new MWC's by about 99 percent. Overall MWC metal emission reductions of about 99 percent would be achieved. Acid gas emissions at affected new MWC's would be reduced by about 94 percent, and NO_x emissions would be reduced by about 45 percent.

Under the guidelines for existing MWC's, emissions of dioxins/furans from designated MWC's would be reduced by about 95 percent. Overall MWC metals emission reductions of about 97 percent would be achieved. Acid gas emissions at designated MWC's would be reduced by about 65 percent. There are no guidelines for NO_x emissions from existing MWC's.

Water and Solid Waste. As discussed at proposal, no significant water or solid waste impacts are projected for the standards and guidelines. Requirements for good combustion practices (GCP) tend to reduce the quantity of ash generated by MWC's, whereas addition of acid gas control slightly increases the quantity of ash generated due to addition of lime scrubber solids. Overall, the standards and guidelines would increase the net amount of MWC ash generated by roughly

5 percent relative to baseline. It is unclear what, if any, effect acid gas control would have on ash quality. However, increased scrutiny and control over waste disposal in municipal waste landfills should result in environmentally adequate ash disposal practices. Combustion of MSW as opposed to direct landfilling greatly reduces the volume of waste to be disposed of in landfills (by approximately 90 percent) and extends landfill life.

1.2.3 Cost Impacts

The cost impacts of the standards and guidelines have been revised somewhat since proposal. The total annualized costs of control in the fifth year after adoption of the standards for new MWC's would be $170 million, and the overall national average annualized cost per unit of MSW combusted would be $12/Mg ($11/ton). Cost increases resulting from the standards for typical new MWC plants would range from about $11 to $21/Mg ($10 to $19/ton) of MSW combusted. For perspective, typical costs incurred by the general public for disposal of MSW range from $40 to over $100/Mg ($36 to $90/ton) of MSW, including collection, transportation, combustion, and ash disposal.

The total annualized cost of the guidelines for existing MWC's would be about $302 million, and the overall national cost would be about $12/Mg ($11/ton) of MSW combusted. Cost increases for typical very large existing MWC plants resulting from the guidelines would range from about $8 to $12/Mg ($7 to $11/ton) of MSW combusted. Cost increases for typical large existing MWC plants would range from about $8 to $36/Mg ($7 to $32/ton) of MSW combusted.

1.2.4 Energy and Economic Impacts of Promulgated Action

The BID's for the proposed standards and guidelines discussed the economic impacts. Additional technical background documents published at promulgation discuss the economic impacts of the final regulations.

A new MWC regulated under the standards would require additional energy to operate the MWC emissions and NO_x control equipment. Total national usage of electrical energy would increase by about 220,000 megawatt hours per year (MW-hrs/yr). For existing MWC's, total national electrical energy usage for operating the MWC emissions control equipment would increase by about 210,000 MW-hrs/yr. Also, natural gas for auxiliary fuel at existing MWC's would increase by about 820 terajoules (TJ) (7.8×10^{11} Btu) per year. Although new and existing MWC's would require additional energy to operate control equipment, the additional energy use would result in only a very small net reduction in energy generation at the MWC site of less than 3 percent.

The NSPS and guidelines will have a wide range of impacts on the price of combustion services. Using a 1988 average tipping fee of $42.70/Mg ($38.74/ton) of waste combusted (1987 dollars), and assuming the full cost of meeting the standards is passed directly to MWC customers, the lowest and highest price increases for the model new MWC plants used in the Agency's economic analysis will be 25 and 50 percent, respectively. Using the same average tipping fee, the lowest and highest price increases for model existing MWC plants will be 19 and 84 percent, respectively.

The economic impacts on small communities and on households in those communities will not occur because MWC's in small communities will not have sufficient capacities to be covered under these standards or guidelines.

The Agency reanalyzed how the standards and guidelines might affect the way communities and private owners choose among alternative waste disposal technologies, and among alternative capacities from those MWC's that are constructed. The Agency expects that, as a result of the standards for new MWC's, some communities will substitute landfills and other waste management options for some combustors, and therefore, that fewer MWC's will be constructed. As a result of this substitution, the direct social cost of controlling emissions from the new MWC's drops, and MWC emission reductions due to the standards are less than what they would have been had there been no adjustments of MWC construction plans.

The Agency also expects that some communities may elect to close their existing MWC's and substitute landfills or other waste management options rather than implement the guidelines. However, in an analysis scenario that allows new MWC's as substitutes for existing MWC's that will be very expensive to retrofit, the Agency found that there was no substitution. The Agency recognizes that both the social costs and emissions due to MWC's would likely be reduced if, because of the cost of the regulation, communities chose to replace their existing combustors with other, less expensive means of solid waste disposal.

Some of the benefits of the NSPS and guidelines have been quantified. The absence of a sufficient exposure-response and valuation information precludes a comprehensive benefits analysis. Partial benefits for reduction of PM and SO_2 -- primarily benefits from reductions in morbidity and mortality -- are expected to total $70 to $120 million for the NSPS and $95 to $152 million for the guidelines.

2.0 PUBLIC COMMENTS

2.1 LIST OF COMMENTERS

The public comment period was from December 20, 1989, to March 1, 1990. A total of over 300 letters commenting on the proposed standards and guidelines were received. Comments were provided by industry representatives, governmental entities, environmental groups, and private citizens. These comments have been recorded and placed in the docket for these rulemakings (Docket No. A-89-08, Category IV-D). Table 2-1 presents a listing of all persons submitting written comments, their affiliation, and the recorded Docket Item No. assigned to each comment letter.

In addition, 118 persons presented oral comments on the proposed standards and guidelines at public hearings held in Boston, Massachusetts, on January 22 and 23, 1990; in Detroit, Michigan, on January 25 and 26, 1990; and in Seattle, Washington, on January 30 and 31, 1990. Verbatim transcripts of the comments at the public hearings have been prepared and placed in Docket No. A-89-08, Category IV-F. Table 2-2 presents a listing of all persons presenting comments at the public hearings, their affiliation, and the Docket Item No. assigned to each speaker.

2.2 ORGANIZATION OF COMMENT SUMMARIES

Comments made at the public hearings or submitted in writing are summarized and responses are provided in Chapters 3.0 through 9.0. The comments are grouped by subject areas, and the organization of topics is similar to the organization of the proposal preamble for the NSPS and guidelines (54 FR 52251 and 54 FR 52209).

Chapters 3.0 through 6.0 include comments on the proposed NSPS. Chapter 3.0 contains comments on the applicability of the NSPS and the standards for MWC emissions (e.g., MWC organics, MWC acid gases, and MWC metals). These include comments on selection of the best demonstrated technology for control of MWC emissions, the selected size categories for MWC's, the proposed emission limits, GCP requirements, and the testing, monitoring, and reporting provisions. Comments on the environmental, economic, and other impacts of the standards are also included.

Chapter 4.0 summarizes comments on materials separation. These include comments on the proposed separation requirements and the associated compliance demonstration and reporting provisions. The environmental, economic, and other impacts of materials separation are also discussed. In addition, broader comments on national strategies to promote MSW recycling are contained in Chapter 4.0.

Chapter 5.0 summarizes comments on the proposed standards for NO_x. Chapter 6.0 includes other comments on miscellaneous issues related to the NSPS.

Chapters 7.0 through 9.0 summarize comments on the proposed emission guidelines for existing MWC's. In many instances, comments apply equally to new and existing MWC's regulated under the NSPS and guidelines. In such cases, the comment is included with NSPS comments in Chapters 3.0 through 6.0 and is not repeated in Chapters 7.0 through 9.0. Only those comments and responses that pertain specifically to the guidelines and not the NSPS, are included in Chapters 7.0, 8.0, and 9.0.

Chapter 7.0 contains comments related to the guidelines for MWC emissions and compliance times for existing MWC's. Chapter 8.0 focuses on the materials separation provisions of the guidelines; and Chapter 9.0 includes miscellaneous comments on topics related to the guidelines.

TABLE 2-1. LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-01	Lloyd L. Chambers, III Nekoosa Papers Inc. Port Edwards, Wisconsin
IV-D-02	Lloyd L. Chambers, III Nekoosa Papers Inc. Port Edwards, Wisconsin
IV-D-03	Donald L. Shepherd Private Citizen Salem, Virginia
IV-D-04	Lloyd L. Chambers, III Nekoosa Papers Inc. Port Edwards, Wisconsin
IV-D-05	Kenneth R. St. George Private Citizen Chicopee, Massachusetts
IV-D-06	Nancy E. Rogers Board of Health Shrewsbury, Massachusetts
IV-D-07	Sharyl Barbee Private Citizen Madison Heights, Michigan
IV-D-08	Harry A. Watters Puget Sound Air Pollution Control Agency Seattle, Washington
IV-D-09	Orinne Goldberg Private Citizen Spokane, Washington
IV-D-10	Charles A. Collins Air Quality Division State of Wyoming
IV-D-11	Judd Gregg Office of the Governor Concord, New Hampshire

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-12	George C. Pedersen Kimre, Inc. Perrine, Florida
IV-D-13	Thomas W. Stephens Private Citizen Detroit, Michigan
IV-D-14	Ronald R. Welch City of Petersburg Petersburg, Alaska
IV-D-15	Arthur C. Sprenkle House of Representatives Olympia, Washington
IV-D-16	Joan Stevens American Lung Association of New Hampshire Manchester, New Hampshire
IV-D-17	Christine O. Gregoire State of Washington Department of Ecology Olympia, Washington
IV-D-18	Louis D. Draghetti Town of Agawam Department of Weights and Measures Agawam, Massachusetts
IV-D-19	Alex Sagady American Lung Association of Michigan Lansing, Michigan
IV-D-20	Ora Mae Orton Council for Land Care & Planning, Inc. Spokane, Washington
IV-D-21	David Cohen Mercury Refining Company Latham, New York

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-22	Curtis A. Pike Town of Wolfeboro Wolfeboro, New Hampshire
IV-D-23	Loren Yunk, Laura Sarau Loralaur Technologies Tucson, Arizona
IV-D-24	Mr. and Mrs. Arthen and Mary F. Stema Private Citizens Madison Heights, Michigan
IV-D-25	G. Raymond Lorello, Robert S. Sommers Public Utilities and Aviation Department Columbus, Ohio
IV-D-26	Glen S. McGhee The Cherry Street & Gold Street Neighborhood Association, Inc. Shrewsbury, Massachusetts
IV-D-27	Curt Messex Citizens for Clean Air Spokane, Washington
IV-D-28	Francis J. Hopcroft North East Solid Waste Committee North Andover, Massachusetts
IV-D-29	Mark Radzinski Solid Waste Management Department Tulsa, Oklahoma
IV-D-30	J. T. Hestle, Jr. Nashville Thermal Transfer Corporation Nashville, Tennessee
IV-D-31	Richard J. Swift Foster Wheeler Power Systems, Inc. Clinton, New Jersey

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-32	Lloyd J. Compton Compton Engineering, P.A. Pascagoula, Mississippi
IV-D-33	Dean A. Massett City of Red Wing Red Wing, Minnesota
IV-D-34	Nicholas Menonna, Jr. KTI Energy, Inc. Guttenberg, New Jersey
IV-D-35	Mark K. Bobman Polk County Solid Waste Management Crookston, Minnesota
IV-D-36	Jim Shirrell City of Batesville Batesville, Arkansas
IV-D-37	Lawrence E. Baker City of Irving, Texas Department of Environmental Services Irving, Texas
IV-D-38	W. Harold Snead City of Galax Galax, Virginia
IV-D-39	Dan Edwards City of Fergus Falls Fergus Falls, Minnesota
IV-D-40	Stanley J. Keely Orange County Division of Public Utilities Orlando, Florida
IV-D-41	Daniel E. Warren American Resource Recovery Milwaukee, Wisconsin

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-42	Frances B. Richerson United Bio-Fuel Industries, Inc. Petersburg, Virginia
IV-D-43	Timothy A. Hurst Cassia County Burley, Idaho
IV-D-44	Fred E. Marquis Pinellas County Clearwater, Florida
IV-D-45	Paul D. Wiegand City of Ames Ames, Iowa
IV-D-46	Michael A. Gagliardo Northeast Maryland Waste Disposal Authority Baltimore, Maryland
IV-D-47	Fred Retchin Board of Commissioners New Hanover County Wilmington, North Carolina
IV-D-48	Parker Andrews Department of Public Works Anne Arundel County, Maryland
IV-D-49	T. C. Crusberg Worcester Polytechnic Institute Worcester, Massachusetts
IV-D-50	Mary R. Wieman Private Citizen Spokane, Washington
IV-D-51	Benjamin A. Harvey Waste Recyclers Council Washington, D. C.
IV-D-52	James Self City of Waxahachie Waxahachie, Texas

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-53	Alan C. Cason Harford County Government Belair, Maryland
IV-D-54	Floyd H. Lawson Broome County Resource Recovery Agency Binghamton, New York
IV-D-55	Edward Kuzanarowis Private Citizen Sandwich, Massachusetts
IV-D-56	Pam Liester Pilchuck Audubon Society Everett, Washington
IV-D-57	Joan Lintelman, Connie Ferguson The League of Women Voters Lansing, Michigan
IV-D-58	William H. Hudnut, III City of Indianapolis Indianapolis, Indiana
IV-D-59	Ray and Vivienne Kell Private Citizens Madison Heights, Michigan
IV-D-60	Janet Manter Three Rock Solid Waste Planning District Candia, New Hampshire
IV-D-61	Jon Peacy JPC Consultants Highland Parks, Illinois
IV-D-62	Donald A. Drum Butler County Community College Butler, Pennsylvania

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-63	Jon P. Sandstedt for Leonard D. Verrelli State of Alaska Department of Environmental Conservation Juneau, Alaska
IV-D-64	Steve Shuler Joy Energy Systems, Inc. Charlotte, North Carolina
IV-D-65	Carroll W. Chambliss I. C. Thomasson Associates, Inc. Nashville, Tennessee
IV-D-66	Marvin D. McKinley The University of Alabama Tuscaloosa, Alabama
IV-D-67	John Keegan Trican Energy Systems Limited Brantford, Ontario, Canada
IV-D-68	Steve Passage Montenay Power Corporation Mineola, New York
IV-D-69	Jeffrey C. Smith IGCI Industrial Gas Cleaning Institute, Inc. Washington, D. C.
IV-D-70	Frank E. Rutherford City of Tuscaloosa Solid Waste Disposal Authority Tuscaloosa, Alabama
IV-D-71	Justin Kopca Private Citizen
IV-D-72	Richard D. Parker Londe - Parker, Inc. Ballwin, Missouri

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-73	Timothy I. Michaels Private Citizen St. Louis, Missouri
IV-D-74	Richard H. Watson Washington State Energy Office Olympia, Washington
IV-D-75	Charles E. Roos National Recovery Technologies Nashville, Tennessee
IV-D-76	Paul Gruendler Private Citizen Rising Fawn, Georgia
IV-D-77	Durwood S. Curling Southeastern Public Service Authority of Virginia Chesapeake, Virginia
IV-D-78	G. Raymond Lorello Public Utilities and Aviation Department Columbus, Ohio
IV-D-79	Mrs. Velma Drake Private Citizen
IV-D-80	David A. Buff KBN Engineering and Applied Sciences, Inc. Gainesville, Florida
IV-D-81	John A. Kleppe Scientific Engineering Instruments, Inc. Sparks, Nevada
IV-D-82	Alfred C. Schmidt Schmidt Instrument Co. San Carlos, California

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-83	Philip J. Hamel Town of Wallingford Wallingford, Connecticut
IV-D-84	David Gossman Gossman Consulting, Inc. Hampshire, Illinois
IV-D-85	Sara Elizabeth Frey Private Citizen Bloomington, Indiana
IV-D-86	Donald T. Flood Scientific Engineering Instruments, Inc. Sparks, Nevada
IV-D-87	Roger Randolph Missouri Department of Natural Resources Jefferson City, Missouri
IV-D-88	Paul A. Faust Private Citizen St. Louis, Missouri
IV-D-90	Arthur C. Granfield Babcock & Wilcox, and National Ecology Barberton, Ohio
IV-D-91	William R. Darcy Connecticut Resources Recovery Authority Hartford, Connecticut
IV-D-92	J. R. Smith Houston Lighting & Power Company Houston, Texas
IV-D-93	Joel Carr Village of Saltaire Saltaire, New York

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-94	Lawrence M. Hands WW Engineering & Science, Inc. Livonia, Michigan
IV-D-95	Doug MacMillian Environmental Systems Co. Alexandria, Virginia
IV-D-96	Stephen M. Rhoads California Energy Commission Sacramento, California
IV-D-97	John M. Griffin Michigan Hospital Association Lansing, Michigan
IV-D-98	Beth C. Miller Private Citizen Detroit, Michigan
IV-D-99	Ronald H. Ford Concord Regional Solid Waste/ Resource Recovery Cooperative Penacook, New Hampshire
IV-D-100	Michael A. Rollor Recytec America, Inc. Cedar Knolls, New Jersey
IV-D-101	David B. Sussman Ogden Martin Systems, Inc. Alexandria, Virginia
IV-D-102	Paul C. Rettig American Hospital Association Washington, D. C.
IV-D-103	George Abel U. S. EPA, Region X Air Programs Branch Seattle, Washington

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-104	George Abel U. S. EPA, Region X Air Programs Branch Seattle, Washington
IV-D-105	David A. Smith Natural Resources Defense Council New York, New York
IV-D-106	Renee J. Robins Conservation Law Foundation of New England Boston, Massachusetts
IV-D-107	John S. Lambert Foster Wheeler Power Systems, Inc. Clinton, New Jersey
IV-D-108	Bernard Killian Illinois Environmental Protection Agency Springfield, Illinois
IV-D-109	Bernard Killian Illinois Environmental Protection Agency Springfield, Illinois
IV-D-110	Bernard Fryshman Private Citizen Brooklyn, New York
IV-D-111	Everett A. Bass City of Tampa Solid Waste Department Tampa, Florida
IV-D-112	Charles J. Curran County of Montgomery Dayton, Ohio

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-113	John W. Norton County of Montgomery Dayton, Ohio
IV-D-114	American Newspaper Publishers Association
IV-D-115	John D. Pirich Greater Detroit Resource Recovery Authority Detroit, Michigan
IV-D-116	Westinghouse Resource Energy Systems Division Pittsburgh, Pennsylvania
IV-D-117	Marjorie J. Clarke INFORM, Inc. New York, New York
IV-D-118	Donna Dupont Private Citizen Holyoke, Massachusetts
IV-D-119	C. G. Mumm Bechtel Corporation Gaithersburg, Massachusetts
IV-D-120	Thomas Webster Center for the Biology of Natural Systems Flushing, New York
IV-D-121	Mark Cohen Center for the Biology of Natural Systems Flushing, New York
IV-D-122	Robert F. Brothers Eastman Kodak Company Rochester, New York

Continued

Docket Item No.	Commenter and Affiliation
IV-D-123	James Ledbetter City of Huntsville Solid Waste Disposal Authority Huntsville, Alabama
IV-D-124	Arthur C. Granfield Babcock & Wilcox Barberton, Ohio
IV-D-125	Harland M. Doliner Donna J. Vorhees McGregor, Shea & Doliner (Counsel for) Town of North Kingstown North Kingstown, Rhode Island
IV-D-126	James H. Heil Town of Brookhaven Brookhaven, New York
IV-D-127	Bert Brown Joy Technologies Inc. Monrovia, California
IV-D-128	James Sears Department of Solid Waste Management Marion County, Oregon
IV-D-129	Audrie Zettick Schaller Private Citizen Lower Makefield, Pennsylvania
IV-D-130	Steve Smallwood Florida Department of Environmental Regulation Tallahassee, Florida
IV-D-131	Thomas F. Tansey SEMASS Partnership Rochester, Massachusetts

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-132	G. Raymond Lorello Public Utilities and Aviation Department Columbus, Ohio
IV-D-133	Walter Roy Quanstrom Amoco Corporation Chicago, Illinois
IV-D-134	Edward W. Davis New York State Department of Environmental Conservation Albany, New York
IV-D-135	Konheim & Ketcham (Counsel for) Citizens Advisory Committee on Resource Queens, New York
IV-D-136	New York Public Interest Research Group, Inc. New York, New York
IV-D-136A	New York Public Interest Research Group, Inc. New York, New York
IV-D-137	Richard F. Anderson Wheelabrator Technologies, Inc. Danvers, Massachusetts
IV-D-138	Richard F. Anderson Wheelabrator Technologies, Inc. Danvers, Massachusetts
IV-D-139	Michael A. Gagliardo National Resource Recovery Association Washington, D. C.
IV-D-140	Dr. James L. Burke Garden State Paper Company Elmwood Park, New Jersey

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-141	Gordon L. Sutin EAC Systems, Inc. Albany, New York
IV-D-142	Cheryl Richardson, Carl Hild, Karen Wood, Randall Weiner, Mary Grisco Anchorage Clean Air Coalition Anchorage, Alaska
IV-D-143	Max Stul Oppenheimer Venable, Baetjer and Howard (Counsel for) The Pulaski Company Baltimore, Maryland
IV-D-144	Carl W. Strickler, Bo Ocarsson Gotaverken Energy Systems, Inc. Charlotte, North Carolina
IV-D-145	Patrick L. Stevens City of Indianapolis Indianapolis, Indiana
IV-D-146	Joseph R. Williams Washington Department of Ecology Olympia, Washington
IV-D-147	Fred A. Lafser Riedel Industrial Waste Management, Inc. St. Louis, Missouri
IV-D-148	William J. Nicholson Potlatch Corporation San Francisco, California
IV-D-149	John W. Drake Oklahoma Department of Health Oklahoma City, Oklahoma
IV-D-150	John W. Drake Oklahoma Department of Health Oklahoma City, Oklahoma

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-151	Dorothy Gibson and Gordon Gibson Citizens for a Livable Environment and Recycling, Inc. Huntington, New York
IV-D-152	Scott Duboff Bishop, Cook, Purcell & Reynolds (Counsel for) Pinellas County Department of Solid Waste Management St. Petersburg, Florida
IV-D-153	Scott Duboff Bishop, Cook, Purcell & Reynolds (Counsel for) Pinellas County Department of Solid Waste Management St. Petersburg, Florida
IV-D-154	Anthony Licata American Energy Corporation Washington, D. C.
IV-D-155	Kent Burton Institute of Resource Recovery Washington, D. C.
IV-D-156	Robert Earl National Solid Wastes Management Association Washington, D. C.
IV-D-157	W. Allen Moore National Solid Wastes Management Association Washington, D. C.
IV-D-158	Occidental Chemical Corporation Washington, D. C.
IV-D-159	Roger Etter Waste Combustion Equipment Institute Washington, D. C.

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-160	Luke Schmidt National Association for Plastic Container Recovery Charlotte, North Carolina
IV-D-161	Herschel Cutler Institute of Scrap Recycling Industries, Inc. Washington, D. C.
IV-D-162	Lynn A. Monk Swidler & Berlin (Counsel for) Northern States Power Company - Wisconsin
IV-D-163	Sue M. Briggum Waste Management, Inc. Washington, D. C.
IV-D-164	Governmental Refuse Collection and Disposal Association Silver Spring, Maryland
IV-D-165	National Electrical Manufacturers Association Washington, D. C.
IV-D-166	National Association of Counties Washington, D. C.
IV-D-167	Jon Greenberg Browning-Ferris Industries Washington, D. C.
IV-D-168	S. William Becker STAPPA/ALAPCO Washington, D. C.
IV-D-169	William B. Marx and Jan B. Vlcek Sutherland, Asbill & Brennan (Counsel for) Council of Industrial Boiler Owners Burk, Virginia

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-169A	William B. Marx and Jan B. Vlcek Sutherland, Asbill & Brennan (Counsel for) Council of Industrial Boiler Owners Burk, Virginia
IV-D-170	Gerald Z. Dubinski and Jean M. Beaudoin Battery Council International Washington, D. C.
IV-D-171	Norman H. Nosenchuck and David Buckner Association of State and Territorial Solid Waste Management Officials Washington, D. C.
IV-D-172	H. Randall Puterbaugh Frontier Industries Inc. Lewisburg, Pennsylvania
IV-D-173	John F. Ruston Environmental Defense Fund Washington, D. C.
IV-D-174	Robert C. Kaufmann American Paper Institute and the National Forest Products Association Washington, D. C.
IV-D-175	NUMARC/Inadvertently submitted to Docket A-89-08; Submitted 03/09/90 to Docket A-79-11
IV-D-176	John Chadbourne Systech Environmental Corporation Xenia, Ohio
IV-D-177	Bradley J. Beckham State of Colorado Department of Health Denver, Colorado

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-178	Robert P. Miller State of Michigan Department of Natural Resources Lansing, Michigan
IV-D-179	Harold M. Draper Mississippi Forestry Association Jackson, Mississippi
IV-D-180	John H. Gulledge Los Angeles County Sanitation Districts Los Angeles, California
IV-D-181	N. C. Vasuki Delaware Solid Waste Authority Delaware
IV-D-182	David W. Carroll Lafarge Corporation Reston, Virginia
IV-D-183	Craig S. Volland Spectrum Technologists Kansas City, Missouri
IV-D-184	Mark L. Wollschlager HDR Engineering, Inc. Omaha, Nebraska
IV-D-185	Kent M. Barlow Madison Gas and Electric Company Madison, Wisconsin
IV-D-186	E. Gail Suchman State of New York Department of Law New York, New York
IV-D-187	H. Clark Gregory Private Citizen Atlanta, Georgia

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-188	James K. Hambright Department of Environmental Resources Harrisburg, Pennsylvania
IV-D-189	Anthony J. McMahon State of New Jersey Department of Environmental Protection Trenton, New Jersey
IV-D-190	Francis W. Holm The American Society of Mechanical Engineers Washington, D. C.
IV-D-191	Mary B. Powers Kalamazoo River Protection Association Kalamazoo, Michigan
IV-D-192	Martin C. Fisher Department of Environmental Services County of York Yorktown, Virginia
IV-D-193	Francis J. Hopcroft North East Solid Waste Committee North Andover, Massachusetts
IV-D-194	Anton S. Gardner Arlington County, Virginia
IV-D-195	Marjorie A. Franklin The American Society of Mechanical Engineers Washington, D. C.
IV-D-196	Gary M. Garfield Town of Litchfield Litchfield, New Hampshire
IV-D-197	Max Stul Oppenheimer Venable, Baetjer and Howard Baltimore, Maryland

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-198	Alan T. Butler State of Washington Department of Ecology Redmond, Washington
IV-D-199	George Abel U. S. EPA, Region X Air Programs Branch Seattle, Washington
IV-D-200	George Abel U. S. EPA, Region X Air Programs Branch Seattle, Washington
IV-D-201	Bonnie Kay House, et. al. Private Citizens Phillipston, Massachusetts
IV-D-202	Robert L. Massey Consumat Systems, Inc. Richmond, Virginia
IV-D-203	Jeanne Davies Sierra Club, San Diego Chapter San Diego, California
IV-D-204	George Rainer Private Citizen Irvington, New York
IV-D-205	Victor A. Bell Rhode Island Department of Environmental Management Providence, Rhode Island
IV-D-206	Hans G. Arnold Oneida - Herkimer Solid Waste Management Authority Utica, New York
IV-D-207	Ronald O. Webb Environmental Systems Corporation Knoxville, Tennessee

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-208	Mary Brown Citizens for Responsible Waste Management Stratham, New Hampshire
IV-D-209	J. Michael Valentine Minnesota Pollution Control Agency St. Paul, Minnesota
IV-D-210	Peter D. Venturini Air Resources Board Sacramento, California
IV-D-211	G. D. Walmsley, Hickory Springs Manufacturing Company, Document Inadvertently Put Into This Docket - Forwarded to Docket A-89-09
IV-D-212	John E. Pinkerton, Reid A. Miner National Council of the Paper Industry for Air and Stream Improvement, Inc. New York, New York
IV-D-213	Craig Hart Methodist Hospital of Indiana, Inc. Indianapolis, Indiana
IV-D-214	Don Bockelman Committee to Protect the Ozone Sedro Woolley, Washington
IV-D-215	Larry K. Bright Private Citizen Fairbanks, Alaska
IV-D-216	Doug Swanson GE Government Services Washington, D. C.
IV-D-217	Andrew Rodwin Private Citizen Cambridge, Massachusetts

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-218	Andrew Saul Private Citizen
IV-D-219	Brendan Sexton Department of Sanitation New York City, New York
IV-D-220	Ronnie Crochet Crochet Equipment Company Baton Rouge, Louisiana
IV-D-221	J. Leonard Ledbetter Georgia Department of Natural Resources Atlanta, Georgia
IV-D-222	Trudy R. Gasteazoro Waste to Energy Association Minnesota
IV-D-223	Timothy F. Hunt, Jr. Solid Waste Authority of Palm Beach County West Palm Beach, Florida
IV-D-224	Frank J. Visser County of Oswego Department of Public Works Fulton, New York
IV-D-225	EPA Regional Administrator, Region II New York, New York
IV-D-226	Wayne Goode Energy and Environmental Committee Missouri Senate
IV-D-227	Rose A. Menyes, Brian C. Stock The Lung Association Windsor, Ontario

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-228	J. Leonard Ledbetter Georgia Department of Natural Resources Atlanta, Georgia
IV-D-229	John J. Henry The City of Revere Revere, Massachusetts
IV-D-230	Mary E. Hurley The City of Springfield Springfield, Massachusetts
IV-D-231	Thomas M. Hendersen Broward County Board of County Commissioners Fort Lauderdale, Florida
IV-D-232	William S. Becker U. S. Small Business Administration Washington, D. C.
IV-D-233	Douglas G. Viafora Scientific Engineering Instruments, Inc. Sparks, Nevada
IV-D-234	David J. Zaber National Wildlife Federation Ann Arbor, Michigan
IV-D-235	R. N. Mosher American Boiler Manufacturers Association Arlington, Virginia
IV-D-236	William J. Nicholson Potlatch Corporation San Francisco, California
IV-D-237	Charles D. Malloch Monsanto Company St. Louis, Missouri

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-238	Daryl Ditz Cornell Waste Management Institute Ithaca, New York
IV-D-239	Ross Glasgow Canadian Embassy Washington, D. C.
IV-D-240	Elizabeth Greene State of New Hampshire House of Representatives Concord, New Hampshire
IV-D-241	Leigh Sanderson Private Citizen Huntsville, Alabama
IV-D-242	Leonard D. Verrelli State of Alaska Department of Environmental Conservation Juneau, Alaska
IV-D-243	John R. McKernan State of Maine Office of the Governor Augusta, Maine
IV-D-244	Craig Volland Spectrum Technologists Kansas City, Missouri
IV-D-245	Air Pollution Control Association Dallas, Texas
IV-D-246	Joseph R. Williams State of Washington, Department of Ecology Olympia, Washington
IV-D-247	George T. Musler State of New Hampshire, House of Representatives Concord, New Hampshire

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-248	Julino Cesar Roman Officina del Alcalde, Gobierno Municipal de Aguada Aguada, Puerto Rico
IV-D-249	W. Douglas Scamman State of New Hampshire, House of Representatives Concord, New Hampshire
IV-D-250	Kenneth M. MacAskill State of New Hampshire, House of Representatives Concord, New Hampshire
IV-D-251	Caroline L. Gross State of New Hampshire, House of Representatives Concord, New Hampshire
IV-D-252	Bob Kirk City of Dyersburg Dyersburg, Tennessee
IV-D-253	Michael Horn Private Citizen Taos, New Mexico
IV-D-254	L. W. Eberley Northern States Power Company Minneapolis, Minnesota
IV-D-255	Michael A. Gagliardo Northeast Maryland Waste Disposal Authority Baltimore, Maryland
IV-D-256	James Self City of Waxahachie Waxahachie, Texas

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-257	Gary L. Boley Combustion Engineering Windsor, Connecticut
IV-D-258	E. O. Morris Gardinier, Inc. Riverview, Florida
IV-D-259	Paul J. O'Connor St. Lawrence County Solid Waste Disposal Authority Ogdensburg, New York
IV-D-260	Dave Nelson Pope-Douglas Solid Waste Board Alexandria, Minnesota
IV-D-261	Kenneth F. Sheehan Public Works Division Nashua, New Hampshire
IV-D-262	Richard W. McCain Lake County Fish & Game Protective Association Lake County, Indiana
IV-D-263	Christopher Morgan Private Citizen Concord, New Hampshire
IV-D-264	N. C. Vasuki Delaware Solid Waste Authority Dover, Delaware
IV-D-265	Dominick M. Di Gangi Greater Bridgeport Regional Solid Waste Advisory Board Bridgeport, Connecticut
IV-D-266	Dayle E. Johnson Quandrant Co. Fergus Falls, Minnesota

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TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-267	Phillip M. Ringrose Public Works - Utility Services Tacoma, Washington
IV-D-268	Charles E. Roos National Recovery Technologies Nashville, Tennessee
IV-D-269	Reuter Resource Recovery Hopkins, Minnesota
IV-D-270	Ronald O. Webb Environmental Systems Corporation Knoxville, Tennessee
IV-D-271	Gary M. Garfield Town of Litchfield Litchfield, New Hampshire
IV-D-272	Linda G. Stuntz Department of Energy Washington, D. C.
IV-D-273	Argonne National Laboratory University of Chicago Chicago, Illinois
IV-D-274	Dwight Kessel The Metropolitan Knox Solid Waste Authority, Inc. Knox County, Tennessee
IV-D-275	Michelle Slovak, Tova Kantrowitz, Janice Cardinale, Jesse Wilson, Martin Nagel, Jeffrey Kerner City of Long Beach Long Beach, New York
IV-D-276	Donald W. Coleman, Donald J. Belcourt, Neil A. Sieminski Town of Candia Office of the Selectman Candia, New York

Continued

TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-277	Martin W. Walsh, Jr. State of Maryland Department of the Environment Baltimore, Maryland
IV-D-278	Harriet Weinmann Slive Slive & Slive Cleveland, Ohio
IV-D-279	Michael Mains Maine Energy Recovery Company Biddeford, Maine
IV-D-280	John S. Nordin Western Research Institute Laramie, Wyoming
IV-D-281	Richard Schneider Public Relations Consultant Fairfield, Iowa
IV-D-282	Sue M. Briggum Waste Management, Inc. Washington, D. C.
IV-D-283	John S. Nordin Western Research Institute Laramie, Wyoming
IV-D-284	Elizabeth C. Brown State of Connecticut House of Representatives Hartford, Connecticut
IV-D-285	James Self City of Waxahachie City Council Waxahachie, Texas
IV-D-286	Trudy R. Gasteazoro Waste to Energy Association Minnesota

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TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-287	Durwood S. Curling Southeastern Public Service Authority of Virginia Chesapeake, Virginia
IV-D-288	James Sahagian Catrel New York Edison, New York
IV-D-289	Ronnie Crochet Crochet Equipment Company, Inc. Baton Rouge, Louisiana
IV-D-290	Sue M. Briggum Waste Management, Inc. Washington, D. C.
IV-D-291	G. Michael Pope Entech Corporation Ottumwa, Iowa
IV-D-292	D. H. Trott Crossbow, Inc. Cincinnati, Ohio
IV-D-293	Jerry Raque, Bill Sego Falls City RDF, Inc. Louisville, Kentucky
IV-D-294	Carl W. Strickler Reading Energy Company Philadelphia, Pennsylvania
IV-D-295	G. Michael Pope Entech Corporation Ottumwa, Iowa
IV-D-296	David S. Beachler Westinghouse Electric Corporation Pittsburgh, Pennsylvania

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TABLE 2-1 (CONTINUED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-297	Ann R. Torr New Hampshire House of Representatives Concord, New Hampshire
IV-D-298	Christine Tritter Private Citizen Lisbon, Ohio
IV-D-299	Michael Hill New Hampshire House of Representatives Concord, New Hampshire
IV-D-300	William S. Bartlett, Jr. New Hampshire House of Representatives Concord, New Hampshire
IV-D-301	Caroline A. Anderson Private Citizen Shaker Heights, Ohio
IV-D-302	J. Patrick Mulcahy Eveready Battery Company, Inc. St. Louis, Missouri
IV-D-303	William J. Nicholson Potlatch Corporation San Francisco, California
IV-D-304	Stanley E. Shafer Board of County Commissioners Wray, Colorado
IV-D-305	Michael Mains Maine Energy Recovery Company Biddeford, Maine
IV-D-306	George Wallis Duracell, Inc. Needham, Massachusetts

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TABLE 2-1 (CONCLUDED). LIST OF COMMENTERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Commenter and Affiliation
IV-D-307	Louis E. Azzato Foster Wheeler Corporation Clinton, New Jersey
IV-D-308	William J. Nicholson Potlatch Corporation San Francisco, California
IV-D-309	William J. Nicholson Potlatch Corporation San Francisco, California

TABLE 2-2. LIST OF PUBLIC HEARING SPEAKERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Speaker and Affiliation
IV-F-1.1	David Minott Alternative Resources, Inc.
IV-F-1.2	Daniel Greenbaum Massachusetts Department of Environmental Protection
IV-F-1.3	Jonathan Bilmes Bristol Resource Recovery Facility Operating Committee
IV-F-1.4	Nancy Seidman Northeast States for Coordinated Air Use Management
IV-F-1.5	Mike Maines Maine Energy Recovery Company Biddeford, Maine
IV-F-1.6	Kent Burton Institute of Resource Recovery
IV-F-1.7	Lee Casey Department of Solid Waste Management of Metropolitan Dade County
IV-F-1.8	Harlan Doliner Town of North Kingstown, Rhode Island
IV-F-1.9	Renee Robins Conservation Law Foundation of New England
IV-F-1.10	Ben Harvey Waste Recyclers Council
IV-F-1.11	Charles Eggers Occidental Energy from Waste Plant Niagara Falls, New York

Continued

TABLE 2-2 (CONTINUED). LIST OF PUBLIC HEARING SPEAKERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Speaker and Affiliation
IV-F-1.12	William Darcy Connecticut Resources Recovery Authority
IV-F-1.13	Beverly Rodeschin State Representative from New Hampshire, Science Technology and Energy Committee
IV-F-1.14	Daniel O'Neil Town of New Port, New Hampshire
IV-F-1.15	Robert Jackson City of Claremont, New Hampshire
IV-F-1.16	John Cook New Hampshire/Vermont Solid Waste Project
IV-F-1.17	Carl Hirths New Hampshire/Vermont Solid Waste Project
IV-F-1.18	Tim Martin Greenpeace
IV-F-1.19	Edward Davis Division of Air Resources New York State Department of Environmental Conservation
IV-F-1.20	Robert Bauman City of Boston, Massachusetts
IV-F-1.21	Charles Adler Private Citizen
IV-F-1.22	Amy Perry Massachusetts Public Interest Research Group
IV-F-1.23	Cathy Fontaine Citizens Against Pollution East Bridgewater, Massachusetts

Continued

TABLE 2-2 (CONTINUED). LIST OF PUBLIC HEARING SPEAKERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Speaker and Affiliation
IV-F-1.24	Charles Spencer Advocates for a Safe Environment of Western Massachusetts
IV-F-1.25	Robert Loring Private Citizen
IV-F-1.26	Ron Ford Concord Regional Solid Waste Resource Recovery Cooperative
IV-F-1.27	Patricia Anderson American Lung Association of Massachusetts
IV-F-1.28	Carl Hanson Bridgewater Residents Against a Contaminated Environment Bridgewater, Massachusetts
IV-F-1.29	Charles Kitson SEMASS Partnership Rochester, Massachusetts
IV-F-1.30	Charles Roos National Recovery Technologies Nashville, Tennessee
IV-F-1.31	Robert Collins Clean Water Actions
IV-F-1.32	Frances Hopcroft Northeast Solid Waste Committee North Andover, Massachusetts
IV-F-1.33	Frank Palermo JWP, Incorporated
IV-F-1.34	Terence Duran Catrel Edison, New Jersey
IV-F-1.35	CSI Resource Systems, Inc.

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TABLE 2-2 (CONTINUED). LIST OF PUBLIC HEARING SPEAKERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Speaker and Affiliation
IV-F-2.1	Miriam Marcus Private Citizen
IV-F-2.2	Maryann Angelini Private Citizen
IV-F-2.3	R. H. Bernstein Montgomery County Solid Waste Dayton, Ohio
IV-F-2.4	Trudy Gasteazoro Minnesota Waste Energy Association
IV-F-2.5	Bella Marshall Greater Detroit Resource Recovery
IV-F-2.6	Kathleen Aterno Clean Water Action
IV-F-2.7	Kent Burton Institute of Resource Recovery
IV-F-2.8	Michael Cousino Olmsted County, Minnesota
IV-F-2.9	Brenda Liveoak Oakwood Environmental Concerns
IV-F-2.10	Tom Stevens Private Citizen
IV-F-2.11	W. Reed Madden Green County, Ohio
IV-F-2.12	Clifton Loveland Hampton, Virginia, Refuse-Fired Steam Plant
IV-F-2.13	Patricia Willis Private Citizen
IV-F-2.14	Millard A. Cutler Friends in Unity with Nature

Continued

TABLE 2-2 (CONTINUED). LIST OF PUBLIC HEARING SPEAKERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Speaker and Affiliation
IV-F-2.15	Curt Kemmppainen Governmental Refuse Collection Disposal Association
IV-F-2.16	Bruce Liles Private Citizen
IV-F-2.17	Unidentified Speaker
IV-F-2.18	Carol Izant Grassroots Detroit Alliance for Solid Waste Solutions
IV-F-2.19	Ralph Franklin Private Citizen
IV-F-2.20	David Watson Cass Corridor of Concerned Residents
IV-F-2.21	Dennis Summers Private Citizen
IV-F-2.22	Harold Stokes Private Citizen
IV-F-2.23	Joan D'Argo Greenpeace
IV-F-2.24	Saulius Simoliunas Sanitary Chemists & Technicians Association
IV-F-2.25	Jesse Enriquez Private Citizen
IV-F-2.26	Rick Coronado Clean Water Alliance
IV-F-2.27	Marcus Maxmad Circle of Flight
IV-F-2.28	Wilburn Henry Bishops Private Citizen

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TABLE 2-2 (CONTINUED). LIST OF PUBLIC HEARING SPEAKERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Speaker and Affiliation
IV-F-2.29	Bradford White Observation Balloon Newsletter
IV-F-2.30	Dennis Minks City of Louisville, Kentucky
IV-F-2.31	David Hales Michigan Department of Natural Resources
IV-F-2.32	Kay Jones Greater Detroit Resource Recovery Authority
IV-F-2.33	Sharon Howell Detroit Area Greens
IV-F-2.34	James Boggs Private Citizen
IV-F-2.35	Paul Stark Detroit Area Greens
IV-F-2.36	Lauren Sargent Huron Valley Greens
IV-F-2.37	Christine Koenig Detroit Area Greens
IV-F-2.38	Harold Stokes Private Citizen
IV-F-2.39	Karen Kendrick-Hands East Michigan Environmental Action Council and Grosse Pointe Citizens for Recycling
IV-F-2.40	Alex Sagady American Lung Association of Michigan
IV-F-2.41	Allen Greenberg Air Pollution Control Division Wayne County, Michigan

Continued

TABLE 2-2 (CONTINUED). LIST OF PUBLIC HEARING SPEAKERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Speaker and Affiliation
IV-F-2.42	William Drake for I. Varga Representative - Third District Detroit, Michigan
IV-F-2.43	Mark Adams Waste Oil Action
IV-F-2.44	Tom Adams Private Citizen
IV-F-2.45	Paul Vial Recycling Detroit
IV-F-2.46	Eloise Crofty Private Citizen
IV-F-2.47	Ann Woiwode Sierra Club, Michigan
IV-F-2.48	Gerald Miley Oakland County Department of Public Works
IV-F-2.49	Marilyn Gilbert WEAVE
IV-F-2.50	Alex Johnson Private Citizen
IV-F-2.51	Rose Menyes Lung Association of Windsor and Essex County Canada
IV-F-2.52	Joan Lintelman League of Women Voters
IV-F-2.53	Kristine Olsson Environmental Advocates Students Organization

Continued

TABLE 2-2 (CONTINUED). LIST OF PUBLIC HEARING SPEAKERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Speaker and Affiliation
IV-F-2.54	James Musso Northern States Power Company, Wisconsin
IV-F-2.55	Eden Winter Private Citizen
IV-F-2.56	Manuel Rottenberg General Mill Supply of Detroit
IV-F-2.57	Judith Davies Private Citizen
IV-F-2.58	Mary Ban Sumpter Environmental Review Board
IV-F-2.59	Donald Issac Private Citizen
IV-F-2.60	Wilburn Bishops Private Citizen
IV-F-2.61	Andy Duncan Private Citizen
IV-F-2.62	Beth Miller Private Citizen
IV-F-3.1	Jay Willenberg Washington Department of Ecology
IV-F-3.2	Mike Ruby Environmetrics
IV-F-3.3	Kent Burton Institute of Resource Recovery
IV-F-3.4	Roger Etter John Zink Company
IV-F-3.5	Lee Eberly Northern States Power, Minneapolis

Continued

TABLE 2-2 (CONCLUDED). LIST OF PUBLIC HEARING SPEAKERS ON PROPOSED STANDARDS OF PERFORMANCE AND EMISSION GUIDELINES FOR MUNICIPAL WASTE COMBUSTORS

Docket Item No.	Speaker and Affiliation
IV-F-3.6	Bill Chesseman Channel Corporation
IV-F-3.7	Diana Gale Seattle Solid Waste Utility
IV-F-3.8	Jon Sandsted Alaska Department of Conservation
IV-F-3.9	Kent Flaherty Entech Corporation
IV-F-3.10	William J. Nicholson Corporate Energy Services, Potlatch Corporation
IV-F-3.11	Dr. Jeffrey Morris Sound Resource Management Group
IV-F-3.12	Ann Robinson League of Women Voters
IV-F-3.13	Pamela Liesten Washington Toxic Coalition

2.3 LIST OF ACRONYMS AND ABBREVIATIONS FOR UNITS OF MEASURE

APCD	air pollution control device
ANPRM	advanced notice of proposed rulemaking
ASME	American Society of Mechanical Engineers
ATSDR	Agency for Toxic Substances and Disease Registry
BACT	best available control technology
BID	Background Information Document
CAA	Clean Air Act
CARB	California Air Resources Board
CEM	continuous emission monitor
CFC	chlorofluorocarbon
CO	carbon monoxide
CO_2	Carbon dioxide
COM	continuous opacity monitor
DAS	data acquisition system
DSI	dry sorbent injection
EPA	U. S. Environmental Protection Agency
ESP	electrostatic precipitator
FAA	Federal Aviation Administration
FBC	fluidized-bed combustor
FDA	Food and Drug Administration
FF	fabric filter
FGR	flue gas recirculation
GCP	good combustion practice
HCl	hydrogen chloride
HEM	Human Exposure Model
IRFA	Initial Regulatory Flexibility Analysis
ISC	Industrial Source Complex
ISCST	Industrial Source Complex Short-Term Model
LAER	lowest achievable emission rate
LLRW	low level radioactive waste
MACT	maximum available control technology
MIR	maximum individual lifetime risk
MSW	municipal solid waste
MWC	municipal waste combustor

NAAQS	national ambient air quality standard
Na_2	sodium sulfide
NESHAP	national emission standards for hazardous air pollutants
NO_x	nitrogen oxides
NRC	Nuclear Regulatory Commission
NSPS	new source performance standards
NSR	new source review
OSHA	Occupational Safety and Health Administration
OSW	Office of Solid Waste
O_2	oxygen
PCB	polychlorinated biphenyls
PIC	products of incomplete combustion
PM	particulate matter
PM_{10}	particulate matter smaller than 10 microns
PSD	prevention of significant deterioration
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RDF	refuse-derived fuel
RFA	Regulatory Flexibility Act
RIA	Regulatory Impact Analysis
SCA	surface collection area
SCR	selective catalytic reduction
SD	spray dryer
SIC	Standard Industrial Classification
SIP	State implementation plan
SNCR	selective noncatalytic reduction
SO_2	sulfur dioxide
SO_x	sulfur oxides
TEF	toxic equivalency factor
THC	total hydrocarbons
TLV	threshold limit value
TSCA	Toxic Substances Control Act

ABBREVIATIONS FOR UNITS OF MEASURE

Btu = British thermal unit

^{o}C = degrees Celsius

dscf = dry standard cubic foot (14.7 psi, $68^{o}F$)

dscm = dry standard cubic meter (14 psi, $68^{o}F$)

^{o}F = degrees Fahrenheit

ft^3 = cubic foot

gr = grains

HHV = higher heating value

J = joules

kg = kilogram

lb = pound

Mg = megagram

MW-hrs = megawatt-hours

m^3 = cubic meter

mg = milligrams

ng = nanogram

ppm = parts per million

ppmv = parts per million by volume

psi = pounds per square inch

sec = second

tpd = tons per day

tpy = tons per year

μg = microgram

yr = year

$/Mg = dollars per megagram

$/ton = dollars per ton

3.0 NEW SOURCE PERFORMANCE STANDARDS - MUNICIPAL WASTE COMBUSTOR EMISSIONS

3.1 SELECTION OF SOURCE CATEGORY

Comment: Four commenters (IV-F-2.3, IV-D-111, IV-D-113, IV-D-195) challenged the selection of MWC's as a major emission source for regulation. The commenters argued that emissions from MWC's are insignificant compared to those from utility coal boilers and other sources.

Response: Municipal waste combustors have been considered an important source category of concern for many years. They were the second combustion source to be regulated under Section 111 of the CAA with the 1971 proposal and subsequent promulgation of NSPS for incinerators (Subpart E). Municipal waste combustors warrant regulatory attention because of their complex mixture of air emissions and the potential public health impacts. In addition, the MWC industry is experiencing rapid growth due to the increasing restrictions and limited space availability for landfilling. At proposal, there were estimated to be 210 MWC plants (450 individual MWC's) with a capacity of 95,000 Mg/day (105,000 tpd) in operation or under construction. It is predicted that in the next 5 years construction will commence on over 60 new MWC plants (over 150 individual MWC's) with an additional capacity of about 50,000 Mg/day (55,000 tpd). Some of these new MWC's will be located in high population areas. Municipal waste combustors are significant sources of air pollution at the individual plant level and could be a major source of emissions on a national basis if not adequately controlled. It was projected that in the absence of an NSPS, new MWC's could emit over 90,000 Mg/yr (100,000 tpy) of MWC acid gases (primarily SO_2 and HCl), about 7,500 Mg/yr (8,300 tpy) PM, as well as MWC organics. The NSPS will reduce combined emissions of these pollutants to about 9,300 Mg/yr (10,300 tpy).

The standards and guidelines currently being promulgated affect MWC unit with capacities greater than 225 Mg/day (250 tpd). They will control about 100 existing MWC plants (200 MWC's units) and 30 new MWC plants (70 MWC units) within the next 5 years. As described in Chapter 1, standards and guidelines to cover the remaining smaller MWC units will be promulgated within 2 years.

Comment: One commenter (IV-F-3.6) noted that no definition for "municipal waste combustion" was given in the Federal Register.

Response: Municipal waste combustion is the burning of MSW in any type of equipment, including heat recovery and nonheat recovery units. A definition of MWC is included in the final NSPS.

Comment: One commenter (IV-D-210) asked why the definition of MSW specifies the waste must contain greater than 50 percent waste consisting of paper, wood, yard waste, etc., when burning any amount of MSW qualifies a facility to be regulated by the standard. Another commenter (IV-D-107) suggested changing the definition of MWC to read "which combusts MSW or any combination of MSW and an alternative fuel" to clarify that the NSPS will apply to facilities that combust any MSW and not just to dedicated MWC's or those that burn more than 50 percent MSW.

Two commenters (IV-D-146, IV-D-246) said in the definition of MSW it is not clear whether the 50 percent applies to a daily, monthly, or design average.

Response: Based on the comments received, the Agency reviewed the definition of MSW and concluded it was unclear, particularly when applied to cofiring situations. The definition of MSW has been revised in the final standard and the 50-percent content requirement has been deleted. However, consistent with the CAA Amendments of 1990, a provision has been added to exclude cofired combustors that fire less than 30 percent MSW (by weight) from the standards.

Comment: One commenter (IV-D-108) said the term "refuse" in the definition of MSW is not defined. The commenter asked why the existing definition of solid waste in 40 CFR 60.51 is not being used to describe MSW.

Response: The proposed definition of MSW was similar to the definition of solid waste given in 40 CFR 60.51. However, the definition has been modified in the final standard in response to public comments requesting clarification on how to interpret the 50-percent content requirement and on what particular materials are included, and to be consistent with the CAA Amendments of 1990.

Comment: Some commenters thought the source category had been defined too broadly. One commenter (IV-D-159) stated the broad definitions of MWC and MSW include for regulation many types of combustors without proper consideration of such factors as size, technology, and application. In particular, he felt many very small modular facilities typically used in medical, industrial, or commercial uses would have to shutdown unless the rules are modified. The commenter thought the definition of MSW should be limited to designate waste streams from various generators that are handled at a centralized facility (rather than at a small on-site combustor). Municipal waste combustors should be defined as facilities which combust such waste streams. Two commenters (IV-D-108, IV-D-169) thought the development of the proposed standard did not address industrial or institutional incinerators whose waste includes MSW or could be classified as MSW under the broad definition proposed. One commenter (IV-D-232) expressed concern that industrial wastes might inadvertently be covered by the broad definition of MSW. One (IV-D-237) recommended industrial combustors which handle self-generated solid waste be exempt from the standards. On the other hand, two commenters (IV-F-3.8, IV-D-242) urged EPA to extend the rules, or to develop similar rules, to apply to combustion of all nonregulated industrial and commercial wastes.

Three commenters (IV-D-122, IV-D-190, IV-D-235) thought that the definition of municipal-type solid waste should be altered to read "construction/demolition, hazardous/nonhazardous, medical and infectious wastes, and sewage sludge are not considered MSW." One commenter (IV-D-102) opposed the rules because they would prematurely place restrictions on the medical waste incinerators before EPA develops a comprehensive regulatory scheme for medical waste disposal, which is expected in 1991. The commenter suggested deferring the regulation of medical waste combustion until the ATSDR report on medical waste is completed. Others (IV-F-3.2, IV-D-64, IV-D-97, IV-D-108, IV-D-149, IV-D-202, IV-D-221) also thought hospital or medical waste should not be covered. Two commenters (IV-D-210, IV-D-213) asked whether the standards would apply to incinerators at hospitals that combust general and medical waste. One (IV-D-210) encouraged EPA to include for regulation all medical incinerators except those that are exclusively crematoriums. Another commenter (IV-D-282) thought medical waste incinerators that combust greater than 50 percent MSW should be subject to the materials separation requirements.

Response: The final standards include a revised definition of MSW. Municipal solid waste includes household, commercial, and institutional discards. Industrial process or manufacturing waste are excluded from the definition of MSW. Some other specific types of waste (such as wood pallets, construction/demolition wastes, sewage sludge, and automobiles) that are not typically in MSW are also excluded by the definition. Furthermore, consistent with the CAA Amendments of 1990, combustors that fire fuel streams composed of 30 percent or less MSW or hospital wastes (by weight, daily basis) are exempt from the emission limits. This will exempt some industrial and commercial facilities that co-fire MSW with other non-MSW fuels. Since the standards being promulgated covered only MWC units with capacities larger than 225 Mg/day (250 tpd), very few medical waste combustors would be covered. As directed by Section 129 of the CAA Amendments of 1990, standards for MWC's with capacities below 225 Mg/day (250 tpd) will be promulgated within 2 years. Section 129 also directs EPA to establish standards for medical waste combustors.

Comment: Many commenters (see Section 6.2) thought facilities that cofire paper and other nontoxic source separated MSW components with solid fuels should be excluded. One commenter (IV-D-148) said the definition of MSW should state materials recovered from the solid waste stream for reuse, recycling, composting, or combustion are not considered to be MSW and units combusting these materials are not considered to be MWC's. The commenter thought that whether RDF is included as MSW should be based upon explicit determination that combustion of RDF leads to similar emissions as combustion of the entire mixed solid waste stream. Other commenters (IV-D-74, IV-D-148, IV-D-174, IV-D-236) felt the definition of MSW should specifically exclude source separated, clean, combustible fuels such as mixed wastepaper and wood pallets.

Response: If the separated materials are discards from residential, commercial, or institutional facilities as specified in the definition of MSW, then they are regulated as any other component or mixture of MSW. Mixed wastepaper and RDF are considered MSW. Wood pallets are specifically excluded from the definition of MSW in the final standards. The standards currently being promulgated affect only MWC's with capacities greater than 225 Mg/day (250 tpd), so combustors firing small amounts of MSW or source-separated MSW components are not covered. Additionally, consistent with the CAA Amendments of 1990, cofired combustors that fire fuel streams composed of 30 percent or less MSW by weight (daily basis) are not subject to the emission limits.

Comment: One commenter (IV-D-212) stated the proposed MWC regulations are inconsistent with the recent regulations proposed for MSW landfills under RCRA (FR 53 33314-33422, August 30, 1988) in defining the source category. The "MSW landfill" definition exempts "industrial solid waste landfills that may receive office, sanitary, or cafeteria wastes generated at the site." The commenter supported the technical rationale for the exemption and said analogous reasoning should be applied to the case where industrial boilers burn on-site generated wastes. He felt EPA lacks sufficient information to develop sound regulations for industrial boilers burning small amounts of MSW or MSW-type materials. He added that if industrial boilers are required to meet MWC standards for doing so, the facilities may begin relying on already overloaded municipalities for waste disposal.

Four commenters (IV-D-158, IV-D-174, IV-D-212, IV-D-221) agreed the definition of MWC should exclude facilities that burn internally-generated wastes as an auxiliary fuel.

Response: The definition of MSW in this regulation does include site-generated wastes such as office or cafeteria wastes. However, the standards currently being promulgated apply only to MWC's with unit capacities greater than 225 Mg/day (250 tpd), and so will not cover many industrial or commercial boilers and other combustors that commonly burn very small amounts of internally-generated wastes. Additionally, the definition of MSW in 40 CFR 60.51a excludes combustors that burn industrial process or manufacturing wastes only.

Comment: One commenter (IV-D-80) asked whether automobile shredder fluff is included in the definition of municipal-type solid waste. He felt it should not be because the fluff could be considered a demolition waste, less than 50 percent of the fluff is composed of the types of refuse specified in the definition and automobile shredding is an industrial process.

Response: Automobiles, and thus automobile shredder fluff, are not considered part of the typical municipal waste stream and have been excluded from the definition of MSW in the final standards.

Comment: Two commenters (IV-D-146, IV-D-246) thought construction and demolition debris should be added to the definition of solid waste. They said their State is establishing programs for separating and recycling these materials.

Response: Construction and demolition wastes are not included in the definition of MSW because they are not considered typical components of the municipal waste stream. The Agency encourages the recycling of all reusable materials whether or not they are classified as MSW.

Comment: One commenter (IV-D-182) asked EPA to specifically exclude cement kilns co-firing MSW or RDF from the definition of MWC.

Response: Cement kilns that combust a fuel stream containing more than 30 percent MSW (by weight) and are above 225 Mg/day (250 tpd) capacity are covered by the standards. The intent of the standards is to control emissions from the burning of MSW, and, therefore, all types of combustor designs are included. Many cement kilns, however, will be below these cutoffs and will not be covered under these standards.

3.2 SELECTION OF DESIGNATED POLLUTANT

Comment: Several commenters (IV-D-116, IV-D-137, IV-D-149, IV-D-150, IV-D-155, IV-D-257) felt it was unnecessary and inappropriate to establish the new classification of pollutants "MWC emissions" for regulation under the CAA. They pointed out that MWC emissions are comprised of MWC metals, MWC organics, and MWC acid gases, all of which are regulated individually. Therefore, it is redundant to establish a separate category of MWC emissions. Two commenters (IV-D-116, IV-D-155) added that the components of MWC emissions are unrelated in their formation, emission, control, and environmental effect. Two commenters (IV-D-149, IV-D-150) objected to the terms MWC organics and MWC acid gases when it is dioxins/furans, SO_2, and HCl that are being regulated, and three commenters (IV-D-149, IV-D-150, IV-D-283) objected to the term MWC metals when it is PM that is being regulated. One commenter (IV-D-257) thought if it is appropriate to regulate emissions of HCl and dioxins/furans from MWC facilities, then they should be specifically designated as pollutants for regulation under the CAA. This designation would permit the regulation of other sources of these pollutants. One commenter (IV-D-108) said the category MWC emissions is undefined in the rule. He asked specifically whether PM and NO_x were included.

Another commenter (IV-D-164) concurred with the EPA's approach to regulate "MWC emissions" and to subcategorize the MWC emissions into organics, metals, and acid gases. However, he asked why NO_x is not included as a subcategory and why NO_x is considered a pollutant from new but not existing sources.

Three commenters (IV-D-116, IV-D-155, IV-D-257) expressed concern that adoption of MWC emissions as a regulated pollutant could require all other sources which emit metals, organic compounds, and acid gases to be subject to requirements associated with MWC emissions such as PSD permitting and NSR requirements. One commenter (IV-D-108) questioned whether sources other than MWC's could emit "MWC" emissions.

Response: "Municipal waste combustion emissions" is a term used to describe the composite mixture of compounds emitted from MWC's. It generally consists of three classes of pollutants: MWC metals, MWC acid gases, and MWC organics. The superclass of MWC emissions was selected as the designated pollutant, rather than designating individual subclasses, to emphasize and encompass the numerous and diverse pollutant emissions. Although the components of MWC emissions may be unrelated in some ways, they are all generated in the same facility from the burning of municipal waste. Furthermore, the applied air pollution control technology is an integrated system which controls all three subclasses. Therefore, MWC emissions have been designated as one pollutant rather than as three subclasses.

Under Section 111, pollutants may be designated if they contribute to health and/or welfare impacts and are not regulated under Sections 108 to 110 or Section 112 of the CAA. The pollutant MWC emissions fits these requirements and is designated for health effects reasons. However, in order to ensure that the components of MWC emissions (MWC acid gases, MWC metals, and MWC organics) are controlled, emission limits for monitoring and compliance purposes include some criteria pollutants regulated under Sections 108 to 110, specifically there are SO_2, CO, and PM limits. These pollutants can be readily measured and indicate control of the other pollutants that are part of MWC emissions. In particular, SO_2 emissions limits (along with HCl limits) ensure MWC acid gas control. Particulate matter emission limits ensure MWC metals control without testing for each and every metal. And CO is one of several emissions parameters monitored to assure MWC organics control. This is a much more practical approach than setting limits for the hundreds of individual compounds in MWC emissions.

The standards currently being promulgated include NO_x limits for new MWC units larger than 225 Mg/day (250 tpd) capacity. However, under Section 129 of the CAA Amendments of 1990, NO_x limits will also be considered for existing MWC's and for units smaller than 225 Mg/day (250 tpd). Revised standards and guidelines for MWC units larger than 225 Mg/day (250 tpd) will be promulgated within 1 year, and those for MWC units smaller than 225 Mg/day (250 tpd) will be promulgated within 2 years.

Municipal waste combustion emissions can only be emitted from MWC's. Acid gases, organics, and metals emitted from other types of stationary sources are not considered "MWC emissions" and therefore the sources emitting them would not be subject to PSD or NSR requirements in terms of this regulation.

Comment: One commenter (IV-F-2.6) felt that emissions of all toxic chemicals should be regulated.

Response: This regulation is a Section 111 action not a Section 112 action. As stated in the ANPRM (52 FR 25339, July 7, 1987) and the preamble to the proposed standards (54 FR 52251, December 20, 1989), it was decided to regulate MWC's under Section 111 rather than Section 112 of the CAA prior to proposal of these standards. While MWC emissions may reasonably be anticipated to contribute to endangerment of public health and welfare, the range of health and welfare effects and the uncertainties in the cancer risk estimates did not warrant listing MWC emissions as a hazardous air pollutant under Section 112. Furthermore, Section 112 could not be used to address particular subgroups of emissions including HCl and lead, which could be addressed under Section 111. And, Section 111(d) permits more thorough evaluation of MWC's at the State level.

Section 111 standards are based on technology whereas Section 112 standards are based on the health effects of specific toxics. Under Section 111 of the CAA, standards of performance are to reflect the emission level "achievable through application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." These standards reflect the best demonstrated technology and are designed to ensure continuous control of the three subclasses of MWC emissions (MWC acid gases, MWC organics, and MWC metals). Measurement of a limited number of pollutants and parameters will adequately assure the technology is installed and operated to control the range of pollutants in MWC emissions. It would be impractical, and in some cases impossible, to set emission limits and measure for each individual pollutant given current information.

3.3 SELECTION OF AFFECTED FACILITIES

3.3.1 Emission Sources Covered

Comment: One commenter (IV-D-108) thought the affected facility should be defined to specifically exclude facilities disposing of hospital or medical waste and units with capacities of 9 Mg/day (10 tpd) or less. Another commenter (IV-D-97) requested a 45 to 90 Mg/day (50 to 100 tpd) minimum capacity threshold in order to exclude hospital incinerators. (Additional comments recommending small size cutoffs are contained in Section 3.5.5.)

Response: Consistent with Section 129 of the CAA Amendments of 1990, the standards currently being promulgated affect only MWC's with capacities above 225 Mg/day (250 tpd). This will exclude the vast majority of hospital or medical waste combustors. Furthermore, consistent with section 129, combustors that combust primarily segregated medical waste are excluded from today's standards. Standards for MWC's with capacities below 225 Mg/day (250 tpd) and medical waste combustors will be promulgated within 2 years as directed by the CAA Amendments of 1990.

Comment: One commenter (IV-D-122) stated the standards should not apply during periods when a MWC is not combusting MSW, for example, when an RDF unit is burning oil rather than RDF.

Response: The standards only apply when a MWC is combusting MSW or a mixture of wastes and fuels containing MSW. During periods when only fossil fuels or other non-MSW materials are being fired a unit does not have to comply with the MWC standards.

Comment: One commenter (IV-D-122) said combustors that are already regulated under RCRA, or other more stringent NSPS should be exempt from the MWC regulation.

Response: Some MWC's may be regulated under Subparts Da or Db as well as this NSPS. Such combustors will have to comply with this regulation as well as Subpart Da or Db. The RCRA regulations the commenter refers to are for hazardous waste incinerators. If a combustor burns hazardous wastes regulated under Subtitle C that is not MSW it would comply with the RCRA regulations rather than this NSPS. Sources that are subject to more than one rule are required to meet all applicable standards and the more stringent set in the case of an overlap.

Comment: Two commenters (IV-F-2.40, IV-F-3.1) said that opacity limitations or other regulations should be set for fugitive emissions such as those from ash handling and transport.

Response: The standards do not set limits for fugitive emissions. However, the site-specific training manuals required as part of GCP by the NSPS are required to include a section on proper ash handling procedures. Other planned regulatory and legislative actions will further address ash issues.

3.3.2 Affected Facility

Comment: Several commenters (IV-D-101, IV-D-104, IV-D-149, IV-D-199) supported the approach of using the aggregate capacity of all MWC units at one plant in determining facility size. One (IV-D-199) stated the history of the CAA is full of examples where operators purposely construct their facility so that it is just below applicable air pollution standards. Commenter IV-D-101 thought the aggregate capacity should include capacities of space that is left for expansion as well as the capacities of new facilities built on the same or contiguous sites.

Response: Where appropriate, aggregated capacity is being used to determine facility size because of the common practice within the MWC industry of constructing multiple MWC's at the same location and the recognition that multiple small MWC's can have the same emission impacts as a single large MWC. It would be impractical and unnecessary to consider space that is left for expansion in determining capacity. However, when a new combustor is built in the area left for capacity expansion, its capacity would be aggregated with all new combustors (i.e., constructed any time after proposal of these standards) at the site, and all such combustors would be subject to the applicable limits based on the total capacity.

Comment: One commenter (IV-F-2.3) asked for clarification on which combustors at their plant would be subject to the NSPS versus the guidelines. The plant has two combustors with a total capacity above 225 Mg/day (250 tpd), and they may add another combustor.

Response: Consistent with the CAA Amendments of 1990, the standards currently being promulgated affect only MWC units with unit capacities (not aggregate plant capacities) greater than 225 Mg/day (250 tpd) are not subject to these standards, but will be covered by separate standards which are to be promulgated within 2 years. For MWC units above 225 Mg/day (250 tpd), those combustors on which construction commenced prior to the date of proposal of the NSPS, December 20, 1989, are subject to the emission guidelines. Any new combustors on which construction commences after proposal of the NSPS are subject to the NSPS. Capacities of units subject to the guidelines and the NSPS are not added together in determining plant capacity. The NSPS applies the same standards to all combustors larger than 225 Mg/day (250 tpd) regardless of local plant capacity. The guidelines have different provisions for combustors at large versus very large plants. (See Chapter 7, Section 7.5.5 for further discussion of the guidelines plant size categories.)

3.4 MODIFICATION AND RECONSTRUCTION

Comment: Three commenters (IV-F-2.4, IV-F-3.5, IV-D-222) said the point at which an existing facility triggers NSPS during reconstruction should be reconsidered. The commenters felt the 50-percent fixed capital cost limit should be based on the construction cost of the entire MWC plant rather than the individual MWC unit.

Response: The terms of the reconstruction provision are applicable to the affected facility as it is defined in each NSPS. The affected facility in this rulemaking is the individual MWC unit. It should be noted that the affected facility is each combustor and does not include other parts of the plant such as the tipping floor, cranes, post-combustor air pollution control equipment, or ash handling equipment. These commenters are requesting that the affected facility be more broadly defined as the entire MWC plant. Under Section 111, the NSPS must apply to new sources of emissions. Generally pollutants are emitted from specific processes or pieces of equipment (e.g., a combustor) within a plant rather than from the entire plant. Since the purpose of Section 111 is to minimize emissions by application of the best demonstrated control technology (considering cost, health and environmental effects, and energy requirements), there is a presumption that a narrower, more specific, definition of the affected facility is proper. In order to promulgate the broader designation, the Agency would have to find that it would achieve greater total emission reductions or equivalent total reductions with significant other benefits such as reduced costs, energy consumption or other environmental impacts. The Agency has adequately demonstrated that the control technologies required by this NSPS can be applied at a reasonable cost to the affected facility as currently defined.

Comment: One commenter (IV-D-80) asked whether a dismantled combustor would be considered a new or existing unit if it were reassembled with new instrumentation.

Response: Mere disassembly and reassembly and/or sale of an existing MWC does not change the affected facility status from existing to new. However, under the reconstruction provision in 40 CFR 60.15, if components are replaced and their fixed capital cost exceeds 50 percent of the fixed capital cost of constructing a comparable entirely new MWC unit, then the reconstructed unit could be considered a new facility, and therefore subject to the NSPS.

3.5 SELECTION OF BEST DEMONSTRATED TECHNOLOGY FOR MUNICIPAL WASTE COMBUSTOR EMISSIONS

3.5.1 Municipal Waste Combustor Organics

Comment: One commenter (IV-D-101) said that prior to 1989 their MWC facilities with SD/FF control had achieved total dioxin/furan levels of below 10 ng/dscm (4 gr/billion dscf) at 12 percent CO_2. However, Method 23 testing at two new state-of-the-art MWC's with well designed SD/FF systems showed higher total dioxin/furan levels. One plant (Babylon) had an emission level of 22.8 ng/dscm (9.3 gr/billion dscf) (average of three tests) with individual test runs of 28.8, 26.3, and 13.3 ng/dscm (11.7, 10.7, and 5.4 gr/billion dscf). The other (Indianapolis) had an average level of 12.1 ng/dscm (4.9 gr/billion dscf), with two of the three individual test runs above 10 ng/dscm (4 gr/billion dscf). The commenter said that when expressed on the basis of TEF, dioxin/furan emissions from these facilities were relatively low (0.14 and 0.06 ng/dscm [0.06 and 0.02 gr/billion dscf]). Test results were submitted.

Other commenters (IV-D-153, IV-D-155, IV-D-184, IV-D-257) said values in the lower end of the 5 to 30 ng/dscm (2 to

12 gr/billion dscf) range could not be met by all MWC's with SD/FF systems.

Two of the commenters (IV-D-101, IV-D-155, IV-D-257) recommended that, based on these data, if EPA establishes a total dioxin/furan limit for new MWC's it should be no lower than 30 ng/dscm (12 gr/billion dscf). However, the commenters would prefer a limit of 50 ng/dscm (20 gr/billion dscf) due to the limited amount of data and the lack of data over the 20- to 30-year expected life of a typical MWC. Another commenter (IV-D-144) said that while a range of 5 to 30 ng/dscm (2 to 12 gr/billion dscf) is similar to typical emission levels for MWC's, including FBC's, the data base is limited and since NSPS are "never to be exceeded" limits, a margin for uncertainty should be included.

One commenter (IV-D-149) said their evaluation of a large MWC and a commercial biomedical MWC support dioxin/furan limits of 75 ng/dscm (31 gr/billion dscf) for large MWC plants and 30 ng/dscm (12 gr/billion dscf) for small plants. (The emission control technology on these two plants were not specified in the comment.)

Another commenter (IV-D-154) said levels in the range of 10 to 30 ng/dscm (4 to 12 gr/billion dscf) may not be achievable over a 20-year operating period and suggested the NSPS require the same level as the guidelines (125 ng/dscm [50 gr/billion dscf]). Another (IV-D-277) said the proposed range for large plants was too low and had not been demonstrated on a long-term basis.

<u>Response</u>: Test reports submitted by Commenter IV-D-101 as well as other data on SD/FF performance collected before and after proposal were analyzed. The data included tests of 10 recently built MWC's with good combustion and well designed SD/FF control systems. For 8 of the 10 facilities, average total measured outlet dioxin/furan concentrations were toward the low end of the proposed range (below 10 ng/dscm [4 gr/billion dscf] at 7 percent O_2). However, tests for 2 of the 10 facilities were above this level, the highest having individual test runs of up to 29 ng/dscm (12 gr/billion dscf)

and an average of three test runs of 23 ng/dscm (9.4 gr/billion dscf). The process data collected during the tests indicates the control equipment was well operated, and Agency test methods were used. Therefore, these data were judged representative of state-of-the-art, well operated SD/FF control systems, and there is no reason to dismiss the data as unrepresentative.

Under Section 111 of the CAA, standards of performance are to reflect the emission level "achievable through application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated." The emission limits are maximum limits not be exceeded, and must be set at a level that is achievable by all MWC's using best demonstrated technology. Therefore, in the final standards, the emission limit for large new MWC's has been set at 30 ng/dscm (12 gr/billion dscf) total dioxins/furans. It is believed that with proper maintenance and careful operation, there will be little degradation in performance over time and that 30 ng/dscm (12 gr/billion dscf) provides an adequate margin to cover future operating conditions over the life of the equipment. In summary, the data indicate that this level can be continuously achieved by properly designed, operated, and maintained combustors and control systems.

Comment: As an alternative to a total dioxin/furan limit of 30 ng/dscm (12 gr/billion dscf), some commenters (IV-D-101, IV-D-116, IV-D-144) recommended a standard of 2 ng/dscm (1 gr/billion dscf) measured as TEF. Commenter IV-D-144 said Sweden has a limit of 2 ng/dscm (1 gr/billion dscf) and after a 5-year research effort to determine if a lower limit of 0.1 ng/dscm (0.04 gr/billion dscf) TEF can be set, has not yet changed the original limit. Another commenter (IV-D-190) suggested a limit between 1 and 2 ng/dscm (0.4 and 1 gr/billion dscf) TEF and said health studies had shown levels below 2 ng/dscm (1 gr/billion dscf) had negligible community health effects.

Another commenter (IV-D-153) suggested a three-tier approach to regulating dioxin/furan emissions. First, there would be a total dioxin/furan limit. Second, if a facility did not meet that limit, they could employ a more refined analysis to determine TEF. Third, a facility would be given the option of performing a site-specific health risk assessment to demonstrate health risks of less than 1 in 1 million to the surrounding population. Another commenter (IV-D-255) said dioxin/furan control should only be required in cases where risks exceed 1 in 100,000.

Several of these commenters (IV-D-101, IV-D-154, IV-D-155, IV-D-184, IV-D-236) who favored an emission limit no lower than 30 ng/dscm (12 gr/billion dscf) also said that health effects at dioxin/furan levels of 30 ng/dscm (12 gr/billion dscf) would not be significant and pointed out that the proposed guidelines allow levels much higher than this (e.g., up to 1,000 ng/dscm [400 gr/billion dscf]) for existing MWC's without considering these levels to cause unacceptable health risks.

Response: Section 3.7 of this chapter discusses the reasons for selection of a total dioxin/furan emission limit format rather than a TEF format. For perspective, analysis of data from several MWC's show that a 30 ng/dscm (12 gr/billion dscf) total dioxin/furan limit is roughly equivalent to 0.5 ng/dscm (0.2 gr/billion dscf) measured as TEF.

With regard to the comments discussing health risks and requesting an alternative health-risk assessment approach if the dioxin/furan limit is not met, such an approach would not be consistent with Section 111 of the CAA. As stated in the ANPRM (52 FR 25339, July 7, 1987) and the preamble to the proposed standards (54 FR 52251, December 20, 1989), it was decided to regulate MWC's under Section 111 rather than Section 112 of the CAA. While MWC emissions may reasonably be anticipated to contribute to endangerment of public health and welfare, the range of health and welfare effects and the uncertainties in the cancer risk estimates did not warrant listing MWC emissions as a hazardous air pollutant under Section 112. Furthermore, Section 112 could not be used to address particular subgroups of emissions including HCl and lead, which could be addressed under Section 111. And, Section 111(d) would permit more thorough evaluation of existing MWC's at the State level. As described in the previous response, Section 111 standards are to be based on the performance of demonstrated technologies and are not based on reducing health risk to any particular target level.

Comment: One commenter (IV-D-124) said EPA should evaluate how data collected using the proposed Method 23 compares to previously collected data used to develop the standards. They recommended the final limit be no lower than 30 ng/dscm (12 gr/billion dscf) to allow for any potential biases associated with the new method.

Another commenter (IV-D-138) said Method 23 will tend to produce higher results than the ASME protocol. He said testing at one MWC showed that a level of 10 ng/dscm (4 gr/billion dscf) can be achieved if measured using the ASME protocol, but if Method 23 is specified, the standard should be set at 20 ng/dscm (8 gr/billion dscf) rather than 10 ng/dscm (4 gr/billion dscf).

Response: Method 23 is an accurate and precise test method. Some of the data used in developing the standard were collected using Method 23 while other tests used the ASME protocol, which is very similar to Method 23. In the development of Method 23, there was some concern as to whether methylene chloride or toluene should be used to rinse sample train glassware. Acetone followed by methylene chloride was used in the past under the ASME protocol. Method 23 also bases compliance test results on rinse with acetone followed by methylene chloride. In addition, it specifies a final QA rinse with toluene. However, this toluene rinse is used only to collect information, not to determine the emission level for compliance demonstration. Therefore, Method 23 would give the same or very similar results as well-conducted tests using the ASME protocol.

As explained in a previous response, the standard for new large MWC's is 30 ng/dscm (12 gr/billion dscf) total dioxins/furans.

Comment: Two commenters (IV-D-105, IV-D-117) said that the NSPS allowing small MWC's to use DSI but requiring cooling only to 230°C (450°F) at the PM control device inlet (rather than to a lower temperature) permits small plants to have essentially uncontrolled dioxin/furan emissions. The commenters cited a statement in the EPA's earlier Operational Guidance Document saying that control of toxic organic pollutants is affected by reduction in flue gas temperature. They also claimed control equipment can be operated at temperatures as low as 120°C (245°F) and cited a paper to support this claim. These commenters and another (IV-D-186) recommended the rules include a PM control device inlet temperature not to exceed 135°C (275°F), and said this would achieve over 80 percent control of dioxins, whereas at higher temperatures less than 75 percent control would be achieved. A reference was attached.

Response: The standard currently being promulgated affects only MWC units with capacities above 225 Mg/day (250 tpd). A PM control device inlet temperature requirement is included in the standards. The purpose of the temperature at the PM control device inlet is to prevent secondary formation of dioxins/furans in the control device. Information available at proposal indicated that formation can occur if PM control devices are operated at temperatures in the range of 230°C to 320°C (450°F to 600°F). A provision of the proposed NSPS specified a 230°C (450°F) maximum PM control device inlet temperature for all sizes of MWC's. This provision was changed at promulgation. In order to achieve the dioxin/furan and acid gas emission limits, most new MWC's are expected to use a SD/FF system and would operate at temperatures well below 230°C (450°F). As described in more detail in Section 3.5.4, the promulgated standards require MWC's to establish a site-specific maximum temperature at the time of their dioxin/furan compliance test. Compliance with this temperature limit would be continuously monitored to provide added assurance that MWC organic (e.g., dioxin/furan) emissions are reduced on a continuous basis. A site-specific temperature limit approach was chosen because the relationship between temperature and dioxin/furan emissions may be different for different MWC's. For many MWC's, operation at temperatures below 230°C (450°)F may be necessary to meet the dioxin/furan emission limits.

Comment: Two commenters (IV-D-105, IV-D-117) said four European countries have committed to a dioxin emission standard or guideline of 0.1 ng/dscm (0.04 gr/billion dscf) (measured in toxic equivalents rather than as total dioxins/furans), and that efforts are underway in the Netherlands to retrofit their 11 MWC's with activated charcoal add-on devices. The commenter suggested a standard of 0.1 ng/dscm (0.04 gr/billion dscf) on a TEF basis for new plants over 225 Mg/day (250 tpd), between 0.1 and 0.2 ng/dscm (0.04 and 0.08 gr/billion dscf) for plants between 45 and 225 Mg/day (50 and 250 tpd), and 0.2 ng/dscm (0.08 gr/billion dscf) for smaller plants.

Others (IV-D-27, IV-D-142) suggested that the Swedish limit of 0.1 ng/dscm (0.04 gr/billion dscf), on a TEF basis, be adopted, since this level can apparently be met in Europe. Commenter IV-D-190 also suggested 0.1 ng/dscm (0.04 gr/billion dscf).

Another commenter (IV-D-120) said more stringent dioxin levels had been demonstrated than the proposed 5 to 30 ng/dscm (2 to 12 gr/billion dscf) range. He said pilot testing of an MWC with carbon adsorption in Germany showed total tetra- through octa-chlorinated dibenzo-p-dioxin and dibenzofuran levels one to two orders of magnitude below the levels proposed by EPA. He said the proposed standards (5 to 30 ng/dscm [2 to 12 gr/billion dscf]) would equate to about 0.08 to 0.45 ng/dscm (0.03 to 0.18 gr/billion dscf) TEF using the Nordic method or 0.05 to 0.27 ng/dscm (0.02 to

0.11 gr/billion dscf) TEF using the Eadon method, and that the high end of this range is above levels targeted by European countries.

Another commenter (IV-D-238) said New York has a regulation that new facilities must achieve 2 ng/dscm (1 gr/billion dscf) but develop plans to reduce emissions to 0.2 ng/dscm (0.08 gr/billion dscf) Eadon TEF. The commenter said 0.2 TEF is about 7 or 8 ng/dscm (3 gr/billion dscf) total dioxins/furans and therefore suggested a total dioxin/furan limit in the lower end of the proposed range.
Commenter IV-D-239 also suggested a limit near 5 ng/dscm (2 gr/billion dscf).

Response: The format of the standards is a total dioxin/furan limit rather than TEF. Section 111 of the CAA is being used to regulate MWC's, and Section 111(a) of the CAA specifies that standards are to be based on the performance of the best demonstrated control technologies considering costs and other relevant factors. Section 111 standards are not risk-based, nor does the new section 129 require use of a TEF. As explained in Section 3.7, a total dioxin/furan limit will assure installation and proper operation of control technologies as well as a TEF standard would, and is a more straightforward approach. While TEF can be calculated using different methods, and the calculation methods will probably change from time to time, the total dioxin/furan limit will not. The total dioxin/furan limit of 30 ng/dscm (12 gr/billion dscf) is roughly equivalent to a TEF of 0.5 ng/dscm (0.2 gr/billion dscf).

As explained in the first response in this section, test data from 10 state-of-the-art MWC's with well designed and operated SD/FF systems were collected and analyzed in setting the standards. These tests represent the performance of the best demonstrated technology for control of MWC organics (as well as MWC acid gases and MWC metals). Carbon adsorption has been tried on a pilot scale in Europe, but has not been evaluated in continuous operation on commercial- scale MWC's. Review of data from the 10 tests of full commercial MWC's with

SD/FF systems shows that a level of 30 ng/dscm (12 gr/billion dscf) total dioxins/furans is achievable on a continuous basis by all MWC's with this best demonstrated technology. Lower levels would not be continuously achievable by all such systems.

Comment: Several commenters suggested the format of the dioxin/furan limit be a TEF limit rather than a total dioxin/furan limit. The comments are in Section 3.7.

Response: See Section 3.7.

Comment: Some commenters (IV-F-2.15 and IV-D-164, IV-D-232) said MWC's in compliance with the EPA's GCP will emit dioxin concentrations below ambient dioxin/furan concentration levels of concern and that emission limits and costly emission testing that would be required for dioxins/furans are not necessary.

Another commenter (IV-D-219) also suggested deleting the dioxin/furan limits. He said there is a lack of data, it has not been shown that these emissions cause health risks, and GCP and CO monitoring will ensure dioxin/furan control. Alternatively, he suggested establishing site-specific dioxin/furan limits after 4 years of testing.

Response: The dioxin/furan emission limits have been demonstrated to be achievable. Therefore, uniform national standards have been set for MWC plants, and establishing site-specific requirements after testing of each site is not necessary. A combination of both GCP and properly designed and operated add-on controls will be necessary to meet the dioxin/furan emission limits. Direct measurement of dioxins/furans on an annual basis is reasonable and will assure that the combination of GCP and add-on control technology is performing properly and emissions at the stack are in compliance with the emission limits. Monitoring of GCP and CO alone would not give the same level of assurance.

Comment: One commenter (IV-F-1.19) said the same dioxin/furan emission levels should be required for all MWC technologies (e.g., RDF), unless the environmental acceptability of a lesser degree of control is demonstrated. Others (IV-F-2.30,

IV-D-120, IV-D-134, IV-D-138, IV-D-178, IV-D-209, IV-D-222, IV-D-235, IV-D-238, IV-D-255) said that organic emission levels for RDF and other MWC's should be the same because there is no reason to allow different levels of health risk for different types of MWC's. Another commenter (IV-F-2.39) questioned the wisdom of permitting any new RDF's if this type of combustor generates twice as much dioxin/furan as a mass burn MWC.

Four commenters (IV-D-96, IV-D-138, IV-D-184, IV-D-255) said state-of-the-art RDF technology could meet the same dioxin levels as mass burn. The first commenter (IV-D-96) said that current emission test data from RDF's does not accurately reflect what state-of-the-art RDF units can achieve. He cited a 1989 California review of some RDF test data which indicated that the RDF's tested did not have SD/FF control and were not designed specifically to combust RDF and that there were questions regarding the accuracy of test results.

However, another commenter (IV-D-149) said literature indicates RDF's emit more dioxin/furan than mass burn MWC's, and therefore, the NSPS should specify higher limits for large new RDF plants.

Response: As stated in the ANPRM (52 FR 25339) and the preamble to the proposed standards (54 FR 52251), it was decided to regulate MWC's under Section 111 rather than Section 112 of the CAA. While MWC emissions may reasonably be anticipated to contribute to endangerment of public health and welfare, the range of health and welfare effects and the uncertainties in the cancer risk estimates did not warrant listing MWC emission as a hazardous air pollutant under Section 112. Furthermore, Section 112 could not be used to address particular subgroups of emissions including HCl and lead, which could be addressed under Section 111. And, Section 111(d) would permit more thorough evaluation of existing MWC's at the State level.

Section 111(b) requires standards for new sources to be based on performance of best demonstrated technology considering cost and any nonair quality health and environmental impact and energy requirements. Section 111(b)(2) states that the Agency "may distinguish among classes, types, and sizes within categories of new sources for the purposes of establishing such standards." Section 111(d) is similarly based on demonstrated technology for categories of existing sources. Section 111 of the CAA does not require health risks to be controlled to any level or to an equal extent for all sources.

In this case, it is the Agency's judgment after review of all available data that the best demonstrated technology for large MWC's (GCP and SD/FF controls) can achieve the same dioxin/furan level for mass burn and RDF MWC's. Therefore, a single level of 30 ng/dscm (12 gr/billion dscf) total dioxins/furans is included in the promulgated standards for all new MWC units larger than 225 Mg/day (250 tpd).

However, after review of data on the best demonstrated technologies for MWC's at large existing MWC plants (retrofit of GCP and DSI/PM control) it was judged that existing mass burn units using these technologies would achieve somewhat lower dioxin/furan (and CO) emission levels than existing RDF stoker units using the same technologies. This is due to differences in combustor design discussed in the BID's, "Municipal Waste Combustors - Background Information for Proposed Guidelines for Existing Facilities" (EPA-450/3-89-27e) and "Municipal Waste Combustion Assessment: Combustion Control at Existing Facilities" (EPA-600/8-89-058). Section 111 emission limits must be achievable using demonstrated technology considering cost and technical feasibility. Therefore, it is appropriate to have higher emission levels for existing large RDF plants than for existing large mass burn plants. (See Section 7.5.1 for further discussion of existing MWC's.)

Comment: Some commenters (IV-D-05, IV-D-101, IV-D-120, IV-D-134, IV-D-155, IV-D-178, IV-D-191, IV-D-235, IV-D-275) said small MWC plants should be required to meet the same dioxin/furan levels as large MWC plants. Two of the commenters (IV-D-101, IV-D-155) said that from a health risk standpoint, there is no reason to have different dioxin/furan limits for different sizes and types of MWC's. They said small plants may actually cause greater maximum individual risks for any given emission level because the stacks are shorter leading to higher ground level pollutant concentration. Another commenter (IV-D-61) said the same set of standards for all regulated pollutants and parameters should apply to all new MWC's regardless of combustor type or size.

Response: As explained in Chapter 1, the standards currently being promulgated cover only MWC units with capacities greater than 225 Mg/day (250 tpd) of MSW. Standards and guidelines for MWC units smaller than 225 Mg/day (250 tpd) will be promulgated within the next 2 years as directed by the CAA Amendments of 1990. These will include dioxin/furan levels for small MWC's. Under the CAA Amendments of 1990, the emission levels for smaller MWC's do not necessarily need to be the same as larger MWC's. Sections 111 and 129 of the CAA Amendments of 1990 allow the Agency to distinguish among sizes, classes, and types of sources in establishing emission limits.

Comment: One commenter (IV-D-202) said there is a lack of data on dioxin/furan emissions from very small MWC's (e.g., with capacities of 45 kg/hr [100 lb/hr]). The commenter suggested flexibility be incorporated into the standard for very small MWC's until a data base is established.

Response: As explained in Chapter 1, the standards currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd).

Comment: Some commenters (IV-D-101, IV-D-154, IV-D-155, IV-D-168, IV-D-182, IV-D-189) said dioxin/furan limits may not be a good surrogate for all MWC organic emissions. Three commenters (IV-D-101, IV-D-155, IV-D-189) suggested that total hydrocarbons may be a better surrogate and the others (IV-D-168, IV-D-178) suggested additional surrogates such as methylene chloride, chlorobenzenes, or PCB's. However, the commenters said dioxin/furan limits could be promulgated to protect specifically against risks from dioxins/furans.

Response: The standards include limits for a number of parameters to ensure control of MWC organics. In addition to the dioxin/furan limit, there are limits and continuous monitoring requirements for CO, combustor load level, and temperature at the PM control device inlet. Monitoring of this combination of parameters will ensure that combustors and control devices are designed and operated to reduce MWC organic emissions.

3.5.2 Municipal Waste Combustor Metals and Particulate Matter

Comment: Some commenters (IV-F-1.9, IV-F-2.40, IV-D-105, IV-D-106, IV-D-108, IV-D-168, IV-D-186, IV-D-188, IV-D-189) said a PM limit of 23 mg/dscm (0.010 gr/dscf) is demonstrated, and should be required. Commenter IV-F-2.40 said that under the PSD program some new MWC's are already being required by their permits to achieve 23 mg/dscm (0.010 gr/dscf). He gave two examples. Commenters IV-F-1.9 and IV-D-106 said California, New York, and other States have enforced this level as LAER for PM. He also said that a major supplier of baghouses for PM removal guarantees a level of 16 mg/dscm (0.007 gr/dscf), and a test of the Marion County, Oregon, MWC with a SD/FF shows PM rates below 8.5 mg/dscm (0.0037 gr/dscf).

Commenter IV-D-188 said Pennsylvania permitting criteria include a PM_{10} level of 23 mg/dscm (0.010 gr/dscf) and tests from seven MWC's show this can be achieved. He said 23 mg/dscm (0.010 gr/dscf) should be considered either as a PM or PM_{10} limit. Commenter IV-D-189 said New Jersey's PM limit is 23 mg/dscm (0.010 gr/dscf), and this level should be applied to PM and PM_{10}.

Commenters IV-D-105 and IV-D-117 said New York State limits PM emissions to 23 mg/dscm (0.010 gr/dscf). The commenters also attached a table summarizing PM test results for several MWC's and said 17 of 19 tests since 1984 at plants with SD/FF control show PM levels below 23 mg/dscm (0.010 gr/dscf), and the other 2 have levels of 25 mg/dscm

(0.011 gr/dscf). They, therefore, concluded a level of 23 mg/dscm (0.010 gr/dscf) is achievable for all sizes of new MWC's.

Commenter IV-D-106 said that levels of 23 mg/dscm (0.010 gr/dscf) are demonstrated; while emission levels between 23 and 34 mg/dscm (0.010 and 0.015 gr/dscf) are reported in the literature, they frequently appear to be the result of <u>modified</u> Method 5 testing that includes condensibles from the back half of the sampling train in the measurement of PM.

One commenter (IV-D-67) said a PM guideline of 20 mg/dscm (0.009 gr/dscf) is being required at a recently-approved MWC in Canada.

On the other hand, some commenters (IV-D-101, IV-D-138, IV-D-139, IV-D-155, IV-D-164) said the PM limits of 34 mg/dscm (0.015 gr/dscf) is reflective of best demonstrated technologies. Three commenters (IV-D-101, IV-D-139, IV-D-155) said a level of 34 mg/dscm (0.015 gr/dscf) is consistent with the types of SD/FF systems the Agency examined and estimated costs for. They said that lower levels may be achieved by MWC's required to apply LAER, but the control costs for an improved design, higher performance SD/FF would be much higher than EPA estimated. Another (IV-D-116) also supported the 34 mg/dscm (0.015 gr/dscf) level, saying PM can vary by an order of magnitude from MWC's with FF, but 34 mg/dscm (0.015 gr/dscf) is continuously achievable.

One commenter (IV-D-190) suggested that for both new and existing MWC's, plants larger than 225 Mg/day (250 tpd) should meet 34 mg/dscm (0.015 gr/dscf), those below 45 Mg/day (50 tpd) should meet 69 mg/dscm (0.03 gr/dscf), and plants between 45 and 225 Mg/day (50 and 250 tpd) should meet intermediate levels.

<u>Response</u>: The standards currently being promulgated affect only MWC units with capacities greater than 225 Mg/day (250 tpd). In developing the PM emission limits, test data were collected and analyzed for 10 plants with state-of-the-art combustors and well designed, operated, and

maintained SD/FF systems. This control system represents best demonstrated technology, and is the basis of the standards for new MWC's larger than 225 Mg/day (250 tpd). The data are summarized in the BID, "Municipal Waste Combustors - Background Information for Proposed Standards: Post Combustion Technology Performance" (EPA-450/3-89-27c) and the appendix to this promulgation BID, and test reports are included in Docket No. A-89-08.

Analysis of these data support a PM limit of 34 mg/dscm (0.015 gr/dscf) for state-of-the-art control systems. While tests at the majority of these combustors showed average PM levels below 23 mg/dscm (0.010 gr/dscf), one of the SD/FF systems had a PM level of 32 mg/dscm (0.014 gr/dscf) (average of three test runs). All data were collected according to EPA Method 5 and were corrected to 7 percent O_2 or to 12 percent CO_2. The design, operation, and maintenance of the PM control systems achieving levels between 23 and 34 mg/dscm (0.010 and 0.015 gr/dscf) were not significantly different from systems achieving less than 23 mg/dscm (0.010 gr/dscf), and there is no reason to dismiss the data above 23 mg/dscm (0.010 gr/dscf). These data, therefore, represent performance of the best control systems.

It should be noted that a few average PM values higher than 34 mg/dscm (0.015 gr/dscf) were reported in the BID, but these systems were found not to represent state-of-the-art controls or to need maintenance or repair. After modifications or repairs were made, retests showed that they achieved levels below 34 mg/dscm (0.015 gr/dscf).

In view of the fact that Section 111 standards are supposed to represent emission levels that are continuously achievable using demonstrated technology, the PM level for new MWC's has been set at 34 mg/dscm (0.015 gr/dscf). Most tests will show averages below 23 mg/dscm (0.010 gr/dscf). However, there is variability in PM emission rates among MWC's even when the combustor and the best control technologies are properly designed, constructed, operated, and maintained. Levels lower than 34 mg/dscm (0.015 gr/dscf) (e.g., 23 mg/dscm

[0.010 gr/dscf]) may not be continuously achievable by all such MWC's.

Comment: One commenter (IV-F-1.9 and IV-D-106) said a limit for PM smaller than 2 microns (0.08) should be set in addition to a total PM limit. She said small particles (below 2 microns [0.08 mil]) are inhaled most deeply into the lungs. She said California has a limit of 18 mg/dscm (0.008 gr/dscf) for particulates smaller than 2 microns (0.08 mil) for new MWC's.

Response: New plants will use high efficiency PM control devices, usually FF's, to meet the PM emission limits. These control devices have been shown to achieve very good control of all particulates including fine particulates. A total PM limit and opacity monitoring will adequately ensure that the best control technologies are applied and operated to achieve continuous emission reductions. A separate standard for fine particulates is not needed to ensure control technology performance. The emission limits in the NSPS must be met by all new sources in the Nation, however, States are free to set limits for additional pollutants as they see fit.

Comment: One commenter (IV-D-82) asked for clarification of whether the PM limit is an "upper limit" or an "average limit," since compliance is based on an average of three test runs and the limit can also be exceeded during malfunctions.

Response: The PM emission limit is determined as an average. The General Provisions in 40 CFR 60.8(f) state that "unless otherwise specified in the applicable subpart, each performance test shall consist of three test runs using the applicable test method.... For the purpose of determining compliance with the applicable standard, the arithmetic mean of results of the three runs shall apply." The PM results measured and calculated in this way are not to exceed the PM emission limit. (Responses to comments on the malfunction provisions are contained in Section 3.10.)

Comment: Some commenters (IV-F-1.32, IV-F-2.4, IV-F-2.5, IV-F-2.8, IV-D-101, IV-D-111, IV-D-116, IV-D-155, IV-D-184, IV-D-193, IV-D-222, IV-D-257) said the surrogates chosen to ensure MWC metals control, including the PM limit, are appropriate. They thought PM and opacity limits would achieve a high level of metals control and be more practical than setting individual limits for specific metals.

Response: The Agency concurs with these comments.

Comment: One commenter (IV-D-101) concurred with the proposal in not establishing a mercury emission limit. The commenter submitted test reports for two MWC's and said test data from four of their plants ranges from 55 μg/dscm to 530 μg/dscm (22 to 216 gr/million dscf). The mercury data are highly variable and the SD/FF apparently did not remove mercury in some tests.

The commenter said NO_x control does not seem to be the cause of poor mercury control because some tests at the Stanislaus MWC while NO_x controls were turned off as well as some data from Bristol and Vancouver show no mercury removal. The commenter said the control systems on these plants are similar to controls tested at Quebec City which showed good mercury removal. The commenter said one theory is that the good mercury removal at Quebec City could be due to high carbon content in the fly ash caused by poor combustion.

The commenter also said that lowering the SD outlet temperature from 165°C to 140°C (325°F to 285°F) at Bristol did not increase mercury removal. Furthermore, they presented a table to show that testing under various operating and fuel conditions at Stanislaus did not seem to change mercury emissions much.

The commenter concluded that until more testing is done to quantify mercury emissions from MWC's and research is done on whether mercury can be controlled by post-combustion emission control, or by source reduction or separation of mercury sources in MSW, no mercury standards should be set.

Furthermore, the commenter said that the CARB and EPA regional offices have not determined mercury emissions from these MWC's to be a health hazard, and that mercury should not be regulated unless it is determined that there is a health hazard.

Other commenters (IV-F-2.5, IV-D-116, IV-D-137, IV-D-138, IV-D-139, IV-D-155, IV-D-257) also said that mercury regulation should be postponed until after mechanisms affecting mercury emissions and their collection are sufficiently understood. One of the commenters (IV-D-137 and IV-D-138) said test data on mercury control by SD/FF had produced contradictory results that have not been explained. He said validation studies of mercury Test Method 101A have not been performed on MWC's and that valid data must be collected before any standards are developed. One commenter (IV-D-127) asked EPA to examine the test method used to collect mercury data that are used to promulgate any new rules. He was concerned that there could be errors in the data.

Commenter IV-D-101 also said that before any standards are set based on activated carbon or sodium sulfide addition, a demonstration of performance and full evaluation of costs of these technologies would be needed. Another commenter (IV-D-155) said that a range of control techniques including product reformulations or prohibitions, materials separation, and post-combustion emissions control must be evaluated. Some commenters (IV-D-137 and IV-D-138, IV-D-257) also said that if standards are developed based on add-on control, compliance should be demonstrated by meeting either an emission limit or a percent reduction. This format would allow for variations in uncontrolled mercury levels. Commenters IV-D-116 and IV-D-155 added that an analysis of the health effects of mercury emissions from MWC's should be complete prior to establishing a mercury limit. Commenters IV-D-155 and IV-D-257 also said mercury emissions from MWC's must be put in perspective compared to other sources.

<u>Response</u>: The MWC emission standards have been promulgated without a mercury limit at this time. However, the CAA Amendments of 1990 (Section 129) require that mercury emission limits for MWC's be promulgated within 12 months of enactment of the CAA Amendments. Mercury limits will therefore be proposed in the <u>Federal Register</u> and promulgated in the near

future. In developing the mercury emission limit, information on mercury emissions and controls gathered during the rulemaking for the current standards and included in Docket A-89-08, Category IV-M, will be considered. Public comments on mercury received as part of this rulemaking will also be considered.

Comment: Some commenters (IV-F-1.9, IV-F-1.31, IV-F-2.6, IV-F-2.26, IV-F-2.41, IV-F-2.53, IV-D-05, IV-D-135, IV-D-164, IV-D-176, IV-D-178, IV-D-183, IV-D-201, IV-D-244) pointed out that the proposed emission limits, based on use of SD/FF systems, will not ensure mercury control since mercury is volatile. One commenter (IV-F-1.31) stated that the proposal preamble notes that results of mercury emission tests at MWC's with SD/FF control varies widely. Others (IV-F-2.6, IV-D-244) said tests of two California MWC's with SD/FF showed negligible mercury control. Other commenters (IV-D-183, IV-D-244) said mercury control by SD/FF may improve with low temperature, but temperature spikes can occur in the system affecting operation, detention time may be inadequate for condensation, there are potential interactions between mercury and lime, and potential desorption from the filter cake. Furthermore, ammonia injection may scavenge chloride resulting in more mercury release in the elemental form. They concluded that SD/FF do not reliably control mercury, and other techniques should be used.

Some of these commenters and others (IV-F-1.22, IV-F-1.23, IV-F-1.27, IV-F-2.6, IV-F-2.41, IV-F-2.47, IV-F-2.50, IV-D-09, IV-D-234) said mercury is a health risk through bioaccumulation in the environment.

The commenters all concluded that mercury emission limits should be set. Some commenters (IV-F-1.31, IV-D-183, IV-D-191, IV-D-241, IV-D-244) suggested consideration of wet scrubbers and activated carbon, which they said are used in Europe for mercury control. Two (IV-D-183, IV-D-244) said the Netherlands has a mercury limit of 50 μg/dscm (22 gr/million dscf), and Germany is tightening its standards to 100 μg/dscm (44 gr/million dscf) for combined total mercury and cadmium.

Another (IV-D-191) suggested a limit of 50 μg/dscm (22 gr/million dscf).

One commenter (IV-D-127) said that their company has done extensive test work on mercury control and developed an "add-on" system using activated carbon. A patent was enclosed.

Response: As stated in the previous response, mercury emission limits will be proposed and promulgated in accordance with Section 129 of the CAA Amendments of 1990.

Comment: One commenter (IV-D-183) cited a report that over a period of 14 days, from 10 to 15 percent of the mercury in fly ash from a FF evaporated at room temperature. He said this indicates a problem with maintaining mercury capture.

Response: Data cited by the commenter were obtained from an MWC in Malmo, Sweden that is equipped with a DSI system followed by an ESP and then a fabric filter. In this MWC, most of the combustor fly ash (and associated carbon) was removed by the ESP. As a result, only limited amounts of combustor fly ash are captured by the fabric filter. The referenced study found that mercury was strongly attached to the ESP ash and that the level of mercury in the ESP ash did not change over time. On the other hand, analysis of the fabric filter ash suggested that 10-15 percent of the mercury in this ash evaporated from this ash over a period of 14 days.

MWC's are generally equipped with a single PM control device; the use of two PM control systems in series such as at Malmo is very atypical. Based on a review of the referenced study, there is no indication that a conventionally designed SD or DSI system with an ESP or FF would experience evaporation of mercury from the collected ash.

Comment: Several commenters (IV-F-1.9, IV-F-1.22, IV-F-1.23, IV-F-1.28, IV-F-2.6, IV-D-05, IV-D-26, IV-D-118, IV-D-149, IV-D-168, IV-D-176, IV-D-182, IV-D-201) said that in order to ensure metals control, standards should be set for a number of individual heavy metals, and periodic testing for each metal should be required. Two commenters (IV-D-176, IV-D-182) said testing could be achieved cost effectively. One commenter (IV-F-1.9) said that if EPA does not set limits for each metal, they should still require periodic testing for metals and provide target levels for comparison.

Response: Review of emission test data show that PM levels comparable to those required by the standards and guidelines result in the removal of over 97 percent of arsenic, cadmium, and lead and about 99 percent of beryllium, chromium, and nickel in MWC exhaust. Data are presented in the BID, "Municipal Waste Combustors - Background Information for Proposed Standards: Post Combustion Technology Performance" (EPA-450/3-89-27c). Therefore, standards for each individual metal are not needed. The PM limit is used to ensure MWC metals control and will require less testing. As stated in Chapter 1, the CAA Amendments of 1990 (Section 129) specifies that limits for mercury, lead, and cadmium be promulgated within 1 year for MWC units larger than 225 Mg/day (250 tpd) capacity and within 2 years for MWC's smaller than 225 Mg/day (250 tpd) capacity. It should be noted that individual States can establish permit limits for other pollutants and require additional testing if they determine this is appropriate.

Comment: Another commenter (IV-F-1.4) said that there should not be limits for individual metals, but that emission tests for metals should be required in order to collect data.

Another (IV-D-83) said if MWC's are required to measure only PM and do not know levels of individual toxic metals being emitted they would be more subject to lawsuits when illnesses occur in surrounding communities.

Response: State and local agencies and MWC owners or operators can determine whether metals should be tested at particular MWC's to collect data or respond to site-specific law suits. However, the purpose of this NSPS is not to collect data but to establish a uniform national standard that will result in application of best demonstrated technology or the equivalent. As explained in the previous response, a total PM emission limit will adequately measure control technology performance and result in reductions in MWC metals emissions.

Comment: One commenter (IV-D-82) asked if the 34 mg/dscm (0.015 gr/dscf) standard for MWC metals had been reconciled with OSHA limits for individual metals. He said the OSHA levels are much lower than 34 mg/dscm (0.015 gr/dscf).

Response: Compliance with the MWC metals standard is measured with a total PM emission limit. The emission limit for new MWC's is 34 mg/dscm (0.015 gr/dscf) total PM. Each metal makes up only a very small percent of total PM emissions, so while total PM emissions are 34 mg/dscm (0.015 gr/dscf), emissions of an individual metal such as arsenic, lead, cadmium, or nickel are typically 3 or more orders of magnitude lower (e.g., less than 0.03 mg/dscm [0.000013 gr/dscf]). The OSHA limits are written for individual metals, rather than total PM and therefore, the numbers appear smaller. Also, the OSHA values are for the air workers breath while the NSPS PM limit is expressed as a concentration in the stack exhaust gas before any dispersion has occurred. The concentration of metals in the ambient air to which the public near an MWC is exposed would be significantly lower than the concentration in the stack exhaust.

Furthermore, these standards are developed under Section 111 and are therefore based on the performance of demonstrated technology rather than on health risk assessment. However, in any case, comparison of ambient concentrations to the OSHA TLV is inappropriate. The TLV is set to protect a healthy worker population, and as such is based on an 8 hour/day, 40 hour/week exposure (which allows for recovery between exposures). The TLV does not account for exposures of a prolonged duration (such as ambient exposure) or consider sensitive populations such as children or the elderly.

Comment: Some commenters (IV-F-1.4, IV-F-1.19, IV-D-106, IV-D-134, IV-D-149, IV-D-188, IV-D-238) said the proposed temperature of 230°C (450°F) at the PM control device is not adequate to ensure condensation and removal of metals. They suggested that a temperature of about 150°C (300°F) should be required to improve metals control (especially mercury control). One commenter (IV-D-186) suggested a temperature of

135°C (275°F), while others (IV-D-190, IV-D-235) suggested 180°C (350°F) measured at the PM control device outlet.

Two commenters (IV-D-105, IV-D-117) said the EPA's 1989 guidance for control of heavy metals from hazardous waste incineration indicates flue gas temperature at the PM control device affects mercury, cadmium, and arsenic removal. The commenters attached a figure to show that better mercury removal (e.g., 75 to 90 percent control) is achieved when SD/FF are operated below 140°C (290°F) or wet scrubber ESP's are operated below 100°C (210°F). These commenters, therefore, recommended a requirement that temperature at the PM control device inlet not exceed 135°C (275°F).

Other commenters (IV-D-106, IV-D-188) said tests at Quebec City showed no mercury control at temperatures of 200°C (400°F), but 90 percent mercury control below 140°C (280°F), and argued that a temperature limit much lower than 230°C (450°F) is needed to ensure mercury condensation and removal. One of these commenters (IV-D-188) also said tests of the Dutchess County MWC showed that Unit 1 operated at 220°C (430°F) and had an outlet mercury concentration of 1,080 μg/dscm (470 gr/million dscf), whereas Unit 2 operated at 185°C (365°F) and had an outlet level of 85 μg/dscm (37 gr/million dscf).

Another (IV-D-62) said based on published data, the flue gas temperature entering the PM control device should be below 140°C (285°F) to achieve mercury control.

In contrast, others (IV-F-2.4, IV-F-2.8) said a PM control device inlet temperature is not needed to ensure good PM and metals control, and should not be included in the rules.

<u>Response</u>: The 230°C (450°F) temperature included at proposal was not specified to achieve PM and metals control. Rather, it was to prevent secondary formation of dioxins/furans in the control device. However, new MWC's will cool gas to temperatures well below 230°C (450°F) at the PM control device inlet in order to meet the dioxin/furan and acid gas emission

limits. As described in Section 3.5.4, the 230°C (450°F) temperature limit included in the proposal has been changed, and site-specific limits will be established during the dioxin/furan compliance test. While lower temperatures may aid in mercury capture, it is not a simple condensation phenomenon and other factors (such as level of carbon in the flue gas) also influence mercury control. As mentioned in previous responses, the CAA Amendments of 1990 require that mercury emissions be addressed through promulgation of a mercury emission limit within 12 months of enactment of the CAA Amendments.

<u>Comment</u>: One commenter (IV-F-3.5) said the relationship between opacity and particulates is not direct and will vary among MWC's. He suggested a variance procedure for opacity be included in the rules.

<u>Response</u>: Available information indicates that the 10-percent opacity limit is achievable for MWC's with best demonstrated technology. However, the General Provisions allow for site-specific opacity limits in any cases where the emission limits are achievable but the opacity limit is not achieved. As provided for in 40 CFR 60.11(e)(6), if it is found that "an affected facility is in compliance with all applicable standards for which performance tests are conducted in accordance with Section 60.8 of this part but during the time such performance tests are conducted fails to meet any applicable opacity standard, ... he [the owner or operator] may petition the Administrator... to make appropriate adjustment to the opacity standard for the affected facility." Sections 60.11(e)(6), (7), and (8) describe the petition procedure and the conditions under which the Administrator will establish a site-specific opacity standard. Site-specific opacity limits have been established for individual combustion sources regulated under other subparts using this procedure, and MWC's under Subpart Ea would also be able to use this procedure.

Comment: One commenter (IV-D-03) said that a 10-percent opacity limit will not ensure the PM limits are met. The commenter said their MWC cannot meet a 180 mg/dscm (0.08 gr/dscf) limit if opacity is above 0 percent. Another commenter (IV-D-178) suggested 0 percent opacity saying MWC's in their State operate with no visible emissions. Other commenters (IV-D-08, IV-D-168, IV-D-246) suggested a 5-percent opacity limit would better ensure PM control. Commenter IV-D-03 added that there could be a provision to allow site-specific adjustment to a higher level if a site demonstrates their correlation between PM and opacity.

Response: While MWC's may operate at 0 percent some of the time, this will not be continuously achievable, as indicated by COM data from MWC's with state-of-the-art control systems. A limit of 10 percent is achievable, and is sufficient to alert operators to any significant control device problems that may be causing increased PM and MWC metals emissions. As described in the previous response, site-specific adjustments are allowed for by the General Provisions.

Comment: One commenter (IV-D-121) suggested that baghouse design requirements could be included to reduce malfunctions. For example, each parcel of air could pass through at least two bags.

Response: Section 111 of the CAA requires development of standards of performance (i.e., emission limits). As stated in Section 111(h), "if it is not feasible to prescribe or enforce a standard of performance, he [the Administrator] may instead promulgate a design, work practice, or operational standard..." Section 111(h) also defines the meaning of "not feasible" as being where either pollutants cannot be emitted through a conveyance device or emissions measurements is not practical. In the case of MWC emissions, limits can be set for PM and opacity, and testing and monitoring is practical. Therefore, a PM emission limit format and opacity monitoring requirements were chosen rather than a design format that would specify FF design. Any control technique that meets the applicable limits can be used to comply with the standards.

3.5.3 Municipal Waste Combustor Acid Gases

Comment: Some commenters (IV-F-1.35, IV-F-2.15, IV-D-116, IV-D-138, IV-D-164, IV-D-184, IV-D-255) said the NSPS should require 90 percent HCl control and 80 percent SO_2 control (rather than the proposed 95 percent and 85 percent, respectively). Commenters IV-F-1.35 and IV-D-116 claimed these levels are demonstrated and can be guaranteed by vendors. Other commenters (IV-F-2.15, IV-D-153, IV-D-255) claimed the higher proposed levels have only been demonstrated at short-term stack tests and have not been demonstrated on a continuous basis and are not justified in the EPA's background documents. Commenter IV-D-153 recommended 80 percent SO_2 control, but did not mention HCl, while another commenter (IV-D-160) suggested a limit of 80 percent or 40 ppm for SO_2 for large plants. Yet another (IV-D-231) suggested limits of 90 percent or 45 ppm for HCl and 75 percent or 60 ppm for SO_2 (8-hour block average). One commenter (IV-D-67) said acid gas control of 90 percent for HCl and 70 percent for SO_2 is achievable by "dry lime injection scrubbers" and has been required at a recently-approved MWC in Canada.

One commenter (IV-D-154) said that while short-term tests indicate levels of 30 ppm SO_2 and HCl may be achieved on a short-term basis, raising the level by 5 to 10 ppm would allow for long-term variability in performance. Furthermore, a level of 30 ppm might allow only rotary atomizers, whereas a higher level could be achieved with either dual fluid nozzles or rotary atomizers and therefore could reduce costs.

One commenter (IV-D-124) suggested a reevaluation of the technical achievability and cost/benefit ratio of varying removal efficiencies within the 70 percent to 85 percent range for SO_2 and the 90 percent to 95 percent range for HCl. Another (IV-D-167) said the increase in lime needed to increase control from 70 to 85 percent SO_2 and from 90 to 95 percent HCl could amount to 180,000 Mg/yr (200,000 tpy) for a 2,300 Mg/day (2,500 tpd) MWC, and EPA should evaluate the trade-off between the incremental acid gas reduction and the increased landfilling of lime reagent. In contrast, one commenter (IV-D-125) said the proposed 85 percent SO_2 reduction is achievable, as evidenced by a corporation's guarantee that controls at an MWC in Minnesota will remove 95 percent of the potential SO_2 emission rate for that facility.

Response: After proposal, continuous SO_2 emission data from a new MWC with SD/FF control were obtained and analyzed. The data were obtained by CEM's at the SD/FF inlet and outlet and were corrected to 7 percent O_2. The long-term average percent reduction in SO_2 for the data set is about 90 percent, but due to short-term variability in inlet SO_2 levels and other factors, both lower and higher percent reductions are observed on a short term hourly basis. Since performance standards are values that are not to be exceeded, allowance must be made for this unavoidable short-term variability. Statistical analyses of the hourly CEM data show that the hourly levels are lognormally distributed. As a result, use of a geometric mean rather than an arithmetic mean is statistically appropriate for estimating minimum removal efficiencies. Review of the data also showed that use of a 24-hour averaging period was able to reduce the influence of short-term variability. Based on this data, it was concluded that a level of 80 percent SO_2 reduction, on a 24-hour geometric mean basis, can be continuously achieved. This would be the lowest 24-hour mean value expected for a well-operated, state-of-the-art SD/FF system, and is consistent with long-term average performance of 90 percent SO_2 reduction. A higher percent reduction (e.g., 85 percent on a 24-hour average basis) has not been demonstrated to be continuously achievable.

In light of this statistical analysis and considering the comments, a change was made to the proposed MWC acid gas standards. The final SO_2 limit for new MWC's with capacities greater than 225 Mg/day (250 tpd) is 80 percent or 30 ppmv, whichever results in a higher emission level, as calculated using the geometric mean of the 24 hourly averages collected each day. (The proposed SO_2 limit was 85 percent or 30 ppmv.)

As explained at proposal, the ppmv level is included because in cases where SO_2 inlet levels are very low and the specified percent reduction would result in outlet concentration levels much below 30 ppmv, the percent reduction may not be achievable due to limitations in the SO_2 emission measurement and control feedback loops. The 30 ppmv level was not intended to represent a level of control equivalent to 85 percent. Facilities have the choice of meeting either the percent reduction or ppmv limits.

The HCl limits have not been changed since proposal. Compliance with the HCl limit is determined by annual stack tests, so there is no averaging period associated with the HCl emission limits. Performance tests for a number of MWC's with SD/FF control indicate that 95 percent HCl control is achievable.

The cost and economic analysis completed prior to proposal included the cost of lime at a feed rate sufficient to achieve 80 percent or greater SO_2 removal on a 24-hour geometric mean basis. Costs for disposal (landfilling) of the reagent were also included. The cost and economic impacts of these acid gas control systems is reasonable.

Comment: Some commenters (IV-D-101, IV-D-116, IV-D-139, IV-D-155, IV-D-184) said the proposed acid gas emission levels of 85 percent or 30 ppm for SO_2 and 95 percent or 25 ppm for HCl are reflective of LAER applied to facilities to be built in nonattainment areas under the NSR program. These commenters said best demonstrated technology, as defined in Section 111, is to be applicable to all new sources and is generally less stringent than LAER. These commenters and one other (IV-D-138) said the air-to-cloth ratio of 4:1 and stoichiometric ratio of 1.5:1 that EPA used to develop cost impacts in the BID's resembled designs that would result in an emission reduction of about 80 percent or 50 ppm for SO_2 and 90 percent reduction or 40 ppm for HCl. Four of the commenters (IV-D-101, IV-D-138, IV-D-155, IV-D-184) claimed that in order to achieve the proposed levels, or LAER, lower air-to-cloth ratios (e.g., 2.5:1) and higher stoichiometric rates (e.g., 2.5:1) would have to be used, and this would

increase costs above those estimated by EPA.
Commenter IV-D-138 said pumps, pipes, and valves would have to be sized larger to accommodate additional lime.
Commenter IV-D-116 said in order to maintain over 85 percent SO_2 control, MWC's would have to "over-feed" lime at ratios of 3:1 or higher (test results on varying stoichiometric ratios at one MWC were attached), and that this would result in increased costs for the lime and for disposal of the extra lime.

The commenters also said operating and maintenance costs would be higher to achieve the more stringent proposed limits on a continuous basis because the technology would need to continuously perform at the optimum level possible. One (IV-D-116) said there would be increased wear on expensive atomizers (or nozzles) due to operating at higher lime feed rates.

Five of the commenters (IV-D-101, IV-D-116, IV-D-139, IV-D-155, IV-D-184) said vendors would be unlikely to guarantee the proposed SO_2 and HCl levels for 20 years, so liability to the MWC or community would result in increased costs. Commenter IV-D-138 said control efficiency will decrease as equipment ages.

The commenters also questioned the ability of systems to continuously achieve the proposed SO_2 level. Three (IV-D-101, IV-D-139, IV-D-155) said inlet SO_2 loading to the control device at MWC's is highly variable due to fuel composition. Graphs of hourly average inlet SO_2 data for two MWC's showing high variability were attached by Commenters IV-D-101 and IV-D-155. The others (IV-D-116, IV-D-138, IV-D-184) said the available SO_2 emission data represents short-term compliance tests under closely controlled conditions and that little long-term CEM data demonstrating these performance levels are available.

Four of the commenters (IV-D-101, IV-D-138, IV-D-139, IV-D-155) said the proposed HCl limits have been met by some LAER facilities, but they have been demonstrated only on a short-term basis, not on a long-term continuous basis.

The first commenter (IV-D-101) concluded that EPA should change the proposed emission limits to 70 percent SO_2 control and 90 percent HCl control. The other commenters (IV-D-116, IV-D-138, IV-D-155, IV-D-184) recommended an SO_2 level of 80 percent (measured as a 24-hour average) and an HCl level of 90 percent. Two commenters (IV-D-101, IV-D-155) said if EPA does not change the SO_2 and HCl levels, they should reevaluate the technical feasibility, cost, and economic impacts of achieving these higher levels.

Response: As explained in the previous response, analyses of SO_2 CEM data completed after proposal of the standards demonstrate that 80 percent SO_2 control (24-hour daily geometric mean) is achievable by SD/FF systems. In light of this statistical analysis and the comments, the SO_2 reduction was changed from 85 percent at proposal to 80 percent in the final standards. This change addresses the commenter's concern. The Agency's cost analysis conducted prior to proposal was based on an annual average SO_2 removal efficiency of 90 percent. This long-term average removal efficiency is consistent with the data set analyzed prior to promulgation. Thus, the cost analysis conducted prior to proposal is still valid. (As stated in previous responses, the promulgated emission limit of 80 percent SO_2 reduction on a 24-hour geometric mean basis is consistent with long-term average performance of 90 percent.) As stated in the previous response, the HCl level was not changed.

Comment: One commenter (IV-D-130) said the main objective of the MWC acid gas requirements should be to achieve HCl control, since the sulfur content of MSW averages only 0.3 percent, less than found in most No. 2 fuel oil. He claimed that based on stack testing it appears 95 percent HCl control can be achieved at an SO_2 removal efficiency of 70 to 75 percent. He suggested that requiring this level of SO_2 control will still ensure HCl control, but will allow more flexibility in control options and will reduce costs. He said SD/ESP systems could be used to achieve 70 to 75 percent SO_2

control, but SD/FF systems would be needed to achieve the proposed 85 percent SO_2 control.

Response: The standards for new MWC's with capacities greater than 225 Mg/day (250 tpd) are based on SD/FF control (in combination with GCP), however, other acid gas control technologies may be used if they can meet the standards. This combination of technologies represent the best control systems for MWC emissions demonstrated at MWC's and will control all three subclasses of MWC emissions (MWC acid gas, MWC organics, and MWC metals). Many newer MWC's have SD/FF systems. The cost of applying SD/FF to new MWC's larger than 225 Mg/day (250 tpd) was considered and is reasonable, and no severe economic impacts are expected. Therefore, this technology was selected as the basis for the emission standards. The final standards require 80 percent SO_2 control (24-hour daily geometric mean), because this level has been demonstrated to be achievable by SD/FF systems. By monitoring SO_2 performance at these removal efficiencies, HCl removals of 95 percent or greater are expected. However, actual measurement of the system's HCl removal performance is required only during the annual compliance test.

Under the promulgated guidelines for existing MWC's at very large MWC plants, the SD/ESP option is the basis of the emission levels. Section 7.5.5 describes the rationale for selection of SD/ESP as part of the best demonstrated technology, considering costs, for existing very large MWC's. Briefly, the costs of SD/FF and SD/ESP controls would be similar for new MWC's; but for existing MWC's that already have an ESP, which is the most typical case, SD/ESP systems may be significantly less costly and easier to retrofit.

Comment: One commenter (IV-F-3.2) said the 25 or 30 ppm limit for HCl and SO_2 may be hard for small MWC plants to achieve. He said it is difficult to create a system sufficiently sophisticated to handle spikes. He suggested that a more reasonable limit for small MWC plants is 50 percent or 50 ppm. Another (IV-D-124) said the 30 ppm SO_2 level and 25 ppm HCl level should be raised to levels commensurate with the

50-percent removals based on DSI. One (IV-D-190) suggested the SO_2 limit for very small plants be 50 percent or 100 ppm.

Response: As explained in Chapter 1, the standards currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Standards for smaller MWC's will be promulgated within the next 2 years, and comments on SO_2 limits for small MWC's will be considered as part of that rulemaking.

Comment: One commenter (IV-D-184) said performance levels of DSI systems are not demonstrated on a continuous long-term basis because little CEM data are available. He also asked why the cost procedures BID said the DSI system costed could achieve 40 percent SO_2 and 80 percent HCl control, whereas the standards for small new plants specify 50 percent SO_2 control and 80 percent HCl control.

Response: Compliance test data from both DSI/FF and DSI/ESP systems were reviewed. The cost procedures BID (EPA-450/3-89-27a) assumed 40 percent SO_2 control as the "reference" case. However, emissions data from actual facilities reported in the post-combustion technology performance BID (EPA-450/3-89-27c) demonstrates that 50 to 90 percent SO_2 control is achievable with commercial DSI systems. The available performance test data from DSI systems as well as CEM data from a SD/ESP support the conclusion that 50 percent SO_2 control can be achieved on a continuous basis.

Comment: Two commenters (IV-D-105, IV-D-117) said that data show the HCl level below 20 ppm has been met by at least six MWC's in the United States and is, therefore, demonstrated. The commenters were concerned that under the proposed standards, MWC's with high uncontrolled HCl emissions (e.g., 1,000 ppm) achieving 95 percent reduction could emit levels higher than 25 ppm. These commenters and another (IV-D-186) suggested that the percent reduction for HCl and SO_2 be eliminated and emission limits of 20 ppm HCl and 30 ppm SO_2 be established for all new MWC's.

Another commenter (IV-D-106) also suggested the percent-reduction option for HCl and SO_2 be eliminated, and the same acid gas emission limits apply to small and large MWC's. She said as amounts of plastic in the waste increase over time, HCl levels from MWC's may rise, and if facilities are allowed to comply with a percent-reduction rather than an emission limit, emissions much greater than 25 ppm HCl may occur.

Another commenter said the SO_2 limit should be 20 ppm and percent reduction standards resulting in higher outlet levels should be eliminated, however, no data or information supporting the 20 ppm level were provided.

Response: Data from MWC's with state-of-the-art control systems show that the percent reductions specified in the standards are achievable using demonstrated control technology. A percent-reduction format was chosen because it is the most accurate and representative measure of the performance of acid gas control systems. As stated in the previous response, the ppm levels were set because in cases where inlet acid gas levels are low and the specified percent reductions would result in outlet concentrations below 30 ppm for SO_2 or 25 ppm for HCl, these percent reductions may not be achievable.

Furthermore, inlet acid gas levels can be highly variable over relatively short periods of time. In cases where inlet acid gas levels are intermittently high, compliance with a ppm level would require use of significantly more sorbent than is generally needed, would make design and operation of the control instrumentation for SD and DSI systems more complex, and would require the overall emissions control system to be larger than is otherwise required. Furthermore, the short-term and long-term data gathered from MWC's with state-of-the-art controls indicates that higher percent reductions (or outlet levels of 20 to 30 ppm) are not demonstrated to be achievable on a continuous basis by all MWC's with best demonstrated technology.

3.5.4 Good Combustion Practices

3.5.4.1 Operator Training.

Comment: One commenter (IV-D-03) stated that many MWC emission problems can be attributed to a lack of operating training and/or experience.

Response: The Agency agrees that emission problems can be caused by operator error and the final standards require that chief facility operators and shift supervisors meet minimum education and experience levels and that they pass a certification test to be independently administered by: (1) the ASME or (2) an approved State equivalent. The regulations also require facilities to develop and make available an operating manual and to annually update and review the manual with all personnel associated with the operation of the MWC.

Comment: Several commenters (IV-F-2.4, IV-F-2.8, IV-F-3.5, IV-D-78, IV-D-146, IV-D-149, IV-D-162, IV-D-222, IV-D-246, IV-D-286) stated that the rules should allow for approval of a State certification program comparable to the ASME program.

Response: The final standards have been revised to allow State Agencies to establish their own training and certification programs. The proposed regulations allowed only ASME certification of the chief facility operator and the shift supervisors. The final standard allows the alternative of State equivalent certification programs, but in that case, the State certification would not be transferrable out of the State as would the ASME certification. The proposed and final regulations also require annual training of all plant personnel who are in positions associated with the operation of the MWC. The training would be through the use of an operating manual which has certain necessary components.

Comment: One commenter (IV-F-2.12) stated that the process of bringing a unit into compliance and operating in compliance is sufficient education for operators. This commenter stated that there is no need for the additional expense and administrative burdens associated with certification and training.

Response: The ASME certification program has been designed by representatives from a cross-section of interests including MWC owners, operators, manufacturers, State and local government, and citizens groups. The standards and guidelines attempt to ensure that all facilities are operated at a necessary level of competency. Facilities which have previously established operator training programs and have knowledgeable supervision should not find it cumbersome to comply with the regulations. The program was designed to help all facilities operate in an educated manner to ensure continuous combustion control of MWC organics and reduce emissions and upsets. Additionally, the final standards and guidelines allow for State certification as an alternative to ASME certification and this provides additional flexibility.

Comment: Several commenters (IV-F-2.30, IV-D-60, IV-D-84) stated that the certification should be site-specific to avoid, for example, testing of operators on one type of combustor when their facility uses another type of combustor. Commenter IV-D-84 stated that certification and training programs for MWC's cannot be applied to cement kilns because of significant differences in how cement kilns operate.

Response: The standards and guidelines require certification for only chief facility operators and shift supervisors, for whom an in-depth understanding of MWC combustion principals and facility operations is required. Under the ASME program, certification is granted in two stages. Provisional certification requires that certain education and experience requirements have been met, and satisfactory completion of a general test on the basics of MWC operation. The provisional certificate is valid for 5 years and is not specific for any particular MWC technology or jurisdiction. The final stage of operator certification involves completion of a site-specific oral test and pertains to a specific MWC technology. The standards and guidelines also require annual training of all plant personnel who are in positions associated with the operation of the MWC (including control room operators, waste and ash handlers, maintenance personnel, and crane and load operators) by use of a site-specific operating manual.

Comment: One commenter (IV-D-62) stated that operator training should be conducted in a classroom setting and should be in addition to experience requirements. The commenter further recommended that EPA or the State environmental enforcement agency approve the industry-developed training courses before training begins. Several commenters (IV-D-105, IV-D-117, IV-D-190, IV-D-235, IV-D-238) believed that within the regulations, EPA should develop an infrastructure and curriculum which specifies how candidates for operator certification should receive their training.

Commenters IV-D-105, IV-D-106, and IV-D-117 further recommended that EPA address the following issues regarding the operating manual: uniformity across the country, enforcement of annual employee manual review, employee training, and Agency review of the manual. Commenter IV-D-238 stated that the proposed ASME certification program was designed based on a survey of current operators and it does not provide incentive for improving operator quality but only maintains status quo.

Response: The standards and guidelines, by requiring ASME certification (or a State-approved equivalent), require that the chief facility operators and shift supervisors pass a written examination for provisional certification. The certification examination will be sufficiently rigorous to ensure that the examinee has been adequately trained and educated regarding the theory and operation of MWC systems until they receive full operator certification (within 5 years). The Agency does not consider it necessary or efficient to individually approve the content of any training programs. The standards and guidelines require development, annual review, and updating of a site-specific operating manual which contains a minimum of 12 elements specified in the regulations. These include basic combustion theory, start-up and shutdown procedures, and upset or off-specification conditions. Annual review of this manual is required for all plant personnel who are in positions associated with the operation of the MWC. These site-specific manuals and records of annual manual review must be available for inspection to ensure they meet the regulatory requirements.

Comment: Several commenters (IV-D-101, IV-D-137, IV-D-138, IV-D-155, IV-D-164, IV-D-184, IV-D-255) stated that the requirement for chief operator and shift supervisor certification 24 months after ASME certification program adoption may be too short (due to the number of chief facility operators and shift supervisors required to be trained) unless provisions are included for automatic extension of the time period.

Response: Considering the limited number of people requiring provisional certification (only chief facility operators and shift supervisors must be certified) and that provisional certification requires only a written examination (along with educational and experience requirements) a 24-month period for provisional certification after ASME program adoption is believed to be reasonable. Once provisional certification is obtained, the operator has up to 5 years to obtain full certification under the ASME program since the provisional certification is valid for 5 years.

Comment: Several commenters (IV-D-90, IV-D-105, IV-D-106, IV-D-117, IV-D-164, IV-D-238) believed it was not appropriate for EPA to incorporate a plan developed by ASME (or any other organization) into the final regulations, until the plan has been specifically issued for public review and comment. The commenters recommended that the certification program and the procedures for administering the program are given the same opportunity for public comment.

Response: The ASME certification program was designed by representatives from a cross-section of interests including MWC owners, operators, manufacturers, State and local governments, and citizens groups. Drafts were published by ASME and made available for review. Commenters on the NSPS and guidelines could have obtained copies. The ASME certification program standards are included in Docket No. A-89-08. Furthermore, the final MWC standards and guidelines allow State-approved certification programs as an alternative to ASME certification.

Comment: One commenter (IV-D-149) recommended that the requirements include a section on minimum routine maintenance procedures.

Response: While the Agency agrees that proper maintenance is necessary for optimal and long-term operation, the Agency does not believe it is appropriate to define maintenance practices to the facilities. Instead, the standards require continuous monitoring of key operational performance parameters and pollutants to prevent facility deterioration (and also require periodic emissions testing every 1 or 3 years), and allow the facility to perform maintenance as they judge appropriate.

Comment: One commenter (IV-D-26) stated the operator requirements were inadequate. Commenter IV-D-27 suggested that operators be retested every 2 years. The testing should be expanded to include a physical examination, vision testing, drug and alcohol testing, and those who fail the test should be prohibited from unit operation. Commenter IV-D-184 recommended that chief facility operators and shift supervisors be recertified or renew certification on a periodic basis such as 3 to 5 years.

Response: The certification and training requirements are judged to be appropriate as proposed. The only change made between proposal and promulgation was to allow State-approved certification programs as an alternative to the ASME program to provide more flexibility. The required annual update and review of the operating manual by all employees will keep chief facility operators, shift supervisors, and other personnel up to date on topics relating to the operation of the MWC, and the monitoring of key pollutants and operating parameters also assure that the combustor and controls are well operated and continue to achieve the emission standards.

3.5.4.2 Carbon Monoxide Limits.

Comment: One commenter (IV-D-159) stated that in many modern modular system applications the CO is consistently low and fairly insensitive to the operation due to high combustion efficiencies and as a result, its measurement is of little value. Commenter IV-D-116 stated that CO emission levels are not directly correlated to dioxin/furan emission levels and that efficiency and operating temperatures of the PM control device are the key to controlling dioxin/furan emission levels.

Response: The Agency is aware of modular mass burn facilities which consistently operate at less than 10 ppm. However, there are others which do not perform so commendably. The monitoring requirement is deemed necessary as a demonstration of that performance.

One intent of the MWC rules is to control the emission of all organic pollutants from MWC facilities (MWC organics). This is to be achieved by the continuous application of GCP and appropriate flue gas cleaning technology. The approach used in applying GCP to control MWC organics is to maximize organic destruction in the furnace and minimize low temperature formation of organics downstream of the combustor. The purpose of the CO emission limit is to monitor the destruction of organics in the furnace.

If the facility can continuously meet the CO CEM requirement, and demonstrate periodic dioxin/furan compliance, then the goals of GCP have been reached. Those goals are to operate the combustor in such a manner to prevent and control air pollutant emissions from MWC's. In order to meet the continuous compliance requirements of GCP, the facility will have to incorporate additional design and operating practices not specifically required in this rule. These practices include proper waste handling and feeding to minimize variation in the waste characteristics, proper air distribution, proper mixing of combustion air with combustion products, proper waste feeding, proper combustor temperature, etc.

The CO level is a good indicator of the degree of organic destruction in the furnace. There are many factors which can cause poor combustion conditions. These factors range from waste feed conditions to furnace temperature, and air distribution. All of these factors will influence CO emissions as well as organic destruction. High emission levels of CO are associated with high organic emissions. The regulation, by eliminating periods of high CO emissions, reduces periods of high organic emissions.

At high levels, CO is a good predictor of dioxin/furan as shown in the parametric test program at the Mid-Connecticut facility in Hartford, Connecticut. That data showed an excellent correlation of CO greater than 200 ppm with uncontrolled dioxins/furans. A strong correlation was also observed with CO and other uncontrolled organics. Therefore, the Agency has chosen to regulate CO as an indicator of organic destruction in the furnace (and thereby reducing the amount of organics escaping the furnace). The reduction or organics leaving the furnace reduces overall emissions and also the amount of precursor material available for low temperature formation. The remainder of the GCP regulations attempt to minimize low temperature formation of organics by reducing PM carryover and limiting the temperature into the PM control device.

Comment: Several commenters (IV-F-1.35, IV-F-2.4, IV-D-61, IV-D-62, IV-D-80, IV-D-138, IV-D-190) recommended that a single CO limit be set for all MWC technologies and capacities such as was included in the EPA's draft guidelines dated June 1987. Commenters IV-D-105, IV-D-106, and IV-D-117 stated that the CO emission limit be changed to 50 ppm over a 4-hour averaging time for all technologies, a value recommended in a 1987 EPA report. Commenter IV-F-2.4 recommended that the limit be set at the level proposed for RDF combustors. Commenter IV-D-80 believed that modular units were being unduly penalized as a result of their more efficient combustion process and that requiring a 100 ppm limit (1 hour average) will actually result in less CO emissions.

Commenter IV-D-61 felt than the most stringent CO limit should be applied to all new incinerators. Commenter IV-D-78 stated that grouping mass burn rotary waterwall, RDF, coal/RDF cofired, and other technologies under one CO limit creates inequity. Commenter IV-D-188 believed the higher CO limits favor rotary waterwall over other technologies such as mass burn waterwall. Commenter IV-D-209 stated that RDF facilities should be held to a more restrictive CO limit due to the RDF's capability to control its fuel input to a much better degree than mass burn facilities. Commenter IV-D-184 felt the more lenient emission limits for small RDF combustors may create a preference for RDF in this size category. Commenter IV-D-235 stated that a 100 ppm limit should be established for all technologies except RDF which should be set at 250 ppm due to difficulty in continuous compliance with the 100 ppm limit.

Several commenters (IV-D-105, IV-D-106, IV-D-117, IV-D-188) stated that the CO limits were not chosen in accordance with data truly representative of the better operated facilities and therefore this standard will not ensure the best combustion practices. One commenter (IV-D-131) stated that the CO limit set for RDF combustors is insupportable and therefore the proposed emission limit can only be regarded as an arbitrary value. Commenter IV-D-159 stated that not enough data are available for the different size classes of modular units and that the CO limit should be raised to 100 ppm until more data are obtained. Commenter IV-D-188 stated that they have CEM CO data from mass burn waterwall units of less than 50 ppm and less than 100 ppm from rotary waterwall units. Commenter IV-D-188 further stated that they have permitted mass burn waterwall units at 50 ppm and rotary units at 100 ppm limits. This commenter recommends lowering the CO limit to 100 ppm for rotary waterwall and RDF units.

<u>Response</u>: Different types of combustors may have inherently different steady-state CO emission levels when applying GCP. Average CO emissions are composed of steady-state values and excursions to higher levels. Steady-state values are

dependent on the waste properties, excess air levels, and the manner in which the waste (or RDF) is burned, i.e., bed-burning, semi-suspension burning, two-stage combustion, fluid bed combustion, etc. Excursions result predominately from changes in waste properties, feed conditions, or a failure to achieve good mixing of combustion air and the burning waste constituents. Average achievable CO emissions are determined by steady-state values and the frequency, duration, and magnitude of excursions. Good combustion practices attempt to address all of these factors by establishing technology-specific CO limits based on those levels that have been demonstrated to be achievable.

The technology-specific CO emission limits and averaging times were developed on the basis of demonstrated performance in existing MWC's. The specific data and analyses are in the background document entitled, "Municipal Waste Combustion Assessment: Technical Basis for Good Combustion Practice," EPA-600/8-89-063, August 1989, and in other memoranda in the docket. To develop CO limits for various technologies, five long-term data sets and approximately 30 short-term data sets were analyzed. When possible, the data were obtained from facilities determined to be incorporating recommended GCP practices. Data were obtained from facilities determined to be examples of the best designed systems in operation. The data generated by EPA test programs were given greater influence because the operating conditions were dictated by EPA and the systems optimum performance could be determined. This is in contrast to other test data where the facilities were only required to meet State or local regulations which may not have forced the facility to its optimum performance. The EPA did not specifically consider variations in refuse heating value but the many data sets examined included naturally occurring changes in short term and seasonal waste conditions. The EPA also believes that proper waste preparation techniques, such as premixing at mass burn facilities and appropriate processing at RDF facilities, can minimize waste variation.

The CO limit is included in GCP to ensure that good combustion is achieved at all times. The various limits were selected on the basis of their achievability for all technologies from an extensive data base. The limits for new RDF and rotary waterwall facilities have been readdressed based on new data available to EPA. Analysis of the data support establishing different limits for new RDF and rotary waterwall facilities. The new regulations have been developed based on data from the most recently constructed RDF and rotary waterwall units. These facilities incorporate good design practices and are believed to be well operated.

Analysis of data from an RDF unit at Detroit, Michigan, indicates that a level of 150 ppm (corrected to 7 percent O_2) on a 24-hour average is achievable. An averaging time of 24 hours was selected for CO limits to account for the inherent sensitivity of RDF combustors to periodic but unpreventable interruptions in feed conditions that result in high transient CO emission levels. It is expected that new facilities will be designed to include CO controls and improved feed controls, mixing patterns, and heat release rate. These facilities are expected to have CO levels with approximately the same average as the Detroit facility, but have fewer excursions and less variability. Thus, the limit for new RDF facilities has been revised to 150 ppm on a 24-hour average, corrected to 7 percent O_2.

Analysis of the data from a rotary waterwall unit indicates that a level of 100 ppm (corrected to 7 percent O_2) on a 24-hour average is achievable. Thus, the limit for new rotary waterwall facilities has been revised to 100 ppm on a 24-hour average, corrected to 7 percent O_2. For more information on CO levels for new RDF and rotary waterwall facilities, see the memorandum entitled, "Good Combustion Practice: CO Emission Limit," in the docket.

Comment: Several commenters (IV-F-1.11, IV-F-2.15, IV-D-101, IV-D-107, IV-D-111, IV-D-116, IV-D-122, IV-D-137, IV-D-138, IV-D-139, IV-D-143, IV-D-153, IV-D-154, IV-D-155, IV-D-158, IV-D-164, IV-D-184, IV-D-190, IV-D-235, IV-D-255, IV-D-257) stated that the CO 4-hour averaging period is unreasonably short. All of these commenters recommended that the averaging time be lengthened to simplify compliance.

Commenters IV-D-107, IV-D-111, IV-D-116, IV-D-122, IV-D-137, IV-D-138, IV-D-139, IV-D-153, IV-D-155, IV-D-164, IV-D-184, IV-D-255, and IV-D-257 further stated that the CO averaging time is too short to accommodate variations in refuse heating value and automatic combustion control response times and recommended an 8-hour block average. Commenters IV-D-101, IV-D-155, and IV-D-257 stated that the 4-hour averaging time does not account for seasonal variation in the waste and recommends an 8-hour averaging block for compliance throughout the year. Commenters IV-D-108 and IV-D-168 stated that the CO averaging time is too long and recommended a 1-hour averaging time. Commenters IV-D-190 and IV-D-235 recommended an averaging time of 24 and 28 hours, respectively.

Commenters IV-F-1.35 and IV-D-255 recommended a two-tier implementation approach employing both short- and long-term CO limits that recognize typical MWC operating excursions yet provide a more realistic assessment of the CO emissions environmental impact.

Response: A 4-hour averaging time was proposed for mass burn, modular, RDF, rotary waterwall, and FBC facilities because it is believed that high organics concentrations are primarily associated with combustion excursions and not with steady-state CO levels. The regulation's 4-hour block averaging has as its intent the control of unstable combustion conditions which are characterized by high CO and organic emissions. Although a 1-hour average is desirable in forcing facilities to control short-term peak emissions, data from units employing current state-of-the-art combustion control technologies indicate that setting CO emission limits at achievable 1-hour emissions values would allow operation at conditions which result in excessive long-term emission averages. Also, EPA believes that a 1-hour average CO emission limit does not provide adequate time for an operator to correct upsets and still achieve an emission limit representative of GCP. The use of a 4-hour block average resulted in selection of CO emission limits which provide a balance in controlling short-term CO excursions and long-term CO averages.

A 4-hour averaging time was originally proposed for RDF stokers and rotary waterwall facilities, but was readdressed based on a number of comments received and reexamination of data. In RDF stoker facilities more than 40 percent of the feed is burned in suspension and any variation in fuel feed rate or in fuel heating content impacts furnace conditions and CO emissions. All RDF combustors experience periodic feed interruptions which result in moderately high CO emission transients. These periodic feed interruptions are difficult to eliminate and a longer averaging time is needed to "average-out" these episodes. In addition, rotary waterwall facilities experience periodic CO excursions which support changing the CO emission limit and corresponding averaging time. The analysis concludes that a 24-hour averaging period is more appropriate. For these reasons, the CO emission limit averaging time is changed to a 24-hour period for RDF and rotary waterwall facilities. The details of the analysis are given in the CO emission limit memorandum in the docket.

Comment: Two commenters (IV-D-137, IV-D-138) recommended that the CO CEM location not be fixed at the combustor exit because it is the most difficult CEM operational environment due to high particulate loading and uncontrolled acid gases. The commenters recommend allowing the facility the option to install the CO CEM at the APCD outlet with the other CEM's since the small delay in correlating real time CO data with combustion conditions is meaningless.

Response: The location of the CO CEM will be left to the discretion of the facility operator, as long as the CO monitor and the O_2 monitor (alternately the CO_2 monitor) are in the same location. The CO and O_2 (or CO_2) monitors are required to be in the same location in order to accurately correct the CO to a standard O_2 (or CO_2) level. It is not necessary to locate the CEM at a specific location in the furnace since the reactions necessary to form or destroy CO do not normally take place beyond the furnace exit, and there are no devices which serve as CO collectors.

3.5.4.3 Time at Temperature/Temperature.

Comment: Several commenters (IV-F-1.4, IV-F-1.19, IV-D-03, IV-D-106, IV-D-168, IV-D-186, IV-D-189) recommended that the regulation include a time at temperature requirement such as 580°C (1,800°F) for 1 second. Commenter IV-D-134 recommended a time at temperature requirement for new facilities. Several commenters (IV-D-81, IV-D-86, IV-D-105, IV-D-117, IV-D-186) stated that the regulation should include a combustion temperature requirement (both a minimum to ensure PIC destruction and a maximum to reduce NO_x formation) since it is documented that temperature is critical and that technology to measure the temperature is commercially available. Commenter IV-D-107 also recommends that auxiliary burners be required to maintain a required minimum temperature. Commenter IV-D-186 recommends continuously monitoring furnace temperature.

Response: The majority of recent State regulations and operating permits governing air emissions from various classes of incineration equipment have stipulated that the combustion products be maintained at a given temperature (580°C [1,800°F] is typical) for a given period of time (typically 1 or 2 seconds). The objective of such a regulation is to require conditions sufficient to assure oxidation/destruction of organic constituents escaping the primary combustion zone. This condition might be applied to the region above the overfire air ports on a mass burn waterwall or RDF-fired MWC or to the secondary chamber of a modular starved air MWC. Minimizing release of organic compounds from the MWC combustion chamber is the critical objective of GCP. After careful consideration, however, it has been concluded that in some cases attempts to enforce mandated temperature requirements may be counterproductive. Details of the various considerations leading to that conclusion have been presented in the support documentation (EPA-530/SW-87-021a) and included in the docket.

The Agency did consider establishing a minimum combustion temperature requirement which is sufficiently high for all applications and which provides a safety factor for temporal and spatial variations. This approach, however, has several major drawbacks. The most important drawback is its potential impact on mixing. To increase temperatures in the upper furnace region when operating at full load requires a decrease of excess air in that region which can only be accomplished by decreasing the relative amount of overfire air. If the quantity of overfire air is decreased, the jet momentum will also drop and thus mixing may be adversely impacted. There are other considerations, but the major concern is that optimal organic destruction is accomplished when the furnace operates with sufficient temperature and with efficient mixing. The standards and guidelines impose limits on combustor operating load and an additional constraint on operating temperature could negatively impact the ability to control mixing and thus is not an acceptable approach.

The current regulation follows a philosophy that, whenever possible, the standard should address emission performance rather than operating or design constraints. The regulations place limits on CO and dioxin/furan emissions. It is believed that the furnace temperature must be maintained at an appropriate level to achieve the CO limits. If the manufacturer/ operator can achieve those limits, the real objective of "time-at-temperature" will have been achieved. If they fail to meet these objectives, modification to furnace mixing, furnace temperature or critical process parameters may be necessary. Regulating how the manufacturer must operate his system to meet the standards is not consistent with GCP of attempting to regulate performance whenever possible and may actually force less than optimal operation.

The Agency does believe that it is necessary to measure temperature as a means of controlling the combustion process, but does not believe that it is necessary to require the recording and reporting of combustion temperatures to ensure compliance with GCP at MWC facilities.

3.5.4.4 Capacity.

Comment: Several commenters (IV-F-2.4, IV-F-3.5, IV-D-137, IV-D-138, IV-D-222) believed that the proposed demonstrated capacity measurement is overly restrictive and that operation within a range of 80 (or 90) to 110 percent of demonstrated capacity is more appropriate due to the variability of MSW heat content. Commenters IV-D-101 and IV-D-155 stated that the limit should be 100 percent plus or minus 2 percent to account for the error band of the instrument.

Several commenters (IV-F-2.15, IV-F-2.30, IV-D-78, IV-D-101, IV-D-107, IV-D-111, IV-D-137, IV-D-138, IV-D-153, IV-D-154, IV-D-155, IV-D-164, IV-D-190, IV-D-222, IV-D-235, IV-D-257) stated that the load level averaging time should be increased or eliminated due to the variability of MSW. Commenters IV-F-2.15, IV-F-2.30, and IV-D-164 recommended the load level averaging time be changed to 24 hours, similar to other EPA standards. Commenters IV-D-101, IV-D-137, IV-D-138, IV-D-154, IV-D-155, IV-D-190, IV-D-235 and IV-D-257 recommended that the load averaging time match their recommended CO averaging time of 8 hours. Commenter IV-F-2.4 stated that the capacity should be established over a 4-hour average test.

Response: The maximum operating load restriction is included in GCP to address the potential for reduced residence times and increased PM carryover (and associated organic emissions) at high loads. The EPA's concern is that air flowrates are typically adjusted to follow load and, at high loads, the increased undergrate air or lower-furnace air flowrate could: (1) entrain PM and carry it from the combustor and (2) reduce the residence time of burning material in the high temperature regions of the furnace. There is also the possibility that excessive load reduces the mixing efficiency of overfire air jets.

The EPA recognizes that variability in MSW characteristics can be a problem. In response to public comments, EPA has reexamined the load requirement and averaging period. The details of the analysis are in Docket A-89-08 in the memorandum entitled, "Good Combustion Practice: MWC Steam Load Requirement." Steam producing units will be limited to a "maximum steam load." The maximum steam load is defined as 110 percent of the mean steam flowrate recorded during the three-run dioxin/furan performance test. This mean steam flowrate will probably represent the highest average continuous load at which the facility intends to operate. The load averaging time is also changed from a 1-hour averaging time to a 4-hour averaging time. Since facilities are to define the maximum load during the three-run dioxin/furan performance test and each test run is approximately 4 hours in duration, it is reasonable to base the averaging time on a 4-hour average rather than the proposed 1-hour average. The maximum operating load level defined during a previous performance test can be changed by retesting the facility if the owner or operator desires and all compliance conditions are met during testing at the proposed new maximum operating load.

Comment: Two commenters (IV-F-2.15, IV-D-164) requested that EPA clarify whether emission tests are to occur at design capacity or available load level.

Response: The regulations require that performance tests be conducted at the maximum load at which the facility will be operated. The operator must recognize that the maximum operating load allowed in the permit will be that which was demonstrated by the performance tests. The owner or operator of the facility will be responsible for defining the highest continuous operating load, but they must demonstrate that dioxin/furan emission limits are achievable at that load level.

Comment: One commenter (IV-D-78) stated that it is unequal to regulate the maximum demonstrated capacity for only steam producing units. The commenter recommends dropping the guideline.

Response: Excessive flue gas flowrates entrain additional PM and carry it to locations in the MWC system where low temperature formation of organics occurs. Those MWC's which produce steam can use steam flowrate measurements to limit operation at excessive loads. The object of the maximum load requirement as measured by steam flowrate is to limit the volumetric flowrate of flue gases. Several alternate techniques for measurement of flue gas flowrate were initially considered for units which do not generate steam, but none were considered sufficiently accurate or easily applied for inclusion in the original standard proposal. Further investigation has shown that vendors are now offering a number of different techniques for continuous measurement of flue gas flowrate. Although none of these techniques has been validated by EPA for use on combustion sources, one or more of them may be applicable to all classes of MWC's including refractory units without heat recovery. If one of these techniques is validated for MWC facilities, EPA will require their use at units without heat recovery for the purpose of avoiding operation at excessive loads. For more details of this alternative method of measuring combustor gas flowrates, see the steam load memorandum in the docket.

Comment: One commenter (IV-D-219) recommended the rules be amended to allow exemption of steam load requirement to facilities which generate a minimal amount of steam for a limited use and that operate for the primary purpose of burning MSW.

Response: For facilities where the total volume of flue gas is not consistently passed through the boiler or waste heat exchanger, the steam load is not representative of the total gas flowrate. Therefore, it does not accomplish the purpose of the requirement which is to limit flue gas flowrate. The facilities will not at this time be subject to the load requirements for units with heat recovery.

Comment: One commenter (IV-D-134) recommended that the requirements establish a method to define exactly how load capacity should be measured and what calibration or other QA measures are required. Two commenters (IV-D-149, IV-D-150) recommend that the standard for load capacity included consideration of the enthalpy recovered in the steam.

Response: Although enthalpy is a more accurate predictor of heat input into the furnace, EPA believes steam load is an adequate predictor of MWC load. The EPA will utilize the ASME's Power Test Codes to specify measurement and calibration methods for steam load. The ASME Power Test Codes: Test Codes for Steam Generating Units, PTC 4.1, Section 4 contains the method to calculate the steam output from a steam generator. The ASME PTC 19.5 Chapter 4, "Instruments and Apparatus: Measurement of Quantity of Materials" shall be followed with reference to the use and location of flow nozzles and orifices. For more information, refer to the steam load memorandum in Docket A-89-08.

3.5.4.5 Particulate Matter Control Device Inlet Flue Gas Temperature.

Comment: Several commenters discussed the 230°C (450°F) PM control device inlet temperature requirement.

Commenter IV-D-03 believed that the requirement was to improve condensation and capture of metals and organics and pointed out that the best ESP operation is achieved at temperatures greater than 230°C (450°F). Commenters IV-F-1.4, IV-F-1.19, IV-D-106, IV-D-108, IV-D-134, IV-D-149, IV-D-150, IV-D-186, IV-D-188, and IV-D-238 thought that the temperature was too high and recommended a 150°C (300°F) temperature to ensure metals condensation and collection. Commenters IV-D-62, IV-D-105, IV-D-117, IV-D-186, IV-D-188, and IV-D-238 also recommended a 150°C or 135°C (300°F or 275°F) PM control device inlet temperature in order to minimize dioxin/furan formation and to maximize their condensation.

Commenter IV-D-168 recommended a 180°C (350°F) inlet temperature. Commenters IV-D-190 and IV-D-235 recommended an outlet maximum temperature of 180°C (350°F) to capture metals and dioxins/furans. Commenter IV-D-186 further stated that acid gas corrosion can be minimized or prevented with the use of acid gas adsorbents or by using acid resistant surfaces.

Response: Although there are other parameters which also influence dioxin/furan formation in a PM control device, low temperature dioxin/furan formation is strongly dependent on the flue gas temperature and residence time within the critical dioxin/furan temperature window (200°C to 400°C [390°F to 750°F]). The strong dependence of dioxin/furan formation on temperature is shown by recent EPA tests which are discussed in detail in Docket A-89-08 in the memorandum entitled, "Good Combustion Practice: PM Control Device Inlet Temperature Requirement." The data show that dioxin/furan emission levels increase approximately an order or magnitude for every 100°C (180°F) increase in ESP operating temperature. The manner in which the proposed standards and guidelines are written would allow facilities to pass a dioxin/furan performance test while operating at any PM inlet temperatures less than 230°C (450°F). After passing the performance test they then could operate at 230°C (450°F) PM control device inlet temperatures and continuously exceed the dioxin/furan emission requirements. Therefore, as discussed in the memorandum, the maximum PM control device inlet temperature requirement has been changed. The maximum temperature is now defined as the mean PM control inlet temperature measured during the dioxin/furan performance tests plus 17°C (30°F). The 17°C (30°F) cushion is included for the benefit of those facilities which do not directly control PM control device inlet temperatures, but rely on heat transfer surfaces to lower flue gas temperatures. In such cases, the heat transfer surfaces may become fouled over time and the gas temperature will increase. An additional 17°C (30°F) above demonstrated performance test temperatures allows such facilities to continue operating without exceeding the standard. For further information, refer to the PM control device inlet temperature memorandum in Docket A-89-08.

Comment: Several commenters (IV-F-2.4, IV-D-122, IV-D-266) indicated that no temperature limit should be required since dioxin/furan emission limits have been established. One commenter (IV-D-159) recommended that modern modular systems be exempt from the PM control device inlet temperature requirement due to the high combustion efficiencies and destruction of dioxins/furans and their precursors. Commenter IV-D-189 stated that the maximum temperature limit at the PM control device inlet is not relevant to GCP.

Response: There is conclusive evidence that dioxins/furans can be formed in PM control devices such as an ESP or FF and that the formation is strongly temperature dependent. The temperature requirement is to aid in continuous compliance for dioxins/furans since those organics cannot be sampled continuously. Without that requirement, a facility could demonstrate compliance at a low ESP (or FF) temperature and then operate at higher ESP (or FF) temperature causing dioxin/furan emissions greater than the limit.

Comment: One commenter (IV-D-111) recommended that the averaging time be lengthened to avoid constantly attempting to correct for waste variability. Commenters IV-D-137, IV-D-138, IV-D-155, IV-D-190, and IV-D-235 recommended that the inlet temperature averaging time be changed to an 8-hour block average.

Response: The 4-hour averaging time for PM control device inlet temperature is consistent with good operating practices. If a particular facility has large swings in temperature for extended period of time, the Agency believes it is possible to reduce swings or to lower the PM control device inlet temperature set point so compliance will not be a problem.

3.5.4.6 Overall Good Combustion Practices Comments.

Comment: Two commenters (IV-F-2.15, IV-D-219) believed that compliance with the EPA's GCP is sufficient to minimize production of organics and that dioxins/furans testing should not be required. Another commenter (IV-F-2.4) indicated that operational parameters should not be dictated since specific emission limits have been proposed.

Response: Both the dioxin/furan emission limits and the performance requirements specified under GCP are required to ensure that trace organic emissions are minimized. The GCP requirements are designed to address the organic formation and escape mechanisms that have been identified through analyses of MWC test data. The GCP requirements assist in attaining compliance with the dioxin/furan emission limit and are a key to assuring continuous compliance since dioxins/furans cannot be continuously measured.

Comment: Some commenters (IV-F-2.39, IV-D-65, IV-D-101) were concerned about the pollutant tradeoffs between CO and NO_x. Commenter IV-F-2.39 stated that GCP for control of organics and CO emissions includes operation at oxygen-rich conditions which will lead to the formation of excess NO_x.
Commenter IV-D-65 stated that the CO limits should be achievable if the NO_x emission limit for new incinerators is set at 190 to 200 ppm in the final standards.

Response: Commenter IV-F-2.39 is, in general, correct in that the mechanisms effective in controlling these two MWC pollutants can be in conflict. However, the discussion in the comment has been over simplified. The distribution of fuel and air in the combustor has a significant impact on fuel NO_x (i.e., NO_x produced by oxidation of nitrogen contained in the fuel as opposed to thermal NO_x, which is that resulting from thermal fixation of atmospheric nitrogen). Because MWC's operate at relatively low combustion temperatures, fuel NO_x is the primary contributor to MWC NO_x emissions. In the conversion of fuel nitrogen to NO_x, the overall excess air level is much less important than the level of mixing in the early stages of the combustion process (e.g., in and slightly above the bed). Thus, overall oxygen-rich conditions do not necessarily imply that NO_x emissions will be increased. Good combustion practices for organics control depend on optimizing several key components of the combustion process, one of which is the amount and distribution of combustion air. This does not require that excess amounts of air be introduced to the waste bed. In fact, two-stage combustors burn quite fuel rich in the primary chamber without violating the premises of GCP. There is no evidence that the specific CO emission limits will invalidate combustion techniques intended to control NO_x emissions.

Comment: One commenter (IV-D-84) stated that GCP for cement kilns is better accomplished by regulating direct combustion controls such as excess oxygen minimums, kiln rotation speed, and raw material feed minimums, proper draft fan operation, and fuel feed minimums, instead of monitoring emissions.

Response: A review of data from tests on cement kilns indicate that high concentrations of CO in stack gas may result from cement feed material properties and process conditions. The CO emission levels are not always a good indication of process fuel combustion conditions in cement kilns. The GCP provisions of the final standards and guidelines do not include CO emission limits for cement kilns. (See memo entitled "Good Combustion Practice: CO Emission Limits" in Docket A-89-08.) Furthermore, since cement kilns usually do not generate steam they would not be required to measure load level (see Section 3.5.4.4).

Comment: One commenter (IV-D-105) stated that automatic combustion control systems should be required on all MWC's.

Response: It is believed that automatic combustion control systems will generally be used to ensure compliance with GCP requirements. If however, a system can demonstrate required emission performance on a continuous basis without automatic combustion controls, there is no justification for the considerable associated control expense which would result from this regulatory requirement.

Comment: Two commenters (IV-D-108, IV-D-159) stated that hydrocarbon monitors should be used to ensure continuous dioxin/furan compliance rather than CO monitors.

Commenter IV-D-189 recommended using THC as a surrogate of organics. Commenter IV-D-189 recommended establishing a 25 ppmv limit at 7 percent O_2 for a 24-hour average on the total concentration of nonmethane hydrocarbons on facilities greater than 225 Mg/day (250 tpd).

Response: The first indication of an excursion in an MWC system will be observed by the rising CO concentration. Following the rise in CO concentration the THC concentration will increase. Therefore, the Agency chose the more sensitive predictor of poor combustion conditions. In general, CO monitors are a more reliable instrument. A discussion of using CO or THC as predictors of poor combustion is included in "Alternative Approaches to Real-Time Continuous Measurement for Combustion Efficiency of Hazardous Waste Incinerators," March 1987, written under EPA Contract No. 68-03-3365.

Comment: One commenter (IV-D-110) stated that EPA does not completely understand the process of MSW combustion and should develop an understanding of the different furnace designs before approval is given to build any new plants.

Response: During development of the background information, the Agency made a concerted attempt to understand how each of the major equipment types are designed and operated. This included extensive discussions with the manufacturers, site visits throughout North America, Europe, and Japan, as well as an extensive review of all pertinent literature. This effort, coupled with field testing programs conducted on all major classes of MWC's provided the Agency with an in-depth understanding of how the systems are designed and operated as well as a sufficient data base to establish the regulations.

Comment: One commenter (IV-D-117) argued that as part of GCP to reduce secondary dioxin/furan formation, a provision should be required which prevents metals which have been shown to catalyze dioxin/furan secondary formation from entering incinerators.

Response: Sufficient data are not available to demonstrate the effectiveness of the suggested approach in minimizing dioxin/furan emissions.

Comment: Commenters IV-D-106 and IV-D-117 recommended reestablishing the 6 to 12 percent range of oxygen content in the flue gas. Commenter IV-D-186 recommended continuously monitoring for a minimum O_2 level in the furnace. Commenter IV-D-189 recommended establishing a minimum O_2 level.

Response: Operator control of O_2 content in the furnace region is critical to maintaining low CO and MWC organic emissions. The O_2 content in the flue gas is not a direct emission concern and is not a direct indicator of unit performance. Air in-leakage or other operational considerations may directly impact exhaust O_2 without influencing pollutant emissions of concern. Accordingly, it is felt that the designer and unit operator should have full control of this system variable in order to minimize pollutant emissions since placing another operational constraint on the system may negatively impact performance. Therefore, the standards do not specify O_2 level.

Comment: One commenter (IV-D-158) stated that the field test data do not exist (and the preliminary data do not confirm) the ability of GCP to demonstrate a reduction in dioxin/furan emissions to the level predicted. The commenter recommended that numerical emission levels not be mandated at this time.

Response: There is certainly only a limited body of verifiable field data to base a dioxin/furan emission limit for existing MWC's. The emission standards and guidelines for dioxins/furans are based upon application of both GCP and enhanced APCD systems. As described in Sections 3.5.1. and 7.5.1, data support the achievability of the emission limits for dioxins/furans.

Comment: One commenter (IV-D-159) stated that insufficient data on modern modular units exist and that extrapolation from waterwall and older modular systems is inappropriate for developing best demonstrated technology for modern units.

Response: Good combustion practices were developed for the various technologies from the existing data base. The requirements set forth in the standards and guidelines for modular starved air systems was developed from data sets of three different facilities: Oswego, Prince Edward Island, and Red Wing. The facilities are considered to contain modern modular MWC's.

3.5.5 Size Categories for New Municipal Waste Combustor Plants

3.5.5.1 Size Category Distinction Between Small and Large Municipal Waste Combustor Plants.

Comment: Some commenters (IV-F-1.4, IV-F-1.9, IV-F-1.19, IV-F-1.28, IV-F-2.40, IV-D-05, IV-D-09, IV-D-101, IV-D-106, IV-D-128, IV-D-134, IV-D-168, IV-D-186, IV-D-210, IV-D-238, IV-D-275) said the same level of control should be required for small MWC plants as proposed for large MWC plants, and no size distinction should be made. Their rationale was that small MWC plants may create as much health hazard as large MWC plants because the small ones tend not to be maintained as well and/or have shorter stacks.

One commenter (IV-D-106) said that the choice of the 225 Mg/day (250 tpd) size distinction is not adequately justified. She noted that the graph of control costs in the proposal showed four data points for plants below 225 Mg/day (250 tpd), but that only one of these appeared to have costs of $77/Mg ($70/ton) or more. The commenter requested additional analysis on the marginal cost increase of SD/FF relative to DSI/FF control.

Some commenters (IV-F-1.19, IV-D-101, IV-D-107, IV-D-128, IV-D-134, IV-D-138, IV-D-186) also stated that the size cutoff would encourage the proliferation of less well-controlled, small MWC plants.

One commenter (IV-D-107) said if emission reductions are judged to be cost effective as a whole, uniform standards should be applied to the industry as a whole. He claimed that "microeconomic decision making" by determining cost effectiveness for each competitor is beyond the EPA's authority.

Another (IV-F-1.35) said SD/FF technology is applicable to all size MWC plants. One commenter (IV-D-101) said the "best" APCD's have been applied to a number of small plants (such as one in Jackson County, Michigan) and that they are economically viable. Another (IV-D-210) said a 90 Mg/day

(100 tpd) MWC in California will be equipped with SD/FF control.

Response: As explained in Chapter 1, the standards currently being promulgated affect only MWC's with MWC unit capacities greater than 225 Mg/day (250 tpd). This is consistent with the CAA Amendments of 1990 (Section 129). Under Section 129, standards for MWC units smaller than 225 Mg/day (250 tpd) will be promulgated with 2 years. The emission standards for small plants may be different than those for large plants. As written in Section 111(b)(2) of the CAA, "[t]he Administrator may distinguish among classes, types, and sizes within categories of new sources for the purposes of establishing such standards". Section 129, which addresses solid waste combustion, contains similar wording. The proposed and final standards for large new plants are based on the performance of SD/FF technology while the December 1989 proposed standards for small plants were based on the performance of DSI/PM control. The rationale for the decision that these controls represented best demonstrated technology for large and small MWC's was discussed in the proposal Federal Register notice (52 FR 52251, December 20, 1989). During the next 2 years, the level of control for small MWC's will be reconsidered in light of the CAA Amendments of 1990, and comments on the size category distinction between small and large MWC plants will be addressed as part of that rulemaking.

Comment: Some commenters (IV-F-1.7, IV-D-101, IV-D-137, IV-D-138, IV-D-155, IV-D-188) suggested all MWC plants larger than 45 Mg/day (50 tpd) should be required to have the same control level. Commenter IV-D-188 said costs for SD/FF are higher for MWC plants smaller than 45 Mg/day (50 tpd) than they are for plants between 45 and 225 Mg/day (50 and 250 tpd), and suggested a 45 Mg/day (50 tpd) category distinction. He said their State has an application from a plant with two 32 Mg/day (35 tpd) units that plans to use SD/FF control. Commenter IV-D-106 also mentioned that if a size distinction is needed, 45 Mg/day (50 tpd) would be preferable to 225 Mg/day (250 tpd).

Some commenters (IV-D-103, IV-D-199, IV-D-200) said small plants should be defined as those with capacities below 90 Mg/day (100 tpd) rather than 225 Mg/day (250 tpd). The commenter said plants between 90 and 225 Mg/day (100 and 250 tpd) have similar environmental impacts to plants over 225 Mg/day (250 tpd), and that control costs, on an incremental basis, are not significantly different. Two of the commenters (IV-D-103, IV-D-200) claimed the proposed NSPS, like the PSD rules, will cause many MWC's to be sized just below the 225 Mg/day (250 tpd) capacity level.

On the other hand, one commenter (IV-F-1.34) said that from studying Figure 1 in the proposal preamble, a size category breakpoint of 450 Mg/day (500 tpd) plant capacity rather than 225 Mg/day (250 tpd) seems supportable on the basis of control cost per Mg (ton) of MSW combusted. He commented that cost for MWC plants above 650 Mg/day (720 tpd) are relatively stable, but that control costs increase more rapidly for plants below 650 Mg/day (720 tpd). For example, costs for SD/FF control of a 225 Mg/day (250 tpd) plant, at $33/Mg ($30/ton) is over twice that for a 650 Mg/day (720 tpd) MWC (about $15/Mg [$14/ton]). He thought a breakpoint at a level between 225 Mg/day and 650 Mg/day (250 and 720 tpd) was reasonable, and suggested 450 Mg/day (500 tpd).

Response: As explained in Chapter 1, the standards currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Under the CAA Amendments of 1990, standards for MWC units smaller than 225 Mg/day (250 tpd) are to be promulgated within 2 years. Comments on the level of control for small MWC's will be considered as part of that rulemaking.

Comment: Two commenters (IV-D-190, IV-D-235) suggested there should be three size categories for new plants. Those above 225 Mg/day (250 tpd) should have one control level (e.g., 34 mg/dscm [0.015 gr/dscf] for PM and 80 percent SO_2 control), those below 45 Mg/day (50 tpd) should have a lower level (e.g., 69 mg/dscm [0.03 gr/dscf] for PM and 50 percent SO_2 control), and intermediate size plants between 45 and

225 Mg/day (50 and 250 tpd) would have emission limits set proportionally between these limits. Another commenter (IV-D-242) said further analyses should be conducted for communities with MWC's below 225 Mg/day (250 tpd) and additional size categories should be created. Control requirements should be the most stringent levels affordable for communities of each size.

Response: As explained in Chapter 1, the standards currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Under the CAA Amendments of 1990, standards for MWC units smaller than 225 Mg/day (250 tpd) are to be promulgated within 2 years. Comments on the level of control for small MWC's will be considered as part of that rulemaking.

Comment: One commenter (IV-D-129) said there should be a third size category for new plants that would require that very large new MWC plants (e.g., 2,040 Mg/day [2,250 tpd]) have more stringent controls than proposed.

Response: The standards for large new plants are based on performance GCP and SD/FF control technology. No control technologies have been demonstrated to achieve greater reductions in MWC acid gases, MWC organics, or MWC metals emissions. Therefore, the standards could not require more stringent emission levels for larger new plants.

Comment: Two commenters (IV-D-155, IV-D-257) said that in determining whether a plant is small or large, the aggregate daily capacity should be used, however, any physical restrictions or enforceable permit conditions that effectively limit combustion capacity should also be considered.

Response: Under the standards currently being promulgated, capacity of the individual MWC unit determines whether or not an MWC is subject to the standards (Aggregate plant capacity is used in the guidelines to differentiate between different plant sizes). The size category distinction is determined by the design capacity of new combustors assuming continuous operation. Permit limits, operating schedules, or physical limits of parts of the MWC other than the affected facility (which is the combustor) would not be considered in defining size categories. This is a more straightforward approach for both local waste planning and enforcement purposes because it would not result in changes in the required level of control each time a permit is modified or the MWC operating schedule changes. Under the CAA Amendments of 1990, standards for MWC units of 225 Mg/day (250 tpd) or less will be promulgated within 2 years. As a part of that rulemaking the Agency will determine whether aggregate plant capacity distinctions are necessary for those smaller MWC's.

3.5.5.2 Lower Size Cutoff.

Comment: One commenter (IV-D-60) suggested that the proposed standards and guidelines include a total facility capacity below which MWC plants not be regulated. The commenter suggested using one or more criteria including total facility capacity less than 23 Mg/day (25 tpd), batch-type combustion, no heat recovery, or serving less than 10,000 population. Another commenter (IV-D-289) suggested populations below 10,000 and communities with MWC capacities below 18 Mg/day (20 tpd) should not be required to meet the proposed standards. These commenters said very small MWC plants often have only one operator, operate intermittently (e.g., 6 hours per day or less), and would experience high cost and economic impacts under the proposed standards and guidelines. (See additional comments on cost and economic analyses in Section 3.6.4). Other commenters (IV-D-14, IV-D-276) also suggested a 23 Mg/day (25 tpd) cutoff.

Response: As explained in Chapter 1, the standards currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Therefore, MWC's of the size discussed by the commenters will not be subject to this standard. However, under Section 129 of the CAA Amendments of 1990, standards applicable to MWC units smaller than 250 Mg/day (250 tpd) will be promulgated within 2 years. The inclusion of a lower size cutoff will be considered as part of that rulemaking.

Comment: One State agency commenter (IV-F-3.1 and IV-D-146 and IV-D-246) said that there should be a lower size cutoff between 1 and 11 Mg/day (1 and 12 tpd), because the intent probably was not to prohibit "backyard burning" and the resources would not be available to enforce a rule with no lower size cutoff. A report was submitted with Comment IV-D-146 and IV-D-246 showing the size range of municipal and commercial incinerators in Washington. The commenter said by the proposed definition, there would be over 100 MWC's in the State, many below 9 Mg/day (10 tpd). Another commenter (IV-D-08) suggested a cutoff of 11 Mg/day (12 tpd), and one (IV-D-108) suggested 9 Mg/day (10 tpd).

Other commenters (IV-F-3.8, IV-D-63, IV-D-242) also favored a lower size cutoff in the range of 5 to 11 Mg/day (5 to 12 tpd). These commenters said Alaska has four existing MWC plants with capacities of 4 to 65 Mg/day (4 to 72 tpd) and are planning at least four more with capacities of 5 to 23 Mg/day (5 to 25 tpd). Commenter IV-D-242 also said several military facilities in Alaska operate their own combustors, and at least 41 very small communities with populations between 14 and 1,100 people burn MSW. Furthermore, small coastal Alaskan communities may need to use very small MWC's to burn waste from ships that under MARPOL rules may no longer be dumped at sea. They and another commenter (IV-D-188) suggested different rules for MWC plants with capacities below 45 Mg/day (50 tpd) and no rules below a range of 5 to 11 Mg/day (5 to 12 tpd) and suggested further analysis of impacts on very small MWC's to determine size cutoffs. Alternatively, Commenter IV-D-242 suggested that units below 5 to 11 Mg/day (5 to 12 tpd) (or 230 to 360 kg/hr [500 to 800 lb/hr]) could be certified at the factory, similar to woodstoves, but not be subject to any emission testing requirements. The commenters (IV-F-3.8, IV-D-63, IV-D-242) felt Alaska would have particular problems if these very small MWC plants were not used because landfilling of raw waste attracts bears and the large amount of rain and permafrost conditions make landfill operation difficult and expensive.

Another commenter from Alaska (IV-D-216) knew of four sites with small duplex burner incinerators at radar stations with populations of 10 to 30 persons. He said these burn much less than 110 Kg (250 lb) of MSW per day and should not be covered by the standards.

<u>Response</u>: See the response to the first comment under this section (Section 3.5.5.2, "Lower Size Cutoff").

<u>Comment</u>: One commenter (IV-F-3.2) suggested a lower size cutoff in the range of 360 to 450 kg/hr (800 to 1,000 lbs/hr) charging rate. He arrived at this limit by reviewing data on the population of hospital incinerators. He said for small size units, the hourly rate is easier to determine and more meaningful than Mg/day (tpd) capacity. He also commented that without a lower size cutoff the proposed rules could be interpreted to apply to burning mixed paper in a backyard grill.

Another (IV-D-97) said that a size cutoff of 45 to 90 Mg/day (50 to 100 tpd) should be established in order to avoid covering over 100 hospital waste incinerators in one State. The commenter also said hospital waste could be regulated under a separate NSPS.

<u>Response</u>: See the response to the first comment under this section (Section 3.5.5.2, "Lower Size Cutoff"). Medical waste combustors are being investigated for regulation under a separate standard.

<u>Comment</u>: One commenter (IV-F-3.4 and IV-D-159) suggested that the proposed standards be limited to MWC plants larger than 45 Mg/day (50 tpd) that burn typical MSW (i.e., with a heat content of about 10,500 kJ/kg [4,500 Btu/lb]). He said that the best demonstrated technology specified in the proposed rules have not been demonstrated on facilities designed to process less than 45 Mg/day (50 tpd). He also said the economic impacts of air pollution control on small modular combustion plants used at hospitals, industries, and small rural communities had not been addressed in the EPA's studies, and the costs of the proposed rules would preclude the use of such combustors. Other commenters (IV-D-22, IV-D-101,

IV-D-138, IV-D-149, IV-D-155, IV-D-221) also suggested a 45 Mg/day (50 tpd) size cutoff. Some of them said this would be consistent with Subpart E. Commenter IV-D-101 said facilities below 45 Mg/day (50 tpd) are usually batch charged, operate intermittently, and are quite different from large plants. Commenter IV-D-149 said their State has four MWC plants with 27 Mg/day (30 tpd) capacities and one with an 8 Mg/day (8.5 tpd) capacity serving small rural communities with populations below 15,000, and that impacts on such communities would be significant. There are also very small incinerators at hospitals and in commercial and industrial applications.

The first commenter (IV-F-3.4 and IV-D-159) also suggested that, alternatively, different standards could be applied to plants below 45 Mg/day (50 tpd) based on consideration of combustor size, technology, and application (see following comment).

Response: See the response to the first comment under this section (Section 3.5.5.2, "Lower Size Cutoff").

Comment: One commenter (IV-D-159) suggested a regulatory strategy for MWC plants smaller than about 45 Mg/day (50 tpd). The commenter suggested that facilities smaller than 4.5 million Btu/hr (11 Mg/day [12 tpd]) should have a PM limit of 23 mg/dscm (0.10 gr/dscf), an SO_x limit of 50 ppm, an HCl limit of 44 kg/day (96 lb/day), as well as CO limits of 100 ppm, and furnace temperature requirements to ensure GCP. Those plants between 4.6 and 18 million Btu/hr (12 and 44 Mg/day [13 and 48 tpd]) would have a more stringent PM limit of 69 mg/dscm (0.03 gr/dscf) as well as the same HCl and SO_x limits and GCP requirements. He said these levels are achievable and affordable.

The commenter said advanced wet scrubber technologies have been designed in the past 5 years. He claimed these can achieve good acid gas, PM, and metals control at small modular MWC's for much lower costs than SD/FF systems and also use less energy. Furthermore, he claimed that SD/FF or DSI/FF controls have not been demonstrated for MWC's smaller than

45 Mg/day (50 tpd) and may have operating and maintenance problems caused by acid condensation in situations where combustors operate intermittently. The commenter, therefore, urged that the emission limits be set at the levels he suggested to allow wet scrubber systems at very small plants. Two other commenters (IV-D-118, IV-D-220) also suggested that MWC's below 45 Mg/day (50 tpd) be given emission limits based on wet scrubber/ESP control. They said dry scrubber/FF technology has not been well demonstrated for small MWC's and will be very expensive.

In support of the suggested PM level of 69 mg/dscm (0.03 gr/dscf) (at 7 percent O_2) the first commenter (IV-D-159) said this is similar in stringency to the 34 mg/dscm (0.015 gr/dscf) limit for larger plants because the oxygen correction factor required by modular units is typically 2 times greater than the mass burn waterwall systems due to equipment characteristics and oxygen levels that provide high combustion efficiencies and lower CO levels. The commenter also submitted a dispersion modeling study to show that his suggested PM limits would result in negligible impacts on ambient air quality.

The commenter recommended against establishing dioxin/furan limits for MWC plants below about 45 Mg/day (50 tpd) because of a lack of data on either controlled or uncontrolled dioxin/furan emission rates from very small plants.

Information on the designs, sizes, and uses of very small MWC's was also provided by this commenter. He said there are various designs, but most modern modular MWC's employ a two-staged design to maximize control of the combustion process and minimize air emissions, resulting in lower CO, organic, and particulate emissions than many larger MWC's. Many very small combustors are used at hospitals. There are 6,870 hospitals in the United States, and over two-thirds use on-site combustion facilities for waste disposal. Infectious wastes are typically less than 10 to 15 percent of hospital wastes, and many hospitals combust their other wastes along with infectious wastes. Almost half of the hospitals in the United States use modular combustors to process less than 3 Mg/day (3 tpd) of waste on-site. The combustors operate intermittently. The commenter also said very small modular MWC's are also well suited to serve rural communities with population densities below about 55 people per square mile, because such areas would not generate enough waste to support large mass burn MWC's. Industrial and commercial operations may also use very small MWC's to dispose of wastes produced on-site. No estimate of the number of combustors used in these applications was provided.

Response: As described in the previous responses, the standard currently being promulgated applies only to MWC units with capacities greater than 225 Mg/day (250 tpd) of MSW, and will therefore exclude the vast majority of hospital waste combustors. Smaller MWC's and medical waste combustors are being investigated for regulation under separate standards. The control levels for small MWC's and the need for a lower size cutoff will be considered as part of these rulemakings. Furthermore, the definition of MSW excludes combustors burning industrial process wastes or manufacturing wastes only, since these wastes often have quite different characteristics from MSW and the same standards may not be applicable. The revised definition of MSW addresses many of the commenters' concerns.

Comment: One commenter (IV-D-118) suggested that very small MWC's serving rural communities should be required to have GCP and meet a PM limit in Subpart E (180 mg/dscm [0.08 gr/dscf]), but that costs of more stringent controls are prohibitive to small communities. He said several small communities have commented on costs of proposed State standards, which are similar to the proposed NSPS, and the State planned to change their standards to address this concern. The commenter said MWC's in typical rural communities serve 10,000 to 25,000 persons, combust 23 to 45 Mg/day (25 to 50 tpd) of MSW, and operate twice weekly for 8 hours/day.

Another commenter (IV-D-232) said EPA should consider exempting small facilities (less than 45 Mg/day [50 tpd]) from the standards and guidelines and should also consider alternative emission requirements and monitoring requirements. The commenter specifically suggested considering an alternative that would require very small MWC's to use GCP, but not require specific emission limits and monitoring for PM, acid gases, and organics.

This commenter also said EPA should work with the Small Business Association and trade associations representing small businesses and local governments in its evaluation of small MWC requirements.

Response: See the response to the first comment under this section (Section 3.5.5.2, "Lower Size Cutoff").

In response to the final paragraph of the comment, during the public comment period on the proposed standards, comments were received from manufacturers of small combustors and their trade association. Comments were also received from operators of small MWC's, governments of small communities, and State and local regulatory agencies with small combustors in their jurisdictions. These are all contained in Docket No. A-89-08 and were carefully reviewed and considered during development of the final standards.

Comment: One commenter (IV-D-10) said the standards and guidelines will affect small combustors in their State which operate only 1 or 2 hours per day and burn 45 to 230 kg/hr (100 to 500 lb/hr) of wastepaper and cardboard. He suggested that EPA establish a lower size cutoff, and said that without a size cutoff these combustors would likely close and increase the amount of MSW landfilled. Another commenter (IV-D-292) manufacturers small incineration units that burn 23 kg/hr (50 lb/hr) of paper such as classified documents. He did not believe such small units should be covered by the standards.

Response: See the response to the first comment under this section (Section 3.5.5.2, "Lower Size Cutoff").

Comment: One commenter (IV-F-2.40) did not believe the proposed standards require control of very small combustors at stores, apartments, or gasoline stations. He said EPA should specifically address and regulate these combustors. However, Commenter IV-D-178 said a lower size cutoff should be included to exempt these sources from the regulations.

Response: See the response to the first comment under this section (Section 3.5.5.2, "Lower Size Cutoff").

Comment: One commenter (IV-D-149) said the small size cutoff should be based on actual capacity utilized (i.e., amount of waste burned per day given the actual hours of operation of the MWC) rather than potential capacity based on continuous operation. He said most small MWC's operate intermittently and would never approach their potential design capacity.

Response: The capacity is calculated as the maximum daily (24-hour) design capacity. Operating schedules or permit limits would not be considered in defining whether an MWC is above or below the cutoff. This is a more straightforward approach for both local waste planning and enforcement purposes because it would not result in reevaluation of whether an MWC is subject to the regulation each time the operating schedule changes.

Comment: Two commenters (IV-D-159, IV-D-242) said a lower size cutoff should be specified in terms of design heat release rate or thermal capacity because mass throughput for the same combustor will change depending on waste type.

Response: A change has been made to the standards that clarifies the heat content assumptions to be used in calculating design capacity in Mg/day (tpd) for determining applicability of the standards. These comments raised the concern that, as proposed, the standards might not be equitable in all cases. For example, one MWC unit may be designed assuming 9,300 kJ/kg (4,000 Btu/lb) specific heat content for MSW and would appear to have a combustion capacity above 225 Mg/day (250 tpd). Another unit may be designed for 12,800 kJ/kg (5,500 Btu/lb) waste and would appear to have a total combustion capacity below 225 Mg/day (250 tpd). After start-up, both units may actually fire 10,500 kJ/kg (4,500 Btu/lb) waste and therefore may actually fire the same amount (in Mg/day [tpd]) of waste. But because one has a design capacity greater than 225 Mg/day (250 tpd) and the other has a design capacity below 225 Mg/day (250 tpd) (due to the different design heat content assumptions) one would be subject to the standards and the other would not even though they can actually fire the same amount of waste.

To prevent this potential circumvention, the final standards require MWC capacity be based on firing a "design" municipal waste with a specific heat of 10,500 kJ/kg (4,500 Btu/lb). This will result in a uniform method of determining design capacity. The actual heat content of waste fired may vary above and below this level, but this level is typical of MSW. One unique waste is medical waste, which has a different composition from conventional MSW and typically has a much higher specific heat (e.g., 19,800 kJ/kg [8,500 Btu/lb]). The standards specify that combustors cofiring medical waste calculate capacity based on a "design" medical waste with a specific heat of 19,800 kJ/kg (8,500 Btu/lb). Thus, a combustor which fires a mixture of medical waste and other MSW would prorate the specific heats. For example, if a plant fires 50 percent medical waste and 50 percent conventional MSW, then the design specific heat used in determining Mg/day (tpd) capacity is 15,100 kJ/kg (6,500 Btu/lb) (calculated as 19,800 kJ/kg x 0.50 + 10,500 kJ/kg x 0.50 = 15,100 kJ/kg). Medical waste is defined as "any solid waste which is generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals." (The term biologicals refers to preparations such as vaccines that are made from living organisms.) Medical waste does not include any hazardous waste identified under Subtitle C of RCRA or any household waste as defined in regulations under Subtitle C of RCRA. This definition is consistent with standards for the tracking and management of medical waste (54 FR 12339, March 24, 1989).

3.5.6 General Comments on Emission Limits

Comment: One commenter (IV-D-102) rather than suggesting a small size cutoff, suggested exclusion of hospital waste incinerators. He described several differences between hospital incinerators and MWC's.

First, hospital incinerators typically have capacities of 100 to 900 kg/hr (220 to 2,000 lb/hr), or 0.2 Mg/day to 11 Mg/day (0.2 to 12 tpd), while most MWC's are over 45 Mg/day (50 tpd). Hospital incinerators typically run intermittently for 4 to 12 hours per day, 5 days a week or less.

Second, the commenter said hospital combustors are designed differently from MWC's and employ fixed hearths, starved air, and refractory furnaces that retain gases at higher temperatures for a longer period of time. He claimed this may lower uncontrolled emissions. He also said most hospital incinerators employ wet scrubbers, a control technology that was not evaluated in developing the MWC NSPS. The commenter also said the proposed regulations would have high cost impacts on a large number of hospitals, since 50 percent of hospitals incinerated either medical or a combination of medical and general hospital waste on-site. He claimed that the costs could cause hospitals to stop incinerating.

The commenter, therefore, believed hospital incinerators should be evaluated for regulation under separate standards where issues specific to medical waste incineration could be addressed.

Another (IV-D-108) said small MWC's burning hospital or medical waste should not be covered. Another (IV-D-64) said on-site combustion of medical waste should be encouraged rather than regulated out of existence.

Response: Because the standard currently being promulgated applies only to MWC units with capacities greater than 225 Mg/day (250 tpd), very few hospital or medical waste combustors would be included. Both MWC units smaller than 225 Mg/day (250 tpd) and medical (including hospital) waste combustors are being investigated for regulation under separate standards. However, if hospital combustors are larger than 225 Mg/day (250 tpd) and are burning wastes that fit the definition of MSW, they would be covered just like any other MWC and would have to meet the same standards of performance.

Comment: One commenter (IV-D-64) said the NSPS focuses on large grate incineration systems with waterwall boilers serving large metropolitan areas, and that in determining best demonstrated technology, more detailed consideration should be given to other combustion technologies used to incinerate: rural community MSW; hospital waste (on-site and regional); hazardous waste; LLRW waste; and crematoriums.

Response: The BID's contain performance and cost information for a variety of types and sizes of combustors including modular, RDF, and FBC as well as small and large mass burn waterwall combustors. The vast majority of combustors at hospitals or crematoriums or that serve small rural communities are not covered by the standards currently being promulgated because they will be smaller than 225 Mg/day (250 tpd). Furthermore, hazardous waste and LLRW incinerators would not be covered if they burn industrial process or manufacturing waste only, since industrial process wastes are excluded in the definition of MSW. Combustors larger than 225 Mg/day (250 tpd) that combust MSW, as defined in Section 60.51a, are subject to the standards. Under this definition, facilities burning medical waste, hazardous wastes, or LLRW would only be covered if they are larger than this size and burn wastes discarded by residences, commercial establishments, or institutions. If they burn waste fitting the definition of MSW, they would be subject to the same standards as any other MWC. Hazardous waste and LLRW combustors would also be subject to any applicable standards promulgated under the authority of RCRA.

Comment: One commenter (IV-D-74) said that use of source separated paper and wood pallets as fuel has not been adequately considered in establishing the MWC standards. He said tests show that firing of corrugated paper results in lower emissions of SO_2, NO_x, HCl, and metals than firing RDF, and firing of mixed wastepaper also decreases emissions relative to coal or RDF firing. The commenter, therefore, felt that this practice should be encouraged and new combustors firing or cofiring less than 90 Mg/day (100 tpd) of source-separated waste materials should be exempt from the requirements for acid gas control. Another (IV-D-236) said burning separated nonrecyclable wastepaper has less environmental impact than burning MSW, and therefore this practice should not be regulated as an MWC. (Additional comments specifically discussing cofiring as opposed to firing pure mixed wastepaper are included in Section 6.2).

Response: The standards cover combustors burning fuel feed streams that are more than 30 percent MSW by weight. This is consistent with the CAA Amendments of 1990 (see Section 6.2 on cofiring). The definition of MSW includes wastes discarded by households, commercial establishments, and institutions, whether the waste is a mixture or a single material. Paper discarded by these types of facilities is a component of MSW and so would be regulated as MSW. However, the definition of MSW excludes wood pallets and construction and demolition wastes, which typically do not enter the municipal waste stream. It also excludes industrial process or manufacturing wastes so, for example, wood or paper waste generated during paper manufacturing would not be covered. These standards were not intended to cover the large number of waste wood-fired boilers. It should be noted that the standards currently being promulgated cover only MWC's with capacities greater than 225 Mg/day (250 tpd), so facilities burning smaller amounts of wastepaper (or other MSW) from residential, commercial, or institutional facilities would not be subject to these standards. However, in the future, they may be subject to standards for MWC units smaller than 225 Mg/day (250 tpd) that are scheduled for promulgation within 2 years.

Comment: One commenter (IV-D-87) said that all final emission limits should be shown to be consistently attainable over the lifetime of an MWC rather than only when the MWC is new.

Response: The emission levels were set after consideration of test data on performance of control systems that are properly designed, constructed, operated, and maintained. The specified levels are achievable over the lifetime of such systems.

<u>Comment</u>: Some commenters (IV-F-2.31, IV-D-69, IV-D-106, IV-D-178, IV-D-241, IV-D-253) stated that EPA should consider more stringent emission standards and should consider control technologies (or combination systems including multiple technologies) used in Europe in determining best demonstrated technology. One (IV-D-135) said other technologies such as sodium-based wet scrubbers should be evaluated.

<u>Response</u>: The best control systems for MWC emissions (i.e., MWC acid gases, MWC organics, and MWC metals) were considered in developing the standards. No technologies have been adequately demonstrated that result in greater reductions of MWC emissions than the combination of GCP and SD/FF systems.

<u>Comment</u>: One commenter (IV-D-135) said SD/FF and SD/ESP systems have poor reliability and significant maintenance problems. He cited materials handling problems in the FF/hopper area, scaling and plugging of process lines, spray nozzle failures, and a duct collapse which occurred at one MWC.

<u>Response</u>: Both SD/FF and SD/ESP systems have been installed and operated on MWC's for the past several years and have been demonstrated to be reliable when properly designed, operated, and maintained. Problems such as those cited by the commenter can occur if proper care is not taken. To avoid these problems, regular inspection and maintenance of these systems will be required. These requirements, however, are no different than those generally exercised for other types of industrial process equipment. The cost of maintenance for SD/FF and SD/ESP systems was included in the Agency's analysis of the acid has control requirements and is considered reasonable.

<u>Comment</u>: One commenter (IV-D-103) supported the proposed NSPS (Regulatory Alternative 4 in the proposal preamble) because this alternative is consistent with State programs.

Response: This same regulatory alternative is the basis of the proposed and final standards for MWC's larger than 225 Mg/day (250 tpd) capacity.

Comment: One commenter (IV-F-1.33) said that his company's bubbling bed FBC's burning RDF can meet the proposed emission limits.

Response: The commenter's support for the emission standards is acknowledged.

Comment: One commenter (IV-D-61) objected to the use of a particular type of control equipment in deriving the standards, and said EPA should establish limits and not "endorse" equipment. Others (IV-D-69, IV-D-141, IV-D-153) said EPA should clarify that the standards specify emission limits rather than SD/FF technology. Commenters IV-D-69 and IV-D-153 said the long discussion of this type of control in the preamble leaves the impression that this is the only equipment than can be used, whereas dry injection, enhanced wet scrubbers, ESP's, or emerging technologies may also be able to meet the limits. Another (IV-D-124) said other control technologies, such as ESP's and wet scrubbers should not be eliminated from consideration as best demonstrated technology if they can meet the specified standards.

Response: Any technology that can meet the applicable performance standards can be used to comply with the standards. Municipal waste combustors are not required to use SD/FF systems or any other specific type of control system as long as the applicable standards can be met.

Comment: Two commenters (IV-D-144, IV-D-294) said that for circulating bed FBC's that burn RDF, in-furnace limestone injection and injection of hydrated lime ahead of a FF cooled to 150^{o}C (300^{o}F) can achieve equivalent acid gas control to SD/FF on conventional MWC's. However, the commenters have experienced difficulty in getting State and regional EPA offices to consider these techniques as BACT for FBC's. The commenters suggested the documentation of the NSPS specifically state that scrubbing techniques other than SD can be used by FBC's to achieve the NSPS performance levels.

The first commenter (IV-D-144) also requested that for innovative designs such as FBC, the NSPS allow a period of time after the first units come on line in the United States to demonstrate compliance with the NSPS.

Response: The standards do not specify that a particular type of control equipment must be applied, and FBC's (or any other type of MWC) can use any control technique that can meet the standards. This could include scrubbing techniques other than SD. With regard to the time allowed for new sources to demonstrate compliance, Section 60.8(a) of the General Provisions requires that compliance tests must be conducted "within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after start-up of such facility..." and facilities must report the results of such performance tests. However, under Section 111(j) of the CAA, the compliance test can be delayed up to 4 years after a new facility commences operations when an innovative control technology is used and other conditions in Section 111(j) are met. This avenue is available for the commenter to explore.

Comment: One commenter (IV-D-101) said the expenditure of $510 million per year to control less than 1 percent of the Nation's SO_2 and NO_x emissions and produce a negligible improvement in public health is not a wise use of resources.

Response: Municipal waste combustors were selected for regulation because they emit pollutants that may reasonably be anticipated to endanger public health and welfare. (Responses in Section 3.1 present further information on their selection.) Once a source category has been selected for regulation, the language of Section 111(a) of the CAA specifies the development of standards achievable with the "best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact, and energy requirements) the Administrator determines has been adequately demonstrated." Technologies have been demonstrated to significantly reduce emissions of SO_2, NO_X, and other pollutants from MWC's. These technologies have been applied at commercial MWC's in the United States, and cost and economic impacts are not unreasonable. Therefore, standards have been specified based on the performance of these technologies.

Comment: Some commenters (IV-F-1.18, IV-F-1.22, IV-F-1.23, IV-F-1.25, IV-F-1.25, IV-F-1.28, IV, F-1.31, IV-F-2.18, IV-F-2.19, IV-F-2.20, IV-F-2.28, IV-F-2.44, IV-F-2.45, IV-F-2.55, IV-D-20, IV-D-136, IV-D-218) suggested banning all MWC's or said zero emissions from MWC's is the only way to protect public health from mercury, lead, and other toxic pollutants. One (IV-D-24) said emissions must be 100 percent clean, not 99 percent clean.

Response: The use of MWC's is a potentially useful part of national and local strategies for dealing with disposal of MSW. Municipal waste combustors are included in the hierarchy of integrated waste management options in "The Solid Waste Dilemma: An Agenda for Action" (EPA/-530-SW-88-052), which was developed by the MSW Task Force with public involvement. Source reduction and recycling are highest in the waste management hierarchy. However, it is not practical or technically possible to recycle all wastes. Combustion is useful in reducing the bulk of municipal waste prior to landfilling. This is important because many existing landfills are nearing capacity and siting of new landfills, particularly in urban areas, has become increasingly difficult. Up to one-third of existing landfills are expected to become full and then close within the next 5 years. Furthermore, combustion of MSW has the added benefit of energy production.

Combustors are being regulated under Sections 111(b) and (d) of the CAA (NSPS and emission guidelines for existing sources) rather than Section 112 (NESHAP). As described in the Federal Register (52 FR 25399, July 7, 1987) and 54 FR 52251, December 20, 1989) this decision was made because: (1) MWC emissions may reasonably be anticipated to contribute to the endangerment of public health and welfare,

(2) the range of health and welfare effects and the range and uncertainties of estimated cancer risks do not warrant listing of MWC emissions as a hazardous air pollution under Section 112, (3) Section 112 could not be used to address particular constituents or subgroups of emissions including lead and HCl, and (4) the development of emission guidelines for existing MWC's under Section 111(d) would permit a more thorough evaluation of existing MWC's at the State level than would be feasible in a general rulemaking at the Federal level. (Under Section 111(d), States develop standards based on Agency guidelines.)

Section 111 of the CAA directs the Agency to establish standards of performance that reflect the emission limitation "achievable through application of the best technological system of continuous emission which (taking into account the cost...) has been adequately demonstrated." This section of the CAA does not suggest or require the elimination of all risk. The standards are based on best demonstrated technologies that will significantly reduce MWC emissions including compounds with the potential to cause health impacts. However, it is not technically possible for any source to have zero emissions.

Comment: Some commenters (IV-F-1.24, IV-F-2.9, IV-F-2.24, IV-F-2.26, IV-F-2.42) said no new MWC's should be permitted in nonattainment areas. One commenter (IV-D-16) said MWC's should only be permitted if site-specific studies are done and show that a specific MWC would produce less health risk than other waste disposal options.

Response: In nonattainment areas, each new MWC would have to be permitted under nonattainment area NSR authority in Section 173 of the CAA. A determination of LAER on a site-specific basis is required under NSR. The decision on whether to permit a particular MWC can be made under that program. The purpose of NSPS is to set emission standards applicable at a national level to all new sources and require application of best demonstrated technology or the equivalent, and not to determine whether a new source should be located in a particular type of area or whether additional controls may be warranted due to local considerations.

Comment: Some commenters (IV-F-1.21, IV-F-2.6, IV-F-2.47, IV-D-07, IV-D-120, IV-D-218, IV-D-234) stated that EPA had made its decisions based on available technology; however, because of the nature of emissions from MWC's, the standards should be health based. One (IV-D-234) addressing mercury in particular, said that if technology could not meet health-based mercury standards, facility shutdown may be appropriate. Some commenters (IV-F-1.24, IV-D-110) said cost and economic factors should not be considered by EPA. Commenter IV-F-1.24 added that the environment should be protected at all costs.

One commenter (IV-D-135) said site-specific health risk assessments should be required because emission levels and percent reductions are not adequate in and of themselves. Others (IV-D-176, IV-D-182) suggested establishing emission limits for each metal that are risk-based considering source-specific emission parameters and meteorology as was proposed under RCRA for hazardous waste incineration. A third commenter (IV-D-178) said site-specific multimedia risk assessments should be required as part of the permit review process. Another (IV-D-191) said detailed background sampling studies should be done within a 5-mile radius of proposed MWC's.

Response: As explained in previous responses, MWC's are regulated under Section 111 of the CAA, which is based on the performance of demonstrated control technology. The language of Section 111 clearly states that costs and technological feasibility are to be considered in establishing standards. Section 111(a) states "a standard of performance shall reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated."

Furthermore, the language of this section does not contemplate or require performance of site-specific risk assessment or establishment of risk-based standards; rather, standards are to be technology based. The hazardous waste incinerator standards the commenters refer to are established under RCRA, an entirely different regulatory authority than the CAA, and therefore may have a very different format than this NSPS.

Comment: One commenter (IV-D-164) thought Section 111 of the CAA specifies application of BACT and asked why EPA had based the standards and guidelines on best demonstrated technology.

The commenter also said the acid gas and dioxin/furan limits appear to be based on LAER and that these stringent limits are not justified since MWC's emit only 0.10 percent of national SO_2 emissions.

Response: Section 111 standards are based on best demonstrated technology. Best available control technology is the level of control required under the PSD program and is defined in Section 169 of the CAA. The BACT must be at least as stringent as the best demonstrated technology specified in NSPS, but BACT is determined on a site-specific basis through a permitting process and may be more stringent than best demonstrated technology. As explained in Section 3.5.3, the levels of SO_2 control required by the standards are consistent with application of best demonstrated technology.

Comment: One commenter (IV-D-232) said the regulations for MWC's appear to be more stringent than RCRA rules for hazardous waste incinerators and TSCA PCB incinerator rules, and that this stringency is not justified from an emissions or health risk standpoint. He claimed MWC's have low emissions relative to other sources.

One commenter (IV-D-176) said that inconsistencies in the approach used to regulate hazardous waste incineration (proposed under RCRA on October 26, 1989) and MWC's should be reconciled. The commenter said it would be appropriate to consistently regulate metals and specific organic compounds of concern from all combustion sources.

Response: As described in previous responses, MWC's were determined to be a significant source of emissions that may reasonably be anticipated to endanger public health and welfare. Therefore, they are being regulated under Section 111 of the CAA. Section 111 requires development of standards of performance based on the best demonstrated technology of continuous emission reduction considering costs and other factors. The technologies on which the standards are based have been demonstrated and applied to MWC's, and costs of control are not unreasonable. Therefore, the standards have been established. There will be different regulatory approaches when combustion sources are regulated under RCRA or TSCA rather than the CAA because the statutes are different.

Comment: One commenter (IV-D-129) said EPA should not rely only on demonstrated technology, but should encourage development of new and better technologies. One commenter (IV-F-3.4) said that the very low emission limits proposed in the NSPS would discourage development of new combustion and APCD technologies. Another commenter (IV-D-158) said the standards and guidelines should allow and encourage the use of innovative alternative control technologies or practices if they have a substantial likelihood of achieving equivalent overall pollution reductions and will result in equivalent or lesser levels of risk.

Response: The standards allow the use of any technology, including innovative or new technologies, that achieve the applicable emission limits and other requirements. In fact, the standards will encourage the development of new advanced technologies that can meet the applicable limits at competitive costs, because the standards establish a market for such technologies. Furthermore, NSPS are periodically reviewed, and any new developments in technologies can be considered during such reviews.

Comment: One commenter (IV-D-50) asked if she understood correctly that with SD/FF technologies all types of MWC's (e.g., mass burn and RDF) can meet the same emission levels. The commenter said it appears all three types of combustors are being equated since the same best demonstrated technology is applied to all.

Response: Emissions data for SD/FF systems applied to mass burn, modular, and RDF combustors were reviewed in developing the standards. The same performance levels can be achieved by all three types of MWC's with this control technology.

Comment: One commenter (IV-D-60) said it was inequitable that an existing small 9 Mg/day (10 tpd) MWC would not be required to retrofit acid gas controls, but if a 5 Mg/day (5 tpd) MWC upgraded its capacity to 9 Mg/day (10 tpd) it would be required by the NSPS to add acid gas controls. The commenter did not believe acid gas controls were justified for new MWC's with capacities below 23 Mg/day (25 tpd).

Response: The standard being promulgated covers only MWC's larger than 225 Mg/day (250 tpd).

Comment: One commenter (IV-F-3.9) supported the proposed emission limits and said they could be achieved by a new type of combustor technology his company has developed. The combustor is a batch, starved-air process capable of handling 23 to 450 Mg/day (25 to 500 tpd) of MSW. The outlet gas stream is then combusted. Processing of each batch of waste takes about 16 hours. The commenter said no other add-on controls, such as SD/FF, are required to meet low emission levels. The commenter said testing of a 5 Mg (5 ton) unit shows PM levels below 34 mg/dscm (0.015 gr/dscf), HCl of 0.024 ppm, SO_2 of 18 ppm, NO_x of 0.25 ppm, CO less than 2 ppm, and dioxins/furans less than 5 ng/dscm (2 gr/billion dscf). Some test results were submitted in Comments IV-D-28 and IV-D-295. The tests in Comment IV-D-295 showed higher HCl, NO_x, and CO levels than cited in Comment IV-F-3.9, but the measured values were still below the proposed limits.

Response: If compliance with the standards can be demonstrated, the technology described by the commenter can be used.

Comment: One commenter (IV-D-172) asked whether their system would be classified as an MWC. The system includes a recycling and feed preparation area, a thermal treatment (or combustion) step, and emission controls including particulate controls and wet or dry scrubbers. The commenter said PM levels are less than 23 mg/dscm (0.010 gr/dscf) and over 90 percent HCl removal can be achieved. Emission rates (in kg/hr [lb/hr]) were also presented for SO_2, NO_x, hydrocarbons, and CO for units with and without scrubbers. The commenter said a "char" was produced rather than "ash," and that this material is nontoxic according to EP toxicity tests and can be used as a fuel additive, soil conditioner or landfill base, or upgraded to become activated carbon. Analyses of the char were attached.

Response: Any equipment burning waste that meets the definition of MSW contained in Section 60.51a of the final standards is considered to be an MWC and would be subject to the standards. However, only MWC units with capacities greater than 225 Mg/day (250 tpd) are subject to the standards currently being promulgated.

Comment: One commenter (IV-D-12) submitted general information on a scrubber technology they claim could be applied to MWC's to reduce PM to below 23 mg/dscm (0.01 gr/dscf) and remove "nearly 100 percent" of acid gases.

Response: In developing the standards, test data and information on the best control systems were gathered and reviewed. Emission limits have been set based on the performance of best demonstrated technologies. An owner or operator may use any control technology that can achieve compliance with the standards.

Comment: One commenter (IV-D-108) said best demonstrated technology should include an automatic interlock system for waste feed that stops waste feed if critical operating parameters or emission levels which should never be exceeded are exceeded. Such a system would encourage proper operation, eliminate enforcement discretion, and minimize excess emissions.

Response: The combination of emission limits, performance tests, and continuous monitoring of emissions and operating parameters that are specified in the standards were judged adequate to ensure that combustors and control systems will be well designed, operated, and maintained and continuous emissions reductions will be achieved. An equipment specification such as that described by the commenter is not necessary to ensure control. While not required by the NSPS, such equipment could be used and could be considered by State agencies.

Comment: One commenter (IV-D-116) said GCP and operator training cannot be considered pollutants or emissions so they should not be regulated under "MWC emissions" but as a separate category in the regulation.

Response: Good combustion practices are part of best demonstrated technology to reduce MWC emissions. Therefore, they are included in the regulation.

Comment: One commenter (IV-D-214) said that all MWC's should be required to monitor quantities of all ozone-depleting substances, and that emissions of these substances must be controlled. He said combustion conditions are unlikely to destroy ozone-depleting compounds like CFC's and halons in the MSW.

Response: The standards for new MWC's do limit emissions of NO_x which are a suspected "greenhouse" gas. Total environmental influx of CO_2 is also reduced to the extent the MWC's reduce consumption of fossil fuels. The CFC's associated with refrigeration systems are generally removed from the waste already as "white goods." State and local initiatives encouraging source separation and recycling is expected to further reduce the influx of such materials. Levels of CFC's in consumer products are small and difficult to monitor, but are expected to decrease in the future.

3.6 IMPACTS OF MUNICIPAL WASTE COMBUSTOR EMISSIONS STANDARDS

3.6.1 Environmental

Comment: One commenter (IV-D-110) said the November 30, 1989, EPA press release statement that the standards will cause removal of over 227,000 Mg (1/4 million tons) of pollutants by 1994 does not take into account that many new incinerators will come on line.

Response: The figure cited in the press release for the proposed standards compares national emissions from new and existing MWC's with the standards in place, to the predicted level of emissions from new and existing MWC's if no NSPS was in force when the new MWC's were constructed. The predicted level of emissions in the absence of an NSPS is termed the "baseline." As described in the proposal preamble, in the absence of an NSPS, baseline MWC emissions from new MWC's would be about 99,000 Mg/yr (109,000 tpy). The proposed standards for new sources would have reduced this by 89,000 Mg/yr (98,000 tpy). The proposed guidelines would have reduced MWC emissions from existing MWC's by about 132,000 Mg/yr (145,000 tpy). The total reduction for new and existing MWC's compared to baseline would therefore be over 220,000 Mg/yr (240,000 or about 1/4 million tpy). These figures have been revised slightly because of changes in the emission levels between proposal and promulgation and because, as explained in Chapter 1, the standards and guidelines currently being promulgated control only MWC units larger than 225 Mg/day (250 tpd) capacity. However, when standards and guidelines for smaller MWC's are promulgated (scheduled for late 1992) additional emission reductions will result.

In response to the commenter's question about the net change, the final standards and guidelines for MWC's larger than 225 Mg/day (250 tpd) will result in a net decrease of over 126,000 Mg/yr (140,000 tpy) of MWC emissions despite the new MWC's coming on line. The guidelines will decrease MWC emissions from existing MWC's by about 134,000 Mg/yr (140,000 tpy) (combined SO_2, HCl, and PM).

Over the next 5 years, over 30 new MWC plants (over 70 new combustors) with MWC unit capacities above 225 Mg/day (250 tpd) are expected to commence construction. Under the regulations, total MWC emissions from these new plants (SO_2, HCl, and PM) will be about 7,500 Mg/yr (8,300 tpy). The net decrease in national MWC emissions would therefore be about 126,000 Mg/yr (140,000 tpy).

Comment: One commenter (IV-F-1.28) said combustion increases emissions of chemicals that deplete the ozone layer and contributes to the greenhouse effect and global warming. He also said an area in his State where an incinerator is proposed is already on the EPA's suspect hazardous waste list site, and combustion will only make environmental pollution worse. He favored a ban on new combustors.

Response: As described in one of the responses in Section 3.5.6, combustion is a necessary part of local and national waste management strategies. Source reduction and recycling are preferred, but it is not practical or technically feasible to recycle all wastes. Combustion reduces the volume of waste prior to landfilling, which is important because many existing landfills are approaching capacity and siting of new landfills is difficult. Combustion also has the benefit of electric power generation. While not completely risk free, combustors complying with the standards would result in minimal risks.

As previously explained, NSPS are developed under Section 111 of the CAA and are uniform national standards based on the performance of the best demonstrated control technologies. State permitting programs can deal with local siting issues like the concern about locating a particular MWC at a suspect hazardous waste site.

In response to the comment on emissions of pollutants that contribute to global warming, if waste were not combusted most of it would be landfilled. Landfills also emit significant quantities of methane and CO_2 which contribute to global warming.

Comment: One commenter (IV-F-3.4 and IV-D-159) said that small modular MWC's have lower emissions of CO and unburned hydrocarbons than many other combustion sources such as wood stoves and trucks. He also presented the results of a table of dispersion modeling analysis and said emissions from small MWC's result in ground level pollutant concentrations that are negligible relative the Federal ambient air quality standards. Another commenter (IV-D-22) said he had seen no real information in the BID's indicating that emissions from MWC's smaller than 45 Mg/day (50 tpd) are a problem.

Response: Municipal waste combustors emit significant quantities of pollutants which may reasonably be expected to contribute to the endangerment of public health and welfare. As described in the ANPRM (52 FR 25339, July 7, 1987) and the preamble to the proposed rule (54 FR 52251, December 20, 1989), it was decided in 1987 to regulate MWC emissions under Section 111 of the CAA. Subsequently, the CAA Amendments of 1990 directed the Agency to promulgate standards for MWC units larger than 225 Mg/day (250 tpd) as scheduled and to promulgate standards for MWC units smaller than 225 Mg/day (250 tpd) within 2 years of enactment of the CAA Amendments (i.e., November 1992). Standards developed for MWC's under Sections 111 and 129 will be based on performance of the best control technologies considering costs, nonair quality health and environmental impact, and energy requirements. The goal of Section 111 is not to reduce emissions to the same level from all sources (e.g., wood stoves or trucks versus MWC's). Rather each source category is examined and the appropriate technology for that category forms the basis of the standards.

As stated in Section 3.5.5.2, inclusion a lower size cutoff may be considered in the development of standards for MWC's smaller than 225 Mg/day (250 tpd).

Comment: One commenter (IV-F-2.20) was skeptical that the proposed regulations could reduce organic emissions by 99 percent and metals emissions by 97 percent. He said it was probably an advertisers claim and nothing more.

Response: Actual test data from 10 MWC plants with SD/FF control systems were gathered and analyzed in developing the standards. Dioxins/furans, PM, acid gas, and metals emissions were measured in these tests. The data support the conclusion that these control systems achieve roughly 99 percent dioxin/furan control, or outlet levels below 30 ng/dscm (12 gr/billion dscf), and 98 percent or better removal of metals (except mercury). Data for SD/FF and other types of control systems are summarized in the BID, "Municipal Waste Combustors - Background Information for Proposed Standards: Post-Combustion Technology Performance" (EPA-450/3-89-27c) and in the appendix to this promulgation BID, and test reports contained in Docket A-89-08.

Comment: One commenter (IV-D-135) said SD/FF or SD/ESP technology results in large quantities of unreacted reagents (lime) that must be disposed of.

Response: The study of cost, emissions, and environmental impacts of control alternatives included consideration of the increase in the quantity of solid waste (ash) from MWC's due to the addition of lime. Costs for disposal of this added amount of waste were included in the estimates of the cost of control. The study, "Municipal Waste Combustors - Background Information for Proposed Standards: 111(b) Model Plant Description and Cost Report" (EPA-450/3-89-27b) shows the increase in the quantity of solid waste and the cost of its disposal for each model plant. For most model plants the amount of solid waste was increased by 5 to 8 percent.

Comment: One commenter (IV-F-2.34) said that FF's only transfer pollution from the air to the ash, but the chemicals are still hazardous. Others (IV-F-1.21, IV-F-1.23, IV-F-2.57, IV-F-2.58, IV-F-3.13, IV-D-56, IV-D-136) said stack air pollution controls will make ash more toxic than it currently is.

Another commenter (IV-D-135) said that overfeeding of lime is common with SD/FF or SD/ESP technology, and that this results in higher pH of ash residues which can change the solubility/leachability of heavy metals in the ash.

Response: Few data are available on the effects of lime addition for acid gas control on the leaching of metals from MWC ash. The addition of lime may alter the pH of ash which may change the solubility of some metals such as lead and cadmium. However, any change in solubility depends on the levels of these metals in the ash as well as the relative amounts of lime, chloride, and sulfate in the scrubber solids, and the environmental conditions in the monofill or co-disposal facility where the ash is disposed. All of these characteristics are highly variable and site-specific. It is therefore unclear what, if any, effect acid gas control will have on ash quality. However, increased scrutiny and control over waste disposal in landfills will result in environmentally adequate ash disposal practices. Ash disposal issues are being addressed under other regulatory authorities rather than as part of this NSPS.

Comment: Several commenters said ash disposal is a major issue for MWC's, and that EPA should address ash disposal. Some commenters (IV-F-1.23, IV-F-1.28, IV-D-129) were concerned that the high concentrations on metals present in ash generated by MWC's could lead to impacts on water quality when the ash is landfilled. Others (IV-F-1.24, IV-F-2.57, IV-F-2.58) claimed that any kind of ash landfill or monofills will eventually leak and create a health hazard. Another commenter (IV-F-2.57) said transport of ash was hazardous and described an ash trailer that tipped over after depositing ash at a landfill and got ash on the roadsides.

Several commenters suggested ash classifications and/or ash disposal methods. Two commenters (IV-F-2.38, IV-D-191) said incinerator ash should be put in separate monofill cells and treated as hazardous waste. Others (IV-F-1.21, IV-F-2.6, IV-F-2.47, IV-F-2.53, IV-F-2.57, IV-D-129, IV-D-136, IV-D-191) said ash should be classified as Subtitle C or hazardous waste, rather than Subtitle D wastes. However, another (IV-D-171) said incinerator ash should be managed as a special waste under Subtitle D, and national ash management standards should be issued under Subtitle D of RCRA. Some commenters

(IV-F-1.21, IV-F-1.24) said fly ash should be classified as hazardous waste and should not be allowed to be mixed with bottom ash or any other waste material. Two commenters (IV-F-1.20, IV-D-135) said EPA should clarify the toxicity classification of ash. Another commenter (IV-F-2.52, IV-D-57) submitted a paper entitled, "Recommendations for Policy and Regulations for Residue from Municipal Solid Waste Incineration" adopted by resolution in August 1988 by the Toxic Substances Control Commission of the State of Michigan.

One commenter (IV-D-62) said ash could be detoxified and used as fillers in cement for cement blocks and roadways. However, another (IV-D-191) said it is hazardous and should never be used in this manner. One commenter (IV-D-141) said a process has been developed to stabilize fly ash which combines mechanical, chemical, and molecular bonding of heavy metals such that metals cannot leach.

One commenter (IV-D-78) said if add-on control required by this regulation causes ash to be classified as a hazardous waste, it would have large cost and economic impacts. For example, the city's MWC produces 127,000 Mg (140,000 tons) of ash each year, and they estimate that transport and disposal of this ash in a hazardous waste landfill would cost $25 million per year. The commenter urged that ash disposal regulations be finalized and any impacts of the NSPS and guidelines on ash disposal and associated costs be considered before finalizing the NSPS and guidelines.

<u>Response</u>: While ash management is an important issue associated with MWC's, it is outside the scope of this NSPS, which focuses on MWC air emissions. The classification and disposal of ash is being addressed by Congress in pending legislative actions including the RCRA reauthorization. The EPA's Office of Solid Waste has also initiated studies and rulemaking programs to address ash management and disposal issues. The MWC NSPS and guidelines will not have any significant impacts on the quantity of ash generated or on the techniques appropriate for ash disposal.

3.6.2 Health (and Risk Assessment)

Comment: One commenter (IV-D-64) said small MWC's may not be built due to the standards, and increased waste transport will result in hazards and spills. Also, use of regional combustors near large populations may increase resulting in greater health risks.

Response: The final standards are not expected to discourage small MWC's from being built. Thus, the Agency disagrees with the commenter's contention that waste transport and the use of large regional combustors will increase.

Comment: One commenter (IV-F-2.42) said risk estimates for MWC's should consider the already existing pollution levels in industrialized or nonattainment areas.

Response: Background risk levels are not considered in developing NSPS in accordance with Section 111 of the CAA. In 1987, the Administrator determined that MWC's would be regulated under Sections 111(b) and 111(d) rather than Section 112 partly because the development of emissions guidelines under Section 111(d) would permit a more thorough evaluation of existing MWC's at the State level than would be feasible in a general rulemaking at the Federal level. The Section 111 standards are technology based, however, States may adopt more stringent standards, and hence, can better consider local existing pollution levels in site-specific standards.

Comment: One commenter (IV-F-1.20) said health risk assessments are imprecise, and that even if the analysis is correct, the plants may not meet the emission levels used in the analyses. Another (IV-D-110) disputed the predictive value of health risk assessments and said that until there is a validated body of data and health risk assessments are shown to have predictive value, no MWC's should be built in populated areas.

Response: The comments imply that risk assessment played a role in the development of these Section 111 standards. This is incorrect. In 1987, the Administrator determined that the magnitude of estimated cancer risks, including consideration of the inherent scientific and technical uncertainties, did not warrant listing of MWC emissions as a hazardous air pollutant under Section 112 of the CAA. Section 111 was considered to be the appropriate authority for the control of MWC emissions. The intent of Section 111 is to reduce emissions to the lowest levels achievable with the best system of continuous emission reduction, considering cost and other factors. Risk assessment plays no role in the development of Section 111 standards.

In response to the latter comment, current data indicate health risks associated with well-controlled MWC's are low. A recent review of risks using data and information gathered to support development of the NSPS found that cancer risks for MWC's are likely at the lower end of the ranges cited previously in the ANPRM (52 FR 25339). In cases where there is a local concern, States are free under Section 116 of the CAA to require more stringent controls. However, a State standard may not be less stringent than the Federal standard.

Comment: One commenter (IV-D-120) said there needs to be a comprehensive analysis of cumulative risks from the many existing and planned MWC's, considering both inhalation and indirect risk pathways. This commenter and one other (IV-F-1.24) were concerned with bioaccumulation of dioxins in the food chain (particularly contamination of dairy products).

Response: The Agency did consider the bioaccumulation of MWC emissions in the environment when making the decision to regulate MWC emissions. During the assessment of air emissions from MWC's, the Agency recognized the potential for exposure from the deposition of emitted pollutants and subsequent human contact through indirect exposure pathways (e.g., bioaccumulation into the human food chain). To address this issue, a preliminary analysis was undertaken which used mathematical models to predict multiple routes of human exposure. Because the models used are still undergoing development and predicting multiple routes of exposure is so complex, the results of the analysis cannot be interpreted quantitatively. However, the preliminary results do suggest that for some persistent organics such as dioxins/furans, indirect exposures to emissions deposited over long periods may be comparable to exposures due to direct inhalation. However, the control techniques specified in the standard being promulgated today result in over 90-percent reduction in dioxin/furan emissions, which will significantly reduce both direct and indirect exposures.

Comment: One commenter (IV-F-1.25) expressed concern that lead emitted from MWC stacks and other sources does not degrade and eventually is deposited and enters drinking water.

Response: National ambient air quality standards for lead were first established in 1978 based on concerns about lead exposure. In 1987, the Administrator determined that MWC's would be regulated under Sections 111(b) and 111(d) of the CAA, partly because Section 112 could not be used to address certain constituents of MWC emissions such as lead. Today's standards require PM control that reduces lead emissions by more than 97 percent which will significantly reduce both direct and indirect exposures. The ban on incineration of lead-acid vehicle batteries should also result in additional reductions in lead emissions from MWC's.

Comment: Several commenters (IV-F-1.31, IV-D-106, IV-D-183, IV-D-234, IV-D-244) raised issues concerning the environmental and health impacts of mercury emissions. The commenters argued for more stringent mercury control, citing health effects as well as instances of surface water contamination and bioaccumulation of mercury in the human food chain. Another (IV-D-178) suggested that risk assessment for mercury considering multiple exposure routes should be conducted in order to develop emission limits.

Commenter IV-D-244 criticized the EPA's past use of ISCST and the HEM to model mercury emissions, and said these models do not accurately predict ambient concentrations and do not address multimedia environmental health risks. Furthermore, the commenter said there are some tests showing higher uncontrolled mercury levels than included in the EPA data base considered prior to proposal (e.g., levels of 6,000 to

7,000 μg/dscm [0.0026 to 0.0031 gr/dscf]). He said SD/FF would not necessarily control mercury, and stated that the uncontrolled and controlled emission inputs used in the EPA's risk modeling were too low. He concluded that modeling is not a valid approach and suggested monitoring of the air, soil, water, and wildlife near several representative MWC's.

Response: The EPA did consider the bioaccumulation of MWC emissions (including mercury) in the environment when making the decision to regulate MWC emissions. During the assessment of air emissions from MWC's, EPA recognized the potential for exposure from the deposition of emitted pollutants and subsequent human contact through indirect exposure pathways (e.g., bioaccumulation into the human food chain). To address this issue, a preliminary analysis was undertaken which used mathematical models to predict multiple routes of human exposure. Because the models used are still undergoing development and predicting multiple routes of exposure is so complex, the results of the analysis cannot be interpreted quantitatively. However, the preliminary results do suggest that indirect exposures to emissions deposited over a long period of time may result in health risks similar to direct inhalation. These results served as an additional basis for the Administrator's finding that MWC emissions warrant regulation under Sections 111(b) and (d) of the CAA.

Under Section 129 of the CAA, as amended in 1990, mercury emission limits for MWC's must be promulgated within 12 months of enactment of the CAA Amendments. The standards to be proposed under Section 129 will assure mercury emission reductions.

Comment: One commenter (IV-D-218) said EPA should comprehensively assess environmental health concerns of MWC's including health effects of respirable particulates, methyl mercury in water bodies, groundwater pollution from heavy metals in MWC ash, and contributions to global warming, acid rain, and ozone problems.

Response: The MWC emissions encompass a wide range of diverse pollutants. The standards being promulgated today address MWC metals, MWC organics, and MWC acid gases. The control technologies and GCP requirements required by the standards have broad benefits that address most of the concerns raised by the commenter. For example, an overall reduction in emissions will reduce pollutant deposition on surrounding areas, including bodies of water. The MWC metals standard addresses respirable particulates and the NO_x standard has positive benefits for both acid rain and ozone formation. As discussed in the preamble to the proposed standard, the question of ash disposal and groundwater pollution will be adequately addressed by separate waste disposal management standards.

Comment: One commenter (IV-D-120) pointed out that small MWC plants are often located in more rural areas nearer to agricultural lands. He said that since the food chain pathway (ingestion of dioxins in contaminated crops and dairy products) often accounts for greater dioxin risks than inhalation, small MWC's near agricultural areas should be required to have the most stringent dioxin/furan controls.

Response: New source performance standards implement Section 111(b) of the CAA. An NSPS requires sources to control emissions to the level achievable by best demonstrated technology considering costs and other impacts. The standards selected for small MWC's have been identified as best demonstrated technology considering economics and adverse impacts. Although additional reductions of MWC emissions (including dioxins/furans) would be achieved by applying the most stringent controls to all MWC's regardless of size, the reductions attributable to small plant emissions would be relatively small, and the cost impacts unreasonably high. However, as provided in Section 116 of the CAA, States are free to establish more stringent emission standards and could consider site-specific local factors.

3.6.3 Energy

Comment: One commenter (IV-D-101) said that in establishing the standards and discussing impacts, EPA had not considered that when MSW is combusted it has the beneficial effect of reducing the amount of fossil fuels burned or nuclear energy produced.

Response: It is true that MWC's generate energy and can supply some of the power that might otherwise be supplied by burning fossil fuels.

Comment: One commenter (IV-D-169) disagreed with the implication that a 2.6-percent increase in energy required to operate control equipment is insignificant. The commenter said this energy would be replaced by electricity generated elsewhere, often by plants emitting higher rates of SO_2 and NO_x.

Response: The Agency has considered the energy impacts associated with emission control requirements and believes they are reasonable relative to the reductions in MWC emissions achieved. The Agency acknowledges that the power to operate the MWC emissions control equipment will ultimately result in somewhat higher emissions from another source, but believes these increases are reasonable relative to the overall reduction in MWC emissions.

3.6.4 Cost and Economic

Comment: One commenter (IV-D-117) said the estimated costs of the NSPS (or $1.50 per household per month) are reasonable, and are a fairly small increase relative to baseline costs. The commenter said the $66/Mg ($60/ton) baseline cost cited in the EPA press release probably does not include transportation of MSW since this can cost as much as $110/Mg ($100/ton). Therefore, the commenter said the $13/Mg ($12/ton) increased cost of pollution control should actually be compared to a baseline cost of about $180/Mg ($160/ton).

Response: The $66/Mg ($60/ton) of MSW cost was meant to include transportation (about $22/Mg [$20/ton]) as well as the tipping fee (about $44/Mg [$40/ton]). However, there is wide variation by geographic location in both tipping fees and transportation costs. As stated in the preamble to the proposed standards (54 FR 52251), typical waste disposal costs including collection, transportation, combustion, and ash disposal range from about $40/Mg to over $100/Mg ($36 to over $90/ton) of MSW.

Comment: One commenter (IV-D-138) submitted a table showing his estimate of costs for a SD/FF for a mass burn MWC with three 680 Mg/day (750 tpd) units. His annualized cost estimate was $12.8 million or $61/Mg ($55/ton) of MSW compared to the EPA's estimate of $7.8 million or $36/Mg ($33/ton) of MSW. Major differences that the commenter included were: (1) a reverse air type baghouse with an air-to- cloth ratio of 2.5:1 rather than a pulse jet with a ratio of 4:1, (2) higher lime consumption rates to compensate for short-term spikes in uncontrolled SO_2 levels, and (3) different operating and maintenance costs. The dollar year of the costs was not specified.

Response: Differences in estimated annualized cost can reflect differences in capital cost, financing assumptions, and operating costs. The cost estimates prepared by the Agency were based on procedures developed over a period of time and have been used for standards development activities for more than 10 years. These procedures have been used by the Agency to develop standards for dozens of source categories. The particular procedures used to estimate model plant costs for this project were based on the Agency's cost procedures mentioned above and recent vendor-supplied cost information.

The Agency did reevaluate the level of acid gas control achievable by SD/FF systems as a result of variability in waste composition. Based on this analysis discussed in Section 3.5.3, the acid gas control requirements for SO_2 have been revised.

Comment: One commenter (IV-F-1.35) said that the stringent acid gas limits will greatly increase costs to MWC customers because the vendors will build high risk premiums into the costs of control technologies. He said risk premiums will be included because the proposed acid gas limits for large new MWC's are not well demonstrated and the technology vendors will need to protect themselves against permit compliance liabilities associated with guarantees of this performance level. He also said that in cases where there is not a vendor guarantee, customer costs will increase because of the assumption of public financial liability.

Another commenter (IV-F-2.15) said individual MWC's will be forced to assume great risks and potentially high costs because vendors will not guarantee compliance with the proposed acid gas levels.

Response: The acid gas levels included in the final standards have been demonstrated. As explained in Section 3.5.3, the SO_2 percent reduction standards for MWC's larger than 225 Mg/day (250 tpd) was changed from 85 percent at proposal to 80 percent (block 24-hour geometric mean) under the final standards. The 80-percent (24-hour geometric mean) level has been demonstrated based on statistical analyses of long-term CEM data. Furthermore, the MWC industry has stated that this level is achievable. Test data also show that the 95-percent HCl level (demonstrated by annual performance tests) is achievable. Since the acid gas control levels in the final standards are well demonstrated, vendors should not include high risk premiums in the costs of the control technologies. Communities and vendors are free to negotiate vendor guarantees.

Comment: One commenter (IV-D-60) said the cost and economic analyses for the proposed standards and guidelines do not adequately address MWC's with capacities below 45 Mg/day (50 tpd). The commenter said EPA did not estimate costs for MWC's below 45 Mg/day (50 tpd) and did not include cities with populations below 10,000 in the economic analysis. The commenter believes impacts on small communities with very small MWC's will be severe. This commenter provided more detailed comments on the guidelines (see Section 7.6.4).

The first commenter (IV-D-60) and others (IV-F-2.3, IV-D-22, IV-D-196, IV-D-289) also said application of the proposed standards and guidelines to very small MWC's will halt building of new small MWC's, and result in closure of some existing small MWC's and force more waste into landfills.

They point out that this is contrary to the waste disposal hierarchy in the "Agenda for Action."

One commenter (IV-D-14) said the proposed standards and emission tests will make small MWC's prohibitively expensive and will cause smaller towns in Alaska to continue open burning and landfilling. Another (IV-D-149) said five rural Oklahoma town with populations below 15,000 operate MWC's and that the standards could make combustion economically infeasible and increase illegal roadside and other types of dumping. He said very small MWC's may be the only viable option for remote rural locations because transport of waste to regional facilities is prohibitively expensive.

Other commenters (IV-D-64, IV-D-159) said the standards will deter small MWC's, resulting in increased transport of waste, which will be costly. One commenter (IV-D-276) said the financial burden will cause small MWC's to close and ship wastes to larger mass burn MWC's.

However, another commenter (IV-D-142) disagreed that control costs for small Alaskan communities were unaffordable and said that if costs were not paid for controls, the public would instead pay increased costs for health care and environmental degradation.

Response: As explained in Chapter 1, the standards presently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Therefore, MWC's and communities of the size discussed by the commenters will not be subject to this standard. However, under Section 129 of the CAA Amendments of 1990, standards applicable to MWC units smaller than 225 Mg/day (250 tpd) will be promulgated within 2 years. Impacts on small communities will be considered as part of that rulemaking.

Comment: One commenter (IV-D-220) said the proposed standards may cause small manufacturers of very small MWC's with wet scrubber systems to go out of business. According to the commenter, wet scrubber systems are typically used on the small MWC's because dry scrubber systems may be two to three times as expensive as wet scrubber systems. He said small rural communities with very small MWC's will not be able to afford the more expensive dry scrubbers required under the NSPS.

In addition, the commenter said that making the proposed NSPS retroactive to December 20, 1989, resulted in virtually all of his projects having to be put on hold.

Response: Section 111(a)(2) of the CAA, in the definition of "new source," establishes the applicability date of these standards to be the date of proposal. The Agency recognizes that uncertainty regarding the ultimate level of emission control for new facilities may result in postponement of some MWC projects and temporary reduction in sales of MWC's and pollution control equipment. However, this regulatory uncertainty applies to all firms, not just small firms or small MWC facilities. Furthermore, promulgation of the standard will ultimately eliminate this regulatory uncertainty and probably boost future sales. Finally, it is not clear how much relief to firms might result from adopting the implicit suggestion that facilities under construction or in planning stages before promulgation be treated as existing facilities. The guidelines for existing firms are themselves at the "proposal" stage and also, therefore, subject to regulatory uncertainty.

Comment: One commenter (IV-D-64) said cost and economic analyses are needed to determine impacts of the proposed stringent standards for small MWC's on medical health care costs and small rural communities.

One commenter (IV-D-202) said small hospitals will face relatively high capital costs due to the proposed controls and CEM's, and that this may encourage a shift to regional facilities. He said larger MWC's may be better from an environmental standpoint, but are difficult to site.

Response: Since the standards currently being promulgated apply only to MWC's with capacities greater than 225 Mg/day (250 tpd), very few medical waste combustors would be covered. Impacts on small medical waste combustors and small rural communities will be considered in the planned rulemakings for small MWC's and medical waste combustors.

Comment: Some commenters (IV-F-3.4, IV-D-64, IV-D-149, IV-D-159) concluded that the proposed rules will preclude the use of modular combustors for many small cities and hospitals, and special commercial and industrial applications. They said that as a result, small communities and hospitals will be faced with disproportionate waste disposal costs and be forced to rely on less environmentally sound waste disposal options than modular MWC's.

Response: Since the standards currently being promulgated apply only to MWC's with capacities greater than 225 Mg/day (250 tpd), very few medical waste combustors would be covered. Impacts on small medical waste combustors and small rural communities will be considered in the planned rulemakings for small MWC's and medical waste combustors.

Comment: Some commenters (IV-F-3.8, IV-D-63, IV-D-64) said the cost of emissions testing will affect costs and tipping fees at small MWC's more than estimated by EPA.

Response: The standards currently being promulgated do not cover small MWC's.

Comment: One commenter (IV-D-74) said that an analysis of one industrial boiler showed that the break-even cost to use mixed wastepaper as a replacement for coal would be $21/Mg ($19/ton). However, if acid gas scrubbers were required, the break-even cost for replacing coal would be $56/Mg ($51/ton) rendering the use of mixed wastepaper as a fuel infeasible.

Response: Mixed wastepaper generated from residential, commercial, or institutional discards is MSW. Combustors that fire or cofire MSW (including mixed paper) in amounts greater than 225 Mg/day (250 tpd) and have fuel feed streams containing more than 30 percent MSW, by weight, are subject to the standards. The extent of emissions control would depend on the amount the boiler fired. Because of the size-related requirements, many smaller existing industrial boilers may be able to fire MSW without having to install acid gas scrubbing equipment. However, the intent of the standards is to control emissions from combustion of MSW. The MSW (including mixed paper) would cause roughly the same emissions per Mg (ton) fired whether combusted in a modular, mass burn, or RDF-fired MWC or cofired with fossil fuels. Therefore, it is appropriate to require controls on all units firing MSW, whether by itself or as a cofired fuel.

3.7 SELECTION OF FORMAT OF PROPOSED STANDARDS FOR MUNICIPAL WASTE COMBUSTOR EMISSIONS

Comment: One commenter (IV-D-108) supported regulation of dioxins/furans as total emissions. He maintained that regulation as a group addresses the risk posed by the compounds and the use of TEF's is an unnecessary refinement for the purpose of NSPS.

In contrast, many commenters (IV-F-1.19, IV-F-1.20, IV-D-62, IV-D-69, IV-D-101, IV-D-107, IV-D-116, IV-D-117, IV-D-119, IV-D-122, IV-D-134, IV-D-135, IV-D-139, IV-D-143, IV-D-144, IV-D-145, IV-D-154, IV-D-155, IV-D-164, IV-D-210, IV-D-235, IV-D-255, IV-D-277) thought the dioxin/furan limits should be expressed in terms of toxic equivalents. Several (IV-F-1.19, IV-D-101, IV-D-107, IV-D-143, IV-D-155, IV-D-164) pointed out the worldwide data base focuses on TEF's and past EPA and State actions have used TEF's. One commenter (IV-D-154) said before a standard is established using total dioxins/furans, additional testing and evaluation is needed to compare the TEF technologies to the new data base. One commenter (IV-D-119) stated that there is insufficient data on total dioxins/furans to establish emission limits on that basis. In addition, dioxin/furan emissions data which have been collected on a toxic equivalent basis cannot be directly converted to a total dioxin basis because, in many cases, only toxic isomer emissions were measured. Thus, he said, there is little known about the ability to control these nontoxic isomers. Others (IV-D-62, IV-D-101, IV-D-104, IV-D-107, IV-D-117, IV-D-144, IV-D-235) added that the use of total emissions ignores the inherent variability in the toxicities of the dioxin/furan isomers. One commenter (IV-D-144) stated, in most cases, use of total emissions would over dramatize the importance of low toxicity isomers. He said there may also be circumstances where use of total emissions could mask toxic impacts that would have been more accurately revealed by the use of TEF. Three other commenters (IV-D-154, IV-D-184, IV-D-235) objected to the inclusion of octa-chlorinated dibenzo-p-dioxins and dibenzofurans in the standards because of their negligible toxicities. The commenters said TEF is a more appropriate measure to use because it is a better index of health hazards.

One commenter (IV-D-189) said a limit for just 2,3,7,8-tetra chloro-dibenzo-p-dioxin would be more meaningful from a toxicity standpoint, but still reduce test complexity.

One commenter (IV-D-107) said EPA justified the use of total dioxin/furan emissions because "studies have shown a direct relationship between dioxins/furans and TEF so reduction in dioxin/furan health risks will be achieved using either approach." The commenter asked for an opportunity to review the unnamed studies. He presented data from field tests to show that total dioxin/furan emissions significantly in excess of 5 to 30 ng/dscm (2 to 12 gr/billion dscf) range can occur without proportionate increases in the TEF's of the emissions. Another commenter (IV-D-145) also felt toxic equivalents are not proportional to total dioxins/furans.

Some commenters (IV-D-107, IV-D-116, IV-D-144) suggested setting a limit of 2.0 ng/dscm (1 gr/billion dscf) using the EPA's current TEF methodology. Other commenters (IV-D-27, IV-D-105, IV-D-117, IV-D-142) suggested the standards require a TEF limit in the range of 0.1 ng/dscm (0.04 gr/billion dscf) based on European data (see comments on specific dioxin/furan levels suggested in Section 3.5.1).

Response: As explained in responses in Sections 3.2 and 3.5, this regulation is pursued under Section 111 not Section 112, and therefore, is a technology-based rather than a health-based standard. The emission limit for total dioxins/furans reflect the achievable performance levels of specific types of control technologies, and are not derived from any target levels of health risks. There is no indication that TEF would be a better measure of emissions control performance than total dioxins/furans. In addition, there is no way to select or operate technology for control of specific isomers given current knowledge. A principal reason for not expressing emission limits as TEF is that some accommodation would have to be included in the standards for possible future changes in the values of TEF. Different agencies use different methodologies for calculating TEF, and the Agency recently (in 1989) changed the procedures it uses to calculate TEF based on new toxicity information. Emission limits based on TEF could be referenced permanently to the current (1989) TEF, but this would likely generate confusion when future permits, State regulations, etc., may use post-1989 TEF values. Alternatively, TEF emission limits could be revised each time the TEF are revised (based on no changes in total dioxins/furans and no intended changes in control technologies), but this presents some technical uncertainties regarding achievability of the revised emission limits if there are major changes in TEF for some groups of dioxin/furan compounds. Furthermore, a review of tests from several MWC's included in Docket No. A-89-08 shows that total dioxins/furans (specifically total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans) correlate with TEF and will therefore assure control of toxic emissions. Total emissions are also simpler to calculate.

The reference test method for total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans requires measurement and reporting of some 31 groups of the 210 chemical compounds that comprise dioxins/furans. This information gives total dioxin/furan emissions, and when combined with a set of TEF values is also sufficient to permit the calculation of TEF emissions and estimation of associated health risks, if this is desired.

The total dioxin/furan emission standard set for new MWC's larger than 225 Mg/day (250 tpd) in this rulemaking (30 ng/dscm [12 gr/billion dscf]) is approximately equivalent to 0.5 ng/dscm (0.2 gr/billion dscf) TEF. It is more stringent than the 2 ng/dscm (1 gr/billion dscf) TEF limit suggested by two commenters and less stringent than the European TEF standards suggested by other commenters. The selection of this limit is based on performance of demonstrated control technologies as explained in Section 3.5.1 of this chapter.

Comment: One commenter (IV-D-27) objected to establishing emission limits based on ppm measurements. The commenter felt this approach perpetuates the concept that the solution to pollution is dilution. Instead, the commenter suggested that pollution standards be based both on specified limited amounts of pollutants per unit of garbage incinerated and on total pollution per year, by substance, at rated load.

Response: When analyzing possible formats for the standard, it was determined that the most appropriate format would limit the concentration of emissions (specified in ppm for SO_2, HCl, and CO; gr/dscf for PM; and ng/dscm [gr/billion dscf] for dioxin/furan) in the exhaust gases discharged to the atmosphere. All of these measurements are corrected to 7 percent O_2, which will prevent dilution from influencing the calculated ppm or other values used to determine compliance. The major advantage of this format is its simplicity of enforcement. The type of format suggested by the commenter, placing a limit on the mass of emissions per mass of waste combusted, would require more data collection and calculations and would prove burdensome to the MWC owner or operator without offsetting benefits.

Furthermore, it would be a violation of the standard for an MWC facility or any other source to intentionally dilute its emissions to achieve compliance as stated in Section 60.12 of the General Provisions.

3.8 PERFORMANCE TEST METHODS AND MONITORING REQUIREMENTS FOR MUNICIPAL WASTE COMBUSTOR EMISSIONS

3.8.1 Periodic Testing

Comment: Many commenters (IV-F-1.24, IV-F-2.52, IV-F-3.13, IV-D-26, IV-D-56, IV-D-57, IV-D-105, IV-D-106, IV-D-115, IV-D-117, IV-D-168) stated that small new facilities (and existing facilities) should not be allowed to skip annual compliance tests. One commenter (IV-F-1.19) said small MWC's should be required to test as often as large MWC's. Three commenters (IV-F-1.24, IV-D-56, IV-D-106) pointed out that testing also serves the purpose of identifying malfunctions or maintenance problems. Three commenters (IV-D-137, IV-D-155, IV-D-164, IV-D-184) felt testing requirements should be the same for all MWC's regardless of size. One (IV-D-164) thought they should be the same regardless of age as well.

One commenter (IV-D-178) thought new facilities with greater than 225 Mg/day (250 tpd) capacities should have the option of skipping compliance tests. The commenter said these facilities are required to meet the most stringent limits and install state-of-the-art air pollution control equipment and thus are most likely to meet the regulations on a long-term basis. The commenter said he understood the philosophy behind the 2-year exemption is to reduce costs for smaller facilities. However, he and another commenter (IV-D-184) felt all facilities, regardless of size, should be granted the same opportunity for exemption from testing.

Response: The standards currently being promulgated apply only to MWC units larger than 225 Mg/day (250 tpd) capacity. Annual stack tests for PM, HCl, and dioxins/furans are required. An annual test for these three pollutants would costs about $30,000 total (including preparation, test runs, analyses, and a report). For MWC's larger than 225 Mg/day 250 tpd this test cost would equate to a range of about $0.10 to $0.45/Mg ($0.10 to $0.40/ton) of MSW. For large MWC's this cost is reasonable given the added assurance annual testing will provide that the emission limits are being met.

Comment: One commenter (IV-D-137) thought that after initial compliance tests, annual performance testing for PM, organics, and HCl is unnecessary. He felt that continuous monitoring of opacity, SO_2, NO_x, CO, steam flow, and temperature will guarantee that facilities are maintaining compliance. The commenter suggested that if EPA policy requires periodic testing that a 3-year interval would be adequate.

Another commenter (IV-D-222) felt it was not clear that frequent testing was needed. He said the tests are very costly and thought the costs should be evaluated in conjunction with the amount of control achieved. Another commenter (IV-D-266) said that testing costs at the proposed frequency exceed projections of his facilities' net income. The two commenters suggested that testing every 5 years (upon permit renewal) would be more reasonable. One commenter (IV-D-255) thought monitoring requirements should be more flexible and allow State regulatory agencies to defer required annual testing if compliance is demonstrated over a period of years and remains supported by continuous emission monitoring.
Response: The periodic stack tests are required to assure that emission limits are met by direct measurement of the pollutants. The test costs were considered and are reasonable. Furthermore, periodic testing is already required in some States and has proven to be practical.

In the case of dioxins/furans, the monitoring of CO, temperature, and load will indicate that the combustor is designed and operated to reduce MWC organic emissions. However, these will not produce a measurement of dioxin/furan emissions. Periodic stack testing is needed to ensure that dioxin/furan emission limits are being met.

In the case of PM, opacity is an indicator of PM and MWC metals emissions, and the monitoring of opacity would detect significant problems with control equipment. However, opacity is not a direct measurement of the PM concentration in gr/dscf. This can only be obtained through periodic stack testing for PM. Similarly, while continuous monitoring of SO_2 is required, periodic testing for HCl will provide assurance that all MWC acid gases are being controlled.

For MWC's larger than 225 Mg/day (250 tpd) the costs of annual stack testing is a small portion of total control costs and is reasonable in light of the additional compliance information provided.

Comment: Two commenters (IV-D-106, IV-D-108) recommended a 9-month testing schedule to address the seasonal variations in the waste stream. One (IV-D-108) said the full cycle of four tests should be required before skipping is allowed. The commenter would support less frequent testing if compliance is demonstrated in this manner.

Response: The standards require annual tests of PM (to indicate MWC metals control), HCl (an MWC acid gas), and dioxins/furans (to demonstrate MWC organics control) for MWC's larger than 225 Mg/day (250 tpd). While there is some variability in MWC control device outlet emissions of PM, HCl, and dioxins/furans, this variability does not appear to be seasonal. Furthermore, the standards require continuous measurement throughout the year of several other pollutants and parameters. Therefore, annual testing of PM, HCl, and dioxins/furans is judged to be frequent enough to ensure compliance. If individual States wish to require more frequent testing, they can do so.

Comment: Four commenters (IV-F-1.20, IV-F-1.22, IV-D-05, IV-D-201) favored stack testing more often than once per year. One commenter (IV-F-1.20) recommended stack testing every 6 months, with retesting after 30 days if an incineration unit failed the first stack test. If the unit failed the second test, the commenter said the incinerator should be shut down until compliance could be demonstrated. One commenter (IV-D-201) suggested monthly stack tests for metals, dioxins/furans, and HCl due to seasonal variations in the make-up of MSW and to monitor changes in the APCD. Another commenter (IV-F-1.22) said monthly emissions testing for dioxin/furan should be required. One commenter (IV-D-05) felt annual emission tests were not sufficient.

Response: Annual stack testing for PM, HCl, and dioxins/furans is performed frequently enough to ensure compliance with the standards. The requirements for continuous monitoring of opacity, SO_2, CO, load level, and temperature will ensure that combustors and control devices are operating properly between annual tests. Requiring stack testing for all pollutants to be performed every month or every 6 months would increase the cost and monitoring burden of operating the MWC. If a plant does, however, fail the stack test and violate the standards, normal enforcement procedures would be followed.

Comment: Two commenters (IV-D-105, IV-D-117) said EPA should require all stack tests to be conducted concurrently so that facilities will not adjust operating parameters to obtain a favorable outcome for a specific pollutant.

Response: Within the range of normal MWC operating conditions, an MWC operator would not be able to significantly adjust the operating parameters to control emission rates of individual pollutants to a specific level. As a general rule, MWC operating conditions that are favorable for controlling emissions of one pollutant (e.g., lower flue gas temperature to control acid gases) are also beneficial in control of other pollutants (e.g., organic emissions). It is not clear that an operator can readily adjust operating conditions in such a way that emissions of one pollutant can be lowered at the expense of increasing the emissions of another pollutant. Moreover, it would not be practical for logistical reasons to perform simultaneous sampling. This is due to space constraints normally associated with stack sampling procedures, the limited number of sampling ports, and limited personnel available to perform the simultaneous testing.

Comment: One commenter (IV-D-135) felt that compliance tests should be run under worst case pollutant loadings within the normal operating parameters of the combustor and APCD to guarantee that emission standards are being met on a continual basis.

Response: Section 60.8(c) of the General Provisions states that: "Performance tests shall be conducted under such conditions as the Administrator shall specify to the plant operator based on representative performance of the affected facility." In addition to this General Provisions requirement to test under representative MWC operating conditions, MWC's are also required by Section 60.55a to establish their maximum load level during their performance tests and may not operate above 110 percent of this load level (4-hour average).

Conducting the performance test under representative conditions at high load is sufficient to guarantee that the emission standards can be met on a continual basis.

Comment: One commenter (IV-F-1.20) advised EPA to pay more attention to stack testing procedures. The commenter mentioned being present at a new facility when it was being tested for acceptance. The facility was burning commercial waste, primarily paper, to improve emissions in order to pass the stack test.

Response: As discussed in the preceding response, stack testing is required by the General Provisions to be conducted under representative MWC operating conditions. The enforcement officer reviewing the test data should question whether the MWC was operating under normal operating conditions (such as burning excess amounts of paper to improve emissions). The enforcement officer could require further testing, and has full authority to do so.

Comment: One commenter (IV-D-121) stated baghouses are vulnerable to failures which may go undetected in normal operation. He suggested more frequent measurement of metals and PM as well as other engineering changes.

Response: Any significant failures of baghouse operation would be detected during continuous monitoring of opacity, which is required by the standards. Therefore, frequent measurement of metals and PM or requirements for specific engineering changes are not necessary.

Comment: Some commenters (IV-F-1.19, IV-F-1.20, IV-D-134) suggested periodic testing for individual metals. They noted that some States or local governments require testing for metals and toxic organics every 6, 9, or 12 months. Two commenters (IV-F-1.20, IV-D-134) thought the stack testing requirements comparable to New York's for metals and organics should be included.

Response: As explained in Section 3.5.2, establishing an emission limit for and monitoring PM emissions would also ensure that individual metals, except mercury, are controlled. Because individual metals are controlled with the PM limit, limits for each individual metal are not needed. However, under Section 129 of the CAA Amendments of 1990, emission limits for mercury, lead, and cadmium are to be promulgated within 12 months of enactment. It States wish to adopt emission limits and require testing for additional individual metals, they may do so. In regard to organics, the annual dioxin/furan test and continuous monitoring of other parameters are adequate to ensure organics control without being burdensome.

Comment: One commenter (IV-F-1.32) said the proposed emission test frequencies and monitoring requirements are appropriate. He said tests are conducted every 9 months in his State, at a cost of $125,000 per test, and little variation is seen from year to year.

Response: The Agency agrees with the commenter that the proposed frequency and monitoring requirements are appropriate for ensuring compliance.

Comment: Several commenters (IV-F-3.8 and IV-D-111, IV-D-130, IV-D-164, IV-D-219, IV-D-246) said that dioxin/furan testing would be a major cost for MWC's. One commenter (IV-D-130) said his State does not require dioxin/furan testing for permits because of the test cost and because the same level of control could be obtained through acid gas control and GCP. He suggested that dioxin/furan emissions be tested for 2 consecutive years for all facilities greater than 225 Mg/day (250 tpd) and the result correlated with CO data. If the organic emissions comply with the standard then the commenter felt CO could be used as a surrogate. He suggested retesting for dioxins/furans on a 5-year cycle. One commenter (IV-D-164) felt that compliance with the EPA's GCP is sufficient to minimize organic emissions from MWC's. He added that modern, well operated MWC's emit organics at concentrations below ambient urban levels. He urged EPA to relax the regulation or require testing only if an MWC fails an annual CO compliance test. Two commenters (IV-F-3.8, IV-D-242) suggested that small MWC plants should have to test for dioxins/furans initially but should not have to retest unless the character of the ash changes in such a way as to indicate decreased combustion performance. Alternatively, they suggested testing for dioxins/furans every 5 years at small MWC plants. One commenter (IV-D-242) also suggested that for small units testing and certification be conducted at the factory or that dioxins/furans limits be waived in consideration of low emissions due to low waste discharge rates and application of GCP. Another commenter (IV-D-111) thought no dioxin/furan limit should be set for any size MWC. He said if a standard were set it should only apply at initial start-up to demonstrate GCP will achieve the limits. One commenter (IV-D-219) thought compliance tests for organics are useful only as an after-the-fact assessment of combustor design and operation.

Two commenters (IV-D-08, IV-D-246) suggested that CO and temperature CEM measurements be considered for use as an alternative method to Method 23 for the demonstration of compliance with the dioxin/furan standard subsequent to the initial compliance testing.

Response: Periodic testing for dioxins/furans is not unreasonably costly. The cost of conducting a typical dioxin/furan compliance test at an MWC facility is about $30,000 per test. This average cost estimate includes travel, preparation, sampling, analysis, reporting, and program management. This cost is a small percent of the total cost of combustion and control. For example, for a typical 450 Mg/day (500 tpd) MWC an annual test would be less than 1 percent of total annualized capital and operating cost of the combustor and control equipment and about 2 percent of the annualized cost of control. Annualized costs for stack tests would typically be about $0.10 to $0.45/Mg ($0.10 to $0.40/ton) of MSW, depending on plant size.

Although MWC parameters such as CO and temperature indicate good combustion which leads to lower organic emissions, no consistent relationship between CO and stack dioxin levels has been demonstrated. Furthermore, certain site-specific factors may affect the amount of dioxin emissions so that periodic testing at individual MWC's is needed to track this variation. It has been determined, therefore, that periodic stack testing is the most reasonable method of ensuring that the MWC facility is actually meeting the dioxin/furan limit.

Comment: One commenter (IV-D-120) stated that an average CO level that meets the standards does not guarantee a similar condition for dioxin/furan emissions because the 4-hour CO averaging period could smooth over significant variations and dioxin/furan emissions are probably not linearly related to CO level.

Response: An average CO level maintained in accordance with the standard would ensure continuous compliance with GCP and thereby would result in lower MWC organic emissions. There may be some variation in dioxin/furan emissions (as there is with emissions of any pollutant) when monitored on a short-term basis; however, no method exists for continuously measuring dioxin/furan emissions. Because no method exists, the combination of continuous monitoring of CO (and other parameters) to achieve GCP and periodic stack testing for dioxin/furan is judged to be adequate to measure compliance with the standard.

Comment: Three commenters (IV-F-1.24, IV-D-09, IV-D-96) thought that testing should be administered by an unbiased government or independent agency.

Response: As described in Section 60.13 of the General Provisions, all emission testing must follow specified procedures and be well documented. Enforcement officers may attend any test and, if submitted test results appear questionable, enforcement officers may request further testing. It is believed that these required test procedures together with enforcement review are sufficient to ensure that testing to determine compliance is being performed accurately.

3.8.2 Continuous Monitoring

Comment: One commenter (IV-F-2.3) contended that MWC plants with more than one MWC burning a given waste type should only be required to install an SO_x emission monitoring device on one of the combustors. The commenter pointed out that SO_2 emissions are dependent on waste feed characteristics rather than specific combustion conditions.

Response: The control device outlet SO_2 emissions are a function not only of sulfur content of the waste feed, but also of combustion conditions, as well as design and operation of add-on acid control devices. Even if two combustors of the same design are fed waste from the same batch, differences in the waste may exist. Furthermore, differences in the control device performance may occur between the two combustors due to small differences in operation and repair of the controls.

Testing at two combustors located at the same MWC has usually shown somewhat different emission rates because of the large number of variables. In view of this, the percent removal or outlet SO_2 level must be monitored separately for each combustor and its accompanying control device. The cost of monitoring each combustor is considered reasonable in light of the additional enforcement capabilities acquired and the potential excess emissions detected.

Comment: Two commenters (IV-D-108, IV-D-168) recommended a 4-hour compliance period for acid gas. One commenter (IV-D-108) said 24-hour averaging times for SO_2 and HCl are not supported by test data or operational considerations.

However, several commenters (IV-D-101, IV-D-139, IV-D-155, IV-D-190, IV-D-257) supported the 24-hour averaging time for SO_2 and NO_x. Two commenters (IV-D-101, IV-D-155) said anything shorter is unwarranted and technically flawed because of the reaction time inherent in the combustion/APCD train.

Response: The focus of Section 111 of the CAA is to require continuous long-term emission reduction based on the performance of best demonstrated technology. Even when the best acid gas control technology is installed and operated correctly, there will be short-term variability in SO_2 emissions, and short-term peak values that are higher than the average emission rate. Therefore, when continuous emission monitoring data are collected, an averaging period must be specified for the purposes of determining compliance. The shorter the averaging time used, the more a standard would represent short-term peak values rather than long-term performance. Therefore, if compliance were measured on a 4-hour as opposed to a 24-hour or longer basis, achievable emission limits would be higher (and required percent SO_2 reduction would be lower). The selected 24-hour averaging period is long enough to be more representative of long-term control technology performance as opposed to short-term variation, but is short enough to provide for timely calculation of performance levels and enforcement information. Therefore, this averaging period was chosen for SO_2. Since HCl is not continuously monitored, but is determined annually using a stack test (average of three or more test runs), there is no averaging period associated with HCl emissions.

Comment: One commenter (IV-D-134) asked why SO_2 emissions will be determined on a 24-hour daily average when corresponding limits in PSD permits are required to be set at 1 or 3 hour intervals.

Another commenter (IV-F-1.4) stated the averaging times appear inconsistent with the EPA policy of requiring States to include short-term limits on pollutant emissions. This commenter also thought the averaging times were inconsistent with permits to insure protection of short-term ambient standards and PSD increments. This commenter argued for short-term (1-hour averaging time) limits for SO_2, HCl, NO_x, and CO. The commenter believed health effects from peak short-term emissions can be serious and high short-term emissions should be prevented. These 1-hour averages could be determined and enforced using CEM's or stack tests. The commenter noted that the proposed emission levels could be adjusted to account for the greater variability in 1-hour averages as opposed to longer averaging times.

Response: The PSD and NSPS programs have different objectives. The aim of the NSPS program is to regulate emissions based on technological performance, whereas the PSD program seeks to protect the ambient air quality against peak emission values. By using short-term tests (1 or 3 hour intervals) in the PSD program, peak values would be detected more easily because they would not be smoothed over by averaging them into a longer-term (e.g., 24 hour) averaging period.

If a State recognizes that an exceedance problem exists with a certain pollutant, that State can require short-term testing to reduce emissions of that problem pollutant. Because the NSPS program is concerned with performance of a given technology, a different averaging time may be used. In this case long-term averaging times are more appropriate. As explained in the previous response, a shorter averaging time would require a lower performance level.

Comment: Three commenters (IV-D-103, IV-D-200, IV-D-231) opposed the use of block averages for acid gases. Two commenters (IV-D-103, IV-D-200) contended that block averages are easier to meet than rolling averages and a facility has the capability to operate in such a way that nighttime compliance might not be attained. One commenter (IV-D-231) added that rolling averaging times should be long enough so that occasional upsets due to normal variations in the waste stream would not result in a violation.

Response: The Agency believes that the averaging time for SO_2 and emission limits for MWC acid gases in the final standards requires careful operation of the APCD's throughout the entire averaging period and is stringent enough to achieve continuous compliance, including at nighttime. No significant benefits would be gained by using the 24-hour rolling average.

Comment: Two commenters (IV-D-108, IV-D-135) advocated the use of continuous monitoring requirements for HCl. One commenter (IV-D-108) said the EPA RCRA branch has been studying them for 4 years and recommends them for hazardous waste incinerators. Several permits have been issued which require the use of HCl CEM's which the commenter thought indicated the monitors meet NSPS criteria as best demonstrated technology. The other commenter (IV-D-135) said continuous monitoring of HCl is common in Europe and Japan.

Two commenters (IV-D-164, IV-D-255) urged EPA to establish a standard CEM method for HCl and defer continuous compliance requirements until the method is well established.

One commenter (IV-D-154) stated he was not aware of any HCl certifiable continuous monitors operating in the United States on a waste-to-energy scrubber inlet. He said EPA needs to define the method of measuring percent removal if these monitors do not exist on the market.

Response: The Agency's OSW requires control of HCl emissions in its regulations for hazardous waste incinerators. The regulations do not require HCl CEM's. Rather, the provision recognizes that HCl monitors are available but does not consider them demonstrated for determining continuous compliance as required by the CAA. Application of HCl CEM's under RCRA is left to the decision of the individual permit writer based on site-specific considerations. The provision allowed currently available HCl monitors to be given special consideration by the regional administrator and evaluated for use on a site-specific basis.

The determination not to require continuous HCl monitoring under this NSPS is, therefore, consistent with the OSW hazardous waste incinerator guidelines. Based on review of data from MWC's with acid gas controls, it has been determined that a correlation exists between SO_2 and HCl control. Most acid gas control systems preferentially control HCl (i.e., for any given percent SO_2 control achieved, a higher percent HCl control is achieved). Because SO_2 CEM's also indicate HCl control, it has been determined that HCl CEM's are not necessary.

Comment: One commenter (IV-D-116) said using CEM's to determine compliance with the acid gas standards is not a demonstrated technology. The commenter argued that the data EPA used to determine best demonstrated technology was based on manual, closely controlled, short-term compliance tests and that performance data obtained from CEM's during continuous operation has not been available to any great extent.

Response: The Agency has reviewed the status of CEM's for SO_2 and has determined that available data indicate they are demonstrated for monitoring SO_2 emissions. Many MWC's use SO_2 CEM's. In developing the standards, long-term data obtained using CEM's were reviewed and analyzed. (The basis for the SO_2 limits is explained in responses in Section 3.5.3.)

Comment: One commenter (IV-D-199) thought daily weights of MSW load should be required to provide a representative assessment of the waste profile.

Response: Determining daily weight of MSW load is not necessary to assess the waste profile. It would be burdensome to require this for MWC operators, especially in addition to all of the monitoring requirements. The Agency believes that meeting the required emission limits and GCP parameters (including steam load) would be sufficient to ensure that emissions are being controlled to the desired level.

Comment: Two commenters (IV-D-105, IV-D-117) questioned why EPA permitted CEM's to be operated only 75 percent of the time. Several commenters (IV-D-08, IV-D-103, IV-D-104, IV-D-199, IV-D-200) requested that the compliance and performance testing standards for SO_x, NO_x, and operating standards be amended to require data collection 90 or 95 percent (rather than 75 percent) of the hours per day for 95 or 100 percent (rather than 75 percent) of the days of the month. The commenters felt this reflects the capability of modern instrumentation. One commenter (IV-D-188) thought it was unlikely that the public would accept a requirement which allows sources to operate 6 hours each day with no available emissions data. He suggested the use of redundant or backup monitoring systems, if necessary, to meet a higher data availability standard.

Response: The commenters have apparently misinterpreted the wording in Section 60.58a(f)(6). Data are to be gathered continuously and every valid piece of data is required to be used in determining compliance and must be recorded as part of the reporting and recordkeeping requirements. The 75-percent requirement is a separate requirement to ensure that an acceptable minimum amount of data are collected and to prevent prolonged periods of operation without a working CEM. It is expected that monitors at MWC's will typically be in operation and data will be recorded over 90 percent of the time; however, monitors occasionally need maintenance or repair. To allow for this, the standards specify that data shall be gathered for at least 75 percent of the operating hours per day and for 75 percent of the operating days per month. If data are gathered during less than 75 percent of the total MWC operating hours, this omission is directly enforceable as a violation of the standard, just as if an emission limit had been violated.

The 75-percent requirement does not mean that only 75 percent of the collected data must be recorded and used to calculate average emission rates. Rather, 100 percent of all valid data collected must be used to determine compliance. This 75-percent requirement also does not allow sources that operate 24 hours per day to routinely cease collecting data for a period of 6 hours (or 25 percent of the day).

Comment: One commenter (IV-D-168) supported the minimum data requirement for CEM's and thought it should be expanded to require incinerators to summarize, analyze, and submit data to the permitting agency.

Response: The MWC owner or operator is required by the reporting and recordkeeping provisions of the standards to record all CEM's data and to determine and report compliance for all regulated pollutants by analyzing and summarizing the data. These emission reports are submitted to the Agency or delegated State air agencies and become public information.

Comment: One commenter (IV-D-111) requested that the 75-percent data collection requirement for CEM's be on a quarterly not a monthly basis. He explained that CEM's repairs cannot always be completed in 1 week.

Response: The monthly 75-percent data collection requirement is considered to be reasonable in light of the increased enforcement capabilities it provides with little additional cost. The CEM's technology is reliable and repairs can generally be completed within a few days. In order to expedite CEM's repairs so they can be completed during 25 percent of the MWC's monthly operating hours, the owner or operator may wish to keep spare CEM's parts on hand so that he does not have a lag time waiting for parts to arrive.

Comment: One commenter (IV-D-207, IV-D-270) pointed out that no specific minimum guidelines are outlined for computer-based DAS which are routinely used to acquire and process data from CEM sensors. The commenter said the DAS output of emissions data reports (or Appendix F reports) may be all that a regulatory agency will see on a regular basis. He recommended minimum requirements include: minimum scan and digitizing rate of sensor outputs (typically 1 second scan of each parameter); minimum accuracy (typically 0.1 percent full scale); minimum system availability (typically 90 percent); and call-in capability or call out on alarm to allow regulatory agencies immediate access to current data.

Response: The Agency does have requirements for frequency and kinds of data that have to be reported, but it does not believe it is necessary to specify operating requirements for a DAS.

Comment: One commenter (IV-D-162) thought that reliance on CEM's for compliance purposes is inappropriate and that States should be allowed the flexibility to require compliance to be demonstrated through alternative methods. He said his State has one of the most stringent and comprehensive air toxics programs in the country and it requires stack testing every 2 years to demonstrate compliance.

Response: As a method of measuring continuous emission reduction, CEM's are used widely to determine compliance. A compliance requirement of stack testing once every 2 years is a much less stringent and comprehensive testing regime than CEM's. These infrequent stack tests would not detect immediate emission excursions or give an indication of the long-term performance of the technology. The use of CEM's gives immediate and continuous feedback of the emission levels achieved, which increases enforcement capabilities. In view of this, CEM's are the most reasonable compliance method for ensuring that the standard is being achieved on a consistent basis. (Periodic stack tests are also required to measure pollutants for which CEM's are not available.) The General Provisions in 40 CFR 60 do include provisions for use of alternative test methods.

Comment: One commenter (IV-D-232) suggested establishing alternative methods for small communities that reflect economies of scale in monitoring, the intermittent use of MWC's by these communities, and the difficulties in maintaining expensive and complex CEM systems. He thought, for smaller communities, money would be better spent on pollution control equipment. Another (IV-D-122) said that for smaller facilities the certifying of quarterly reports of CEM's is very expensive. One commenter (IV-D-188) thought CEM's for SO_2, CO, and opacity are not warranted for very small combustors. One commenter (IV-D-159) stated sufficient information has not been provided in the ANPRM and the BID's to support the performance testing and monitoring systems for MWC's with capacities less than 45 Mg/day (50 tpd). He said extensive pollutant specific monitoring is not always necessary to assure effective operation and in many cases there are measurable operating parameters which accurately reflect combustion efficiency. He pointed out as system size decreases, the proportion of the cost associated with monitoring requirements becomes significant and could possibly equal to or exceed the cost of the waste system itself.

Response: The standards currently being promulgated apply only to MWC's larger than 225 Mg/day (250 tpd) capacity. For these MWC's, CEM's are needed to ensure compliance. The costs for monitors and data reduction systems were included in the estimates of the cost of control in the model plant study. The monitoring costs are reasonable in light of the information gained.

Comment: One commenter (IV-F-1.20) said CEM readings should be displayed to the public in front of the plant, like is done in Japan.

Response: Although the public display of CEM readings is not being required by the standards, all CEM data must be recorded and average daily values reported to the Agency or the State agency. Once this emission data is reported, it becomes public information to be made available upon request and cannot be kept confidential. The State may publish the data if they wish.

Comment: One commenter (IV-D-210) thought that COM's, which are used to continuously monitor PM, may not be able to detect particulate emissions until they are well in excess of the standard. Because the PM standard is used to limit metal emissions, the commenter felt a more sensitive monitoring method is warranted.

Response: Continuous opacity monitoring is used to detect any significant control device malfunctions. As long as control devices are functioning properly, PM and metals will be removed. If the COM shows an exceedance which indicates that the control device is malfunctioning and PM and metals are not being removed adequately, then normal enforcement procedures would be followed.

Comment: One commenter (IV-D-82) pointed out that the statement "[t]he opacity standard allows continuous monitoring, since there are no systems for continuous monitoring of PM mass emissions" needs to be changed because it is not true. He said systems for the continuous extractive monitoring of PM mass emissions have been used for many years at nuclear facilities and should work equally well for incinerators. All that is needed is some development work to facilitate their application to incinerators on a routine basis. He explained with this type of system a representative sample of suspended particles is withdrawn from the stack continuously, using low deposition loss techniques, and put through an external collection device such as a filter. This is then analyzed for the substances of interest, providing a quantitative record of what has been emitted to the atmosphere. In the case of heavy metals the analysis can even be done in "real time" as the particles arrive at the filter, by using X-ray fluorescence equipment.

Another commenter (IV-D-207, IV-D-270) thought PM should be continuously monitored. He said reliable in-situ optical techniques for monitoring particular mass concentration have been available for years and are accepted in other countries. The commenter submitted a brochure on one model of particulate monitor.

Response: The Agency does not believe that PM mass monitors have been adequately demonstrated to allow development of the necessary performance specifications. Opacity monitors are adequate for demonstrating that proper operation and maintenance procedures are being followed, and performance specifications have already been developed for opacity monitors.

Comment: One commenter (IV-D-188) stated Section 60.58(b)(7) gives the impression that results from the required opacity monitoring systems are not to be used to determine direct compliance with the opacity standard. He said that the experience in his State is that such use is essential for enforcement of standards. The commenter felt the standards should be changed to indicate that results from all monitoring systems will be used to determine compliance with applicable standards.

Response: It is true that opacity monitoring is required as an indicator of excess PM emissions, whereas the other CEM requirements (CO, SO_2, NO_x) are required to indicate whether a direct violation of the standard has occurred. Violation of the opacity standard as measured by COMS could trigger a Method 9 opacity reading or another PM test but would not be considered a violation in and of itself. However, direct enforcement of opacity standards can be done when opacity is measured by Method 9 and found to violate the opacity limit. Violation of the other CEM requirements would be a violation of the standards and normal enforcement procedures would be followed.

Comment: One commenter (IV-F-3.1) suggested that opacity should meet a level of 5 percent as measured by EPA Method 9 and 10 percent as measured by a transmissiometer.

Response: The Agency believes that opacity levels measured by Method 9 and by transmissometer should be the same.

Comment: One commenter (IV-D-111) thought reporting emission levels at 7 percent O_2 and a dry basis should only apply to stack test data and not CEM data, otherwise data from each CEM will need to be dependent on and integrated with the data from an O_2 CEM and a moisture CEM.

Response: A wide variation in the amount of air leakage has been noted between MWC facilities. To correct for this variation and to ensure that all MWC facilities are complying with a uniform standard, it is necessary to require CEM measurements to be adjusted to 7 percent O_2.

Moreover, it is believed that to improve combustion performance, most MWC's would install an O_2 or CO CEM's independent of the required regulatory requirements. In view of this, it is not unreasonable to require CEM measurements to be adjusted to 7 percent O_2. This is commonly done with CEM's at combustion sources. Costs for O_2 monitors were included in the Agency's control cost estimates.

Comment: One commenter (IV-F-1.20) suggested that facilities be required to keep a complete inventory of spare parts for CEM's, and to require incineration units to be withdrawn from service if malfunctioning CEM's are not repaired and functioning within 24 hours.

Response: The standards require continuous monitoring for specified pollutants and parameters and further require that data be collected a minimum of 75 percent of the operating hours per day and 75 percent of the days per month. While data will typically be collected much more than 75 percent of the time, if it falls below this, it is considered a violation of the standards. These requirements are adequate to ensure continuous monitoring without including specific provisions on what spare parts must be kept. However, owners or operators may wish to keep spare parts or stack test equipment on hand in order to meet the data collection requirements.

Comment: One commenter (IV-D-155) thought CEM requirements should apply to all facilities equally. One commenter (IV-F-1.19) stated small MWC plants should be subject to the same continuous monitoring requirements as large MWC plants.

Response: The promulgated standards for MWC's with capacities above 225 Mg/day (250 tpd) require continuous monitoring for SO_2, opacity, NO_x, CO, load, and temperature. Monitoring requirements for small MWC's will be addressed in a separate rulemaking for MWC's smaller than 225 Mg/day (250 tpd).

Comment: One commenter (IV-D-96) recommended the development of requirements for continuous monitoring of control equipment performance. The commenter stated that while it is not possible to directly measure particulate and acid gas control efficiency on a continual basis, it is possible to continuously monitor and regularly report operational parameters for the particulate and acid gas control devices.

Response: The standards already require continuous monitoring of control equipment performance through SO_2 and opacity CEM's. Continuous monitoring of SO_2 will indicate performance of the acid gas control system and compliance with MWC acid gas standards, and continuous monitoring of opacity is an index of PM (and MWC metals) emissions and the performance of the PM control device. Specific values and procedures for measuring the operating parameters of the control devices (e.g., stoichiometric ratios) are not described in the standards. Because control device performance is directly monitored by the CEM's for SO_2 and opacity, the MWC owner or operator may operate the controls however they choose as long as the prescribed emission levels are being achieved.

Comment: One commenter (IV-D-135) wanted continuous monitoring of all regulated pollutants.

Response: There are no technologies available to continuously monitor some of those pollutants for which emission levels have been specified in the standards (e.g., dioxin/furan, PM). Moreover, the standards specify surrogate pollutants or parameters to monitor as indicators of the regulated pollutants (e.g., CO, load level, and temperature for MWC organics, and opacity for MWC metals). These continuous monitoring requirements in combination with annual stack tests will ensure continuous emission reduction even though it is not possible to continuously monitor all of the regulated pollutants.

Comment: One commenter (IV-F-2.41) stated that enforcement of the continuous emission requirements would be simplified if operators were required to submit emissions data on a computer-readable disk, rather than solely on paper.

Response: The Agency agrees that enforcement of the continuous emission requirements would be simplified if operators were required to keep CEM data in computer-readable form. In view of this, the recordkeeping provisions of the standards outlined in Section 60.59a have been modified to specify that hourly CEM readings and reported averages of CEM data must be retained on paper and in computer-readable form.

Comment: One commenter (IV-D-27) was not convinced that monitoring surrogates would give a true picture of actual emissions. He felt a research program was needed to develop CEM's for heavy metals, dioxin, and other toxic pollutants.

Response: Municipal waste combustors are being regulated under Section 111 of the CAA, which is based on technology performance, rather than Section 112, which is based on health effects of individual toxic pollutants. Monitoring of every pollutant is not needed to ensure control technology performance. The monitoring provisions required by the standard will provide a representative picture of control technology performance with regard to MWC metals and MWC organics. As discussed in the proposal preamble, MWC metals are associated with PM in the flue gas and are removed by PM control devices. Achieving the prescribed levels of PM control would result in greater than 97 percent control of the range of MWC metals, including heavy metals. This regulatory approach is more practical than setting separate limits for each individual metal. Opacity can be monitored continuously and will indicate PM and metals emissions. Therefore, continuous opacity monitoring in combination with annual PM testing is an acceptable surrogate for monitoring heavy metal emissions. There are no technologies for continuously monitoring individual metals.

Likewise, although a CEM's for monitoring dioxin is not presently available, requiring a dioxin/furan emission limit and annual testing in conjunction with continuous monitoring of GCP operating standards would ensure sufficient reduction in dioxin and other MWC organic emissions to achieve compliance levels.

Comment: Several commenters (IV-D-101, IV-D-111, IV-D-128, IV-D-235) thought that acid gas control is effectively monitored using SO_2 as an indicator. They stated that since HCl is always removed at greater rates than SO_2, annual testing for HCl is not needed.

Response: While SO_2 is a good indicator for acid gas control technology performance, the results of the HCl annual test will provide additional assurance that all of the acid gases are being controlled to the prescribed level. Furthermore, because the MWC operator will have to perform annual tests for PM and dioxins/furans, testing set-ups will be required on an annual basis, and the additional cost of conducting a performance test for HCl at the same time is small.

3.8.3 Comments on Test Methods

Comment: Two commenters (IV-F-2.3, IV-D-113) expressed support for the option of correcting emission levels to a percent CO_2 rather than 7 percent O_2 on a dry basis. However, the commenter felt the combustion relationship between O_2 and CO_2 has been well demonstrated and, therefore, verification at the time of each stack test is not needed.

Response: Available data indicate that the exact relationship between O_2 and CO_2 varies between MWC's. Although a general relationship between O_2 and CO_2 exists, this approximate relationship is not sufficient to allow emission levels to be corrected to 12 percent CO_2 rather than 7 percent O_2 on a dry basis without site-specific determination of the relationship during testing.

Comment: Two commenters (IV-D-101, IV-D-155) said EPA should specify that HCl is only to be measured using Method 26 during annual stack testing since there are no long-term data which demonstrate the capability of continuous compliance with a 25 ppm or 95 percent removal limit. The commenter added that if EPA certifies HCl CEM equipment then EPA must determine the appropriate emission limit. Four other commenters (IV-D-116, IV-D-137, IV-D-138, IV-D-164) thought the HCl compliance test procedures and method are inconsistent with the emission standards. They said the Method 26 compliance test is based on three 1-hour tests, while the percent reduction and/or emission guideline specifies that daily inlet and outlet HCl emission rates be used. Two of the commenters (IV-D-137, IV-D-138) thought Method 26 should only be used to determine hourly HCl emission rates to establish the SO_2 and HCl removal correlation. The 24-hour SO_2 performance test should then serve as the 24-hour HCl test.

Response: Concerning the HCl compliance procedures, no specified averaging time is necessary. The measurement protocol detailed in Method 26 requires a short-term stack test as opposed to continuous monitoring. In view of this, any references to an averaging time for HCl have been removed from the final standards.

Comment: One commenter (IV-F-2.40) stated that a substantial portion of HCl emissions may be in aerosol form, therefore, the HCl rule and test method should be rewritten to address both HCl gas and hydrochloric acid aerosol.

Response: The Agency has compared Method 26 and Method 5, sampling isokinetically, at an MWC and found that the two methods gave the same results. However, at other MWC's where the HCl aerosol may have a larger aerodynamic diameter, isokinetic sampling may give higher HCl results than Method 26. Therefore, we are continuing to assess the method in this respect and are evaluating an isokinetic sampling method for future use.

Comment: One commenter (IV-D-108) thought procedures to determine uncontrolled emissions of SO_2 and HCl are inadequate. He said for FBC's SO_2 and HCl removal occurs in the combustion bed so that it is not possible to conduct emissions testing upstream and downstream of a control device. Even for other types of combustors, some consideration must be given to variability in the waste, if an MWC is operating pursuant to the removal efficiency standard. The commenter suggested at a minimum this should entail classification of the waste at the time of emissions testing. This would enable significant changes in waste composition to be identified, and additional testing to be performed.

Response: The Agency agrees that where FBC's or furnace sorbent injection is used, simultaneous acid gas control device inlet and outlet values cannot be obtained and used to calculate a percent reduction. However, alternate procedures to demonstrate compliance can be used in these cases. Under the General NSPS Provisions, "After receipt and consideration of written application, the Administrator may approve alternatives to any monitoring procedures or requirements of this part" [see 40 CFR 60.13(i)]. Owners or operators of MWC's may develop and apply to use alternative methods under this provision. Alternatively, owners and operators of FBC's could choose to comply with the 30 ppmv SO_2 and 25 ppmv HCl limits rather than the percent reduction requirements.

In order to aid owners or operators of facilities using FSI, a memorandum describing one potential procedure for demonstrating compliance has been included in the docket (see Docket A-89-08, Item No. IV-B-22). In general, the procedure described in the memorandum involves measuring SO_2 emission levels for a period of time without sorbent addition to establish the uncontrolled emission level. The sorbent injection system would then be turned on at predetermined system operating conditions, and the resulting SO_2 level would be recorded. The key operating conditions (e.g., sorbent feed rate and flue gas temperature) during the test would also be recorded. By repeating this procedure several times at different system operating conditions (e.g., different sorbent feed rates) a relationship between measured outlet SO_2 concentration and the key operating variables versus the uncontrolled SO_2 concentrations would be established.

Future compliance with the SO_2 percent reduction requirements would be based on the measured outlet SO_2 level and measured values of key control system parameters. This data would then be compared to the data collected during the compliance test to estimate the uncontrolled SO_2 concentration. The measured outlet SO_2 concentration and estimated uncontrolled SO_2 concentration would then be used to calculate SO_2 percent reduction and compliance with the percent reduction requirement. In order to use this or other alternative procedures, MWC owners or operators would need to submit a written application as specified under 40 CFR 60.13(i).

Not operating the control device while testing in order to demonstrate compliance with the percent reduction standard could conflict with NSR provisions governing modifications to major stationary sources. To avoid such a conflict, not operating the control device for such purposes is exempted in the final standards from being considered a "physical change or change in the method of operation" for NSR purposes.

Comment: Several commenters (IV-D-124, IV-D-137, IV-D-138, IV-D-155) challenged the selection of Method 23 as the compliance test method for dioxins/furans. One commenter (IV-D-124) felt that EPA has not adequately addressed the potential differences in results derived from Method 23, the new dioxin/furan compliance test method, and the existing population of regulatory test data. Others (IV-D-101, IV-D-137, IV-D-138, IV-D-155) said all the dioxin/furan data used to develop the proposed organic standards and guidelines was collected using ASME modified Method 5 sampling and analytical protocol. Method 5 specifies the use of a final methylene chloride solvent rinse for sample recovery. In contrast, Method 23 requires a final toluene solvent rinse. They pointed out the EPA's own Method 23 evaluation studies show that the toluene rinse provides significantly greater dioxin/furan results, primarily octa-chlorinated dibenzo-p-dioxins and dibenzofurans. Therefore, the use of Method 23 with the toluene rinse could adversely impact a source's compliance status. Another commenter (IV-D-154) said EPA has reported there have been sampling and analytical problems associated with measuring octa isomers. Two commenters (IV-D-137, IV-D-138) stated EPA cannot develop a guideline based on one test method and then require that compliance be determined by another method.

Response: Although Method 23 requires a final toluene rinse, it also requires that this QA rinse must be analyzed and reported separately from the rest of the sample. The results from the toluene rinse will not be used to determine the compliance status of a source. It is, as its name implies a QA measure, to demonstrate that sources are not emitting significantly higher dioxins/furans than were measured using methylene chloride as the rinse solvent. Because the results from the toluene rinse are not used in determining compliance, Method 23 is not inconsistent with the ASME protocol.

Comment: Four commenters (IV-D-101, IV-D-116, IV-D-137, IV-D-155) said both Method 23 and the ASME protocol were developed to obtain isomer specific results required for health risk assessments, and that both methods are very complicated and tremendously expensive for determining only total dioxins/furans. They added that there are very few laboratories in North America that have the capability to perform the analyses. They concluded that a simpler and less costly method could be specified for determining compliance with respect to a total dioxin/furan limit, but added that this "simpler" method would need to be validated with respect to the ASME protocol. However, one commenter (IV-D-101) said there would not be a cost savings in many cases because Method 23 would still be required by States for permit and risk assessment use.

Response: The Agency believes it is important to retain the capability of identifying individual isomers even though only total dioxins/furans are being regulated. In addition, as the commenters noted, this is the method that was used to collect the data on which the dioxin/furan limit is based. It would be inconsistent to specify a different method unless a consistent relationship between the two methods had already been established. Of course it is always possible to request an alternative method, but this is not the appropriate time for this request. An application to use an alternative method should be made after the compliance test method becomes final and should be accompanied by supporting data.

Comment: Three commenters (IV-D-101, IV-D-137, IV-D-155) said one problem with Method 23 or the ASME protocol is that the availability of the required isotopic QA/QC standards and EPA audit samples may lead to problems and delays in completing compliance tests.

Response: The Agency believes that there are adequate supplies of both isotopically labeled standards and quality assurance audit samples to prevent any unreasonable delays in performing compliance tests.

Comment: Three commenters (IV-D-101, IV-D-137, IV-D-155) said EPA should clearly and definitively state in any final compliance method that nondetectable levels of dioxins/furans are treated as zero and not use the detection limit as an actual value. This is consistent with the EPA's current practice, and all of the EPA's data is used on this data interpretation.

Response: Method 23 has been revised to clarify that nondetectable levels are to be treated as zeroes.

Comment: Three commenters (IV-D-101, IV-D-124, IV-D-155) said that in Section 1 of Method 23 a new Section 1.3 should be added to remind the users that this sampling method eliminates any possibility of obtaining a vapor/particle distribution of total dioxin/furan or any of the isomers or congeners.

Response: Method 23 has been revised to make it clear that the method cannot determine a vapor/particle distribution of dioxins and furans.

Comment: Two commenters (IV-D-101, IV-D-155) said that in Section 5.1.1, it appears that the reference to "the concentrate from Section 5.1.2" is really from Section 5.1.3.

Response: Section 5.1.1 has been revised to refer to Section 5.1.3.

Comment: One commenter (IV-D-116) reported that it had been necessary to extend the sampling time required by EPA Method 5 for PM in order to capture enough PM to adequately measure PM emissions from new MWC's. He said that the final PM limit should not be any lower than the proposed limit (34 mg/dscm [0.015 gr/dscf]) because much lower concentrations could not be measured with the available test method.

Response: The PM standard for new MWC's will remain at 34 mg/dscm (0.015 gr/dscf). A PM standard at this level would require a minimum sample of only 1.7 m^3 (60 ft^3) which could be collected in less than 3 hours of testing.

Comment: One commenter (IV-D-280) stated the time required to collect the minimum sample volume of 3.4 m^3 (120 ft^3) for Method 5 for PM is too long and cannot be met by some batch MWC's. The commenter described a batch loaded modular starved air MWC for which the total burn time is only about 5 hours. With a stack velocity of 15 feet per second, a 1/2-inch sampling nozzle, and a pressure of 78 kilopascals (11.3 psi), the required sampling time could exceed 6 hours for the unit. The commenter recommended the sampling volume be 0.85 m^3 (30 ft^3) (the old standard) or 1.7 m^3 (60 ft^3).

Response: The Agency agrees that 3.4 m^3 (120 ft^3) is a larger sample than is necessary. The regulation is being revised to require 1.7 m^3 (60 ft^3).

Comment: One commenter (IV-D-108) stated that PM emissions between 23 and 34 mg/dscm (0.01 and 0.015 gr/dscf) reported in the literature frequently appear to be the result of "modified" Method 5 testing. Therefore, he felt the modified Method 5 should be used to determine compliance with the 34 mg/dscm (0.015 gr/dscf) limit.

Response: The data examined in developing the PM limit were collected using Method 5, and this is the appropriate test method. In general, samples collected using "modified" Method 5 are collected for determining emissions of organics such as dioxins/furans. Because of the special handling requirements associated with these samples, it is not possible to use these same samples to determine compliance with the PM emission limit. If "modified" Method 5 were used for both emissions determinations, the organic emissions contained in the PM sample would be driven off when the sample is heated up, thereby compromising the validity of the dioxin/furan measurements.

Comment: Four commenters (IV-D-103, IV-D-104, IV-D-200, IV-D-246) thought COM's should be specified as the compliance method for opacity. Another commenter (IV-D-199) felt COM's should be listed as an alternative method. He said Method 9 evaluations cannot be used accurately after dark, with combined plumes or where sun angle and terrain create obstructions. The others (IV-D-103, IV-D-104, IV-D-200) added that visual observations are subject to interferences by clouds, stack configurations, wind direction, and background. They thought the 6-minute observation time tells very little about the facility. The commenters said COM's are widely used and inexpensive. They suggested given the 34 mg/dscm (0.015 gr/dscf) emission standard, a 5-percent opacity limit should be set.

Response: Method 9 was selected as the compliance method because it allows independent observation and flexibility for the MWC operator and the Agency and State enforcement personnel. By using this visual method, it is easy for enforcement personnel to determine, even from an off-site location, whether or not an MWC is in compliance and to take actions based on their observations. The procedures outlined in Method 9 do include specific instructions for visual reading with regard to sun angle and terrain. However, continuous monitoring of opacity is also required as stated in Section 60.58a of the regulation. It is used as a continuous indication of excess PM emissions. A level of 10 percent opacity can be achieved at MWC's and if this level is exceeded, a problem usually exists.

3.9 ENFORCEMENT, REPORTING AND RECORDKEEPING REQUIREMENTS FOR MUNICIPAL WASTE COMBUSTOR EMISSIONS

3.9.1 Enforcement

Comment: One commenter (IV-D-188) said Section 60.59a(b)(5) allows a facility to exclude CEM data from calculation of averages provided a reason for the exclusion is given. He felt this effectively gives the facility, not the Agency, the authority to determine compliance with the standards. The commenter thought all data should be required to be reported. The facility could request exclusion of data but the Agency should retain the authority to decide which data are used.

Response: Section 60.59a(b) requires that all valid emissions data must be used in calculating the SO_2 and NO_x emission rates. Also, Section 60.59a(b)(5) requires that the MWC owner or operator identify all data excluded and the reasons for excluding such data. If the reasons for excluding these data are not considered sufficient, the enforcement officer has the authority to require that such data be included in the emission rate calculations.

Comment: Two commenters (IV-D-105, IV-D-117) asked for clarification of the enforcement provisions when CEM's show exceedances of standard levels. The commenters asked who oversees CEM calibration and CEM data on a continual basis. They suggested telemetering CEM data instantaneously via computer to EPA or the nearest government control agency. Another commenter (IV-D-27) agreed and wanted 24 hours a day unrestricted public access to the monitors.

Response: For SO_2, NO_x, and GCP operating parameters, the compliance test method required and used for enforcement is CEM's. The initial compliance test data and subsequent annual compliance reports must be submitted to enforcement personnel for review. The MWC owner or operator is also required to submit Appendix F CEM QA specifications each quarter for Agency review. All of these submitted emission data are available to the public upon request. Additionally, the State agency can require any additional data reporting they think is useful. If the reports of CEM data indicate violations of the standards, they are enforced just like any other violation of a standard.

Comment: One commenter (IV-D-27) asked what measures would be taken in the event the incinerator fails to comply with the requirements. He said the industry record is replete with plants operating on variances from day one. The commenter wanted strict emission limits with harsh measures for violators.

One commenter (IV-D-09) said severe penalties should be levied against facilities that fail to meet the standards.

Response: If an MWC facility fails to meet the prescribed emission limits, the Agency would balance the seriousness of the violation against the potential impacts associated with various remedies. One of the primary objectives of an enforcement action is to prevent further noncompliance with the emission limits, and this is often achieved by negotiating a settlement agreement with the noncomplying source to ensure that the source will achieve compliance. However, in cases of continued and repeated noncompliance with the emission limits, enforcement actions seeking severe penalties, such as shutdown of the MWC, may be taken.

Comment: One commenter (IV-D-119) asked EPA to establish a protocol for MWC operators and permitting agencies to follow in the event that MWC's meet all emission limits except the limit for dioxins/furans. The commenter said vendors are very reluctant to guarantee dioxin/furan levels, leaving MWC owners, municipalities, and financiers in a risky position. The commenter believed financing would not be obtainable, unless investors were given reasonable assurance that MWC's would not be shut down if dioxin/furan limits were exceeded. They suggested that actions specified in the protocol should include review of combustion conditions, improvements in operating practices (if needed), and additional testing of dioxin/furans to set a course of action to bring emissions into compliance.

Response: Available data support that the dioxin/furan emission limits are achievable, and MWC's have been financed in States that have permit limits for dioxins/furans. Therefore, it is expected that financing will be available even if vendor guarantees are not obtained. If an MWC violates the standard, enforcement action would follow. In taking enforcement action when violations of the standards occur, the Agency would balance the seriousness of the violation against potential impacts associated with various remedies. Because one of the primary objectives of an enforcement action is to prevent further noncompliance, oftentimes a settlement is negotiated with the noncomplying source to ensure future compliance.

Although no specific enforcement protocols have been developed in the case of emission violations, actions such as the ones suggested by the commenter are usually followed.

3.9.2 Reporting and Recordkeeping

Comment: One commenter (IV-D-116) agreed with the recordkeeping guidelines of collecting daily operational information. However, the commenter thought that, in order not to place an undue burden on State regulators, the quarterly report should be a summary document rather than one including operating data for all periods of compliance. The commenter said the excess emissions quarterly report should be sufficient to verify the 75-percent data collection requirement.

Response: The quarterly compliance report requires only that the following information be included: (1) any period where emissions exceeded the standards, or where values of monitoring parameters were in violation of the standards; (2) results of all annual performance tests; and (3) all average SO_2 emission rates and percent reduction values, 4-hour average CO emission rates and temperatures, and 1-hour average load levels calculated during the reporting period. Each quarterly report would also include the results of the daily CEM drift tests and quarterly accuracy determinations as required under Appendix F, Procedure 1.

The quarterly report is actually a summary report because it requires submittal of only a summary of the averages for the specified averaging period for each pollutant or parameter and information on any exceedances; individual data points collected hourly are not included as part of this quarterly report.

Because the 75-percent data collection requirement applies to all of the CEM's requirements and not just opacity, the excess emissions quarterly report would not be sufficient to verify the 75-percent data collection requirement.

Comment: One commenter (IV-D-266) thought the reporting requirement was unreasonable. He said small facilities cannot generate enough revenue to pay for report certification.

Response: Quarterly and annual reports are required by the standards. However, no certification of the reports is required. The recordkeeping and reporting burden for a typical plant was estimated and considered reasonable.

Comment: Two commenters (IV-D-168, IV-D-222) thought that the rules should accept a State's CEM reporting program as an alternative to Federal requirements to avoid duplication of reports being prepared.

Response: All information specified in the regulation must be reported. If a State requires the same information, then the same report could be used for both purposes. This will reduce duplication of effort.

Comment: One commenter (IV-D-27) contended that even a 20-year recordkeeping requirement is inadequate for monitoring of long-term health effects. He pointed out the correlation between adverse health effects and exposure to Agent Orange was not identified until 24 years after the first spraying. In addition, some health problems end up being of genetic concern in the next generation. The commenter suggested amending the recordkeeping requirements to 40 years.

Response: Municipal waste combustors are being regulated under Section 111 of the CAA. The focus of this and other NSPS developed under Section 111 is the performance of emissions control technology, not long-term health impacts.

The 2-year recordkeeping requirement is adequate for the purpose of monitoring the performance of MWC emissions control technology. Requiring records to be retained beyond this 2-year cutoff would prove burdensome for the MWC owner or operator. However, if States feel that records should be retained for longer than 2 years, they could include this provision in their regulations.

3.10 START-UP, SHUTDOWN, AND MALFUNCTION PROVISIONS

Comment: Two commenters (IV-D-96, IV-D-169) supported the limitation of 3 hours for excess emissions during start-ups, shutdowns, and malfunctions. Another commenter (IV-D-153) thought the 3-hour limit was appropriate for malfunctions and shutdowns.

One commenter (IV-D-164) supported the 3-hour exemption for malfunctions, but not for start-ups and shutdowns (see following comment). Many commenters (IV-F-2.3, IV-F-2.30, IV-D-101, IV-D-103, IV-D-104, IV-D-113, IV-D-116, IV-D-122, IV-D-124, IV-D-137, IV-D-139, IV-D-154, IV-D-155, IV-D-231, IV-D-235) thought the 3-hour malfunction exemption is too short. Four commenters (IV-D-101, IV-D-116, IV-D-155, IV-D-257) said there was no analysis to support the 3-hour maximum. Some commenters (IV-D-116, IV-D-137, IV-D-155) felt the choice appeared to be arbitrary and capricious and three commenters (IV-D-116, IV-D-154, IV-D-257) pointed out that no other NSPS establishes a time limit. Another commenter (IV-D-137) said EPA has not explained why 3 hours was chosen. He asked what other time periods were considered and why they were rejected.

One commenter (IV-D-124) said if the malfunction occurred at the end of a shift, it will take more time to fix because the next operator will have to get acquainted with the problem. He requested a 6-hour exemption.

Response: Under the General Provisions, NSPS apply at all times, except during start-up, shutdown, and malfunction. The MWC standards additionally place a limit of 3 hours per occurrence on the time that a plant can claim an exemption from standards due to start-up, shutdown, or malfunction.

This provision will prevent unreasonably long periods of operation at elevated emission levels.

In selecting the 3-hour period, the Agency considered how long it would reasonably take to correct the types of malfunctions that may occur at MWC's. Most new MWC's will use SD/FF control systems. Due to the configuration of these systems, maintenance can be performed on-line to repair most malfunctions, for example, replacing a rotary atomizer or spray nozzle can be completed in less than 3 hours. If a bag failure occurs, the compartment containing the failed bag can be isolated and taken off-line for repair without requiring complete shutdown of the MWC. If any malfunction would take more than 3 hours to repair, the MWC could shut down to complete the repair, but this would not be expected to occur frequently. The 3-hour limit is therefore reasonable for malfunctions. The following comment and response discuss the adequacy of the 3-hour period for combustor start-up.

Comment: Several commenters thought the 3-hour exemption period for start-ups and shutdowns is too short, or questioned whether the time limits applied during start-up periods when fossil fuels rather than MSW are fired. Four commenters (IV-D-101, IV-D-116, IV-D-155, IV-D-257) said fossil fuels are used to bring the combustor up to temperature, which may take 6 hours. They said that during this time, no MSW is being combusted; therefore, the unit should be exempt from the NSPS. Another commenter (IV-D-153) felt the 3-hour limit was reasonable for start-ups only if the timing commences when MSW enters the combustor after the use of ignition fuels. Several commenters (IV-D-22, IV-D-113, IV-D-190, IV-D-195, IV-D-235) thought start-up should include thermal warming as well as attainment of steady state operating conditions.

Four commenters (IV-D-101, IV-D-116, IV-D-155, IV-D-257) said compliance with emission limits as measured by CEM's should not be required during an 8 to 12 hour start-up period. They said that after the combustor is heated with fossil fuel (which may take 6 hours) an additional 4 hours can be required to bring the unit up to full load, during which time fossil fuel may also be fired. They explained that when both MSW and fossil fuels are being combusted during start-up and stream flow is increasing to maximum load, CO excursions are common. Some CO excursions are related to operation of the fossil fuel burner and not the combustion of MSW. Two commenters (IV-D-101, IV-D-155) therefore recommended a start-up exemption of 8 to 12 hours, while one commenter (IV-D-116) recommended 12 to 16 hours. Two other commenters (IV-D-22, IV-D-139) also thought an 8-hour exemption was reasonable.

Three commenters (IV-F-2.3, IV-D-113, IV-D-195) said most of the combustion equipment has refractory construction and slower rates of temperature change during start-up will preserve equipment life. Two of these commenters (IV-D-113, IV-D-195) thought perhaps up to 12 or 16 hours are needed. The other commenter (IV-F-2.3) thought 5 hours were needed. One commenter (IV-F-2.30) stated much more than 3 hours are required for cure-out following reconstruction of a refractory-lined incinerator. One commenter (IV-D-154) stated cold start-up on large waste energy facilities takes 6 to 8 hours. In addition, if the NO_x controls are installed on the boilers, conflict develops between CO control, start-up and NO_x control. He said on most boilers the ammonia injection nozzles on cold start-up would be located in the area of the start-up burners. The commenter has found that by putting the ammonia system on while the gas burners are still firing tends to burn the ammonia and actually cause more NO_x. Therefore, he would recommend a longer start-up period.

One commenter (IV-D-164) said depending on combustor size and design, start-up and shutdown could take 4 to 24 hours. Another commenter (IV-F-2.15) stated that both start-up and shutdown should be excluded from the CO requirements. Another (IV-D-60) stated that CEM readings taken during start-up and shutdown may not be of any value.

<u>Response</u>: The standards and guidelines allow a 3-hour exemption period from emission requirements for start-up, shutdown, and malfunction. The 3-hour exemption period starts when continuous MSW feeding begins. Therefore, the time

period the unit is being fired strictly on fossil fuels prior to waste feeding is not included in the 3-hour exemption period. The Agency examined characteristic start-up time period of each MWC technology and determined that a 3-hour exemption period after the commencement of continuous waste feeding is reasonable. To comply with the continuous emission limits at the end of the 3-hour exemption it is expected that most units will be preheated with auxiliary fuel before continuous waste feeding begins. Preheating with auxiliary fuel will also allow the operator to control the rate of temperature increase to preserve equipment life and comply with the CO emission limit during the first averaging period after the start-up exemption.

Comment: Several commenters (IV-D-103, IV-D-104, IV-137, IV-D-199, IV-D-200) recommended the 3-hour exemption period be deleted. They suggested rather than including a specific time limit, operators should be required to demonstrate that reasons for noncompliance are due to start-up, shutdown, or malfunction. It would be the operator's responsibility to comply continuously with the NSPS. They thought allowing a particular time period for noncompliance would only encourage sources to claim violations were the result of a start-up, shutdown, or malfunction. One commenter (IV-D-137) said the general provisions of NSPS (40 CFR 60.8 and 60.11) provide tough but reasonable requirements to regulate start-up/shutdown and malfunction events and, therefore, a true limit is unwarranted. However, if EPA required a time limit, the commenter recommended it be 8 hours.

One commenter (IV-D-188) felt that all violations of the standard should be considered as such, with enforcement discretion being used to determine the EPA's response to the violation. He said the cause of the violation does not mitigate the effect on the public or environment, and ignoring the violations will only add to the public's apprehension concerning MWC's.

Response: As outlined in Section 60.7(c)(2) of the General Provisions, each owner or operator required to operate a CEM's shall submit a written report to include: "specific identification of each period of excess emissions that occurs during start-ups, shutdowns, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), the corrective action taken or preventative measures adopted." In the report, the owner or operator is required to explain what caused the episode of excess emissions, why it could not have been prevented, and what steps could be followed to prevent a similar episode from happening again.

It is clear that if an episode of excess emissions occurs, the owner or operator must prove that the MWC was undergoing start-up, shutdown, or malfunction. The 3-hour time limit will not encourage violations. Rather, it will reduce the duration of emission exceedance levels by keeping operators vigilant.

Comment: One commenter (IV-D-121) asked what would keep an unscrupulous operator from fabricating artificial malfunction explanations for exceedances of emission limits. He thought an analysis of the types and frequencies of start-up, shutdown, and malfunction should have been done along with measurements or estimates of emissions for specific episodes.

Response: In reviewing questionable data and claims of malfunctions, enforcement personnel would consider the frequency of the reported excess emissions episodes and justifications of the malfunctions provided in the written report required by the General Provisions. A recurring, preventable exceedance of the emission limits would not be considered a malfunction, and proper enforcement action would be taken.

Comment: Some commenters (IV-F-1.4, IV-D-03) expressed concern over the lack of guidance during start-up and shutdown. Two commenters (IV-D-105, IV-D-117) stated there do not appear to by any shutdown provisions except for during annual stack testing. One commenter (IV-D-189) recommended specifying an upper CO limit for start-up and shutdown so there are national emission limits for all periods of operation.

Response: The standards and guidelines allow a 3-hour exemption period for start-up, shutdown, and malfunction. In addition, the standards and guidelines require that start-up and shutdown procedures are documented in an operating manual. This provision will ensure that operators have guidance during periods of start-up and shutdown. The CO emission limit for continuous operation is commonly exceeded during periods of start-up and shutdown. Special start-up and shutdown emission limits could be established but defining limits which are achievable cannot reasonably be done due to the diversity of unit types and start-up/shutdown procedures. The need to protect equipment against thermal stress and the need to comply with the CO emission limits after the 3-hour start-up exemption will require operators to use auxiliary fuel during start-up and ensure that organic emissions are not excessive.

Comment: Several commenters (IV-F-3.1, IV-D-106, IV-D-117, IV-D-146, IV-D-149, IV-D-150) stated the proposed regulations should include a minimum temperature below which waste cannot be introduced into the system and recommend that auxiliary burners be required during start-up.

Response: In development of the 3-hour exemption period for start-up, a minimum temperature and an auxiliary fuel requirement were considered. The standards and guidelines do not include a minimum temperature requirement or auxiliary fuel requirement because it is expected that in order to comply with the continuous emission limits at the end of the 3-hour exemption period, most units will be preheated with auxiliary fuel.

Comment: Several commenters (IV-D-105, IV-D-117, IV-D-120, IV-D-121, IV-D-191) recommended that EPA set a limit to the number of start-up/shutdown cycles per year. They pointed out that periods of start-up, shutdown, and malfunction are the times when the maximum amount of pollutants are emitted. One commenter (IV-D-191) stated the malfunction provision exemption should be reduced from 3 to 2 hours and that no more than 2 exceedances per year be allowed. She said additional exceedances should be treated as violations with hourly fines or revocation of operating permits.

Two commenters (IV-D-183, IV-D-244) thought the malfunction provision, which sets no limit to the number of incidents, demonstrates to the public that incinerators are complex and unreliable.

Response: It would be impossible to establish a limit on the number of start-up/shutdown cycles allowed each year for MWC's. The number of start-ups, shutdowns, and malfunctions cannot be predicted. The number can vary depending on many factors, such as operation schedule, age of equipment, or amount of MSW received. The General Provisions requires written reports of exceedances during start-up, shutdown, and malfunction. Each excess emission incident that is reported will be reviewed individually to ascertain that is was indeed a start-up, shutdown, or malfunction and that excess emissions could not have been reasonably avoided.

Comment: One commenter (IV-D-85) thought the malfunction provision is a license to pollute.

Response: The malfunction provision is not a license to pollute. Rather, this provision allows an exception in the event of "any sudden or unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner" as stated in the General Provisions. Without this provision, brief emissions exceedances due to equipment malfunction would cause a facility to be in noncompliance. The malfunction provision is 3 hours, which limits an MWC facility from emitting an exorbitant amount of pollution. If any malfunction would take longer than 3 hours to repair, the MWC could shut down to complete the repair to avoid excessive emissions.

The General Provisions also specify that failures "caused entirely or in part by poor maintenance, careless operation, or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions." These provisions also specify that "at all times, including periods of start-up, shutdown, and malfunction," owners or operators shall operate and maintain the affected facility and air pollution controls to minimize pollution.

3.11 LEGAL CONSIDERATIONS

Comment: One commenter (IV-D-232) stated that the Agency has not complied with the RFA because EPA has neither performed an IRFA nor certified that the proposed standards and emission guidelines will not affect a substantial number of small entities. The commenter feels that the technological feasibility, cost, economic impact, and benefit analyses used to support the standards and guidelines are not applicable to MWC's with capacities less than 45 Mg/day (50 tpd). He said that there are thousands of such facilities owned by small entities; that some modular combustors smaller than 90 Mg/day (100 tpd) may be owned by communities smaller than 50,000; and that many private MWC operators may be small firms. He said EPA did not properly analyze the scope and application of the standards and emission guidelines, whose broad definitions of MWC and MSW cover thousands of incinerators at shopping centers, industrial sites, and apartment buildings. He suggests exempting small facilities from the standards and emission guidelines until adequate impact analyses have been conducted. The commenter said that, as alternatives to the proposed rules, the IRFA should discuss simplified compliance and reporting requirements for small facilities, the use of performance rather than design standards, and the exemption of small MWC's from some or all of the requirements. The commenter added that EPA failed to address the broader question of how small local governments that do not now own a MWC will be affected by the regulations in the future. He said that although the regulations do list alternative ways of disposing of MSW for small governments that cannot afford incineration, the cost impacts for those options were not analyzed. Finally, the commenter stated that although the preamble says EPA has taken appropriate steps "to involve small entities in the regulatory development process," the commenter has found no evidence that representatives of small entities were ever alerted to the requirements.

Response: The Regulatory Flexibility Act (RFA) (Public Law 96-354, September 19, 1980) requires consideration of the impacts of regulations on small entities, which are small businesses, small organizations, and small governments. The major purpose of the RFA is to keep regulatory requirements from getting out of proportion to the scale of the entities being regulated, without compromising the objectives of, in this case, the CAA. If a regulation is likely to have a significant economic impact on a substantial number of small entities, EPA may give special consideration to those small entities when analyzing regulatory alternatives and drafting the regulation. Small businesses are identified by the Small Business Association general size standard definitions. For Standard Industrial Code 4953, Refuse Systems, small business concerns are those with annual gross revenue less than $6 million per year. Small organizations are not directly affected by the final regulations. A small government is defined by the RFA to be one with a population less than 50,000. These definitions are flexible.

Subsequent to proposal of the standards and emission guidelines, the Agency added a lower size cutoff that answers the commenter's concerns. Municipal waste combustion units less than 225 Mg/day (250 tpd) are not covered by the standards and emission guidelines.

The Agency knows of only one planned MWC that will be owned by a small business and that will have a capacity between 35 and 90 Mg/day (39 and 100 tpd), and projects from this information that the number of planned small business MWC's affected by the standards is insubstantial or zero. The Agency knows of fewer than five existing MWC's that are owned by small businesses and that have capacities between 35 and 90 Mg/day (39 and 100 tpd), and projects from this information that the number of existing small business MWC's affected by the emission guidelines is insubstantial or zero.

The Agency believes that no small government has or will be building an MWC that would be covered by the standards or emission guidelines. Most MWC plants have two or more MWC units. This means that for all practical purposes the smallest size MWC plant that will be affected will have a capacity of 450 Mg/day (500 tpd). A 450 Mg/day (500 tpd) MWC plant would serve a community of 200,000, assuming each person generates 1.8 kg (4 lb) of municipal solid waste per day, recycles nothing, and sends all municipal solid waste to the MWC, which would be operated at 80 percent of capacity.

The Agency therefore concludes that the standards and emission guidelines will not have a significant economic impact on a substantial number of small entities.

3.12 WORDING OF REGULATION

Comment: One commenter (IV-D-108) felt the definition of the phrase "condensible metals associated with particulate matter" was not clear. The commenter asked what are noncondensible metals and what condensible metals are not associated with PM. The commenter also wanted clarification on the definition of organic compounds. He asked whether it includes CO, and whether organic compounds may exist as solids or liquids or be a constituent of PM.

Response: The word "condensible" has been deleted from the final definition of "MWC metals." All metals emitted from MWC's are included in the term "MWC metals."

Comment: One commenter (IV-D-153) pointed out that Section 60.59a(b)(7) requires recordkeeping of mercury emissions, yet there is no specific limitation or monitoring requirement for mercury emissions. He suggested the section should be deleted.

Response: The reference to recordkeeping for mercury emissions has been deleted from Section 60.59a, since the standards do not include mercury emission limits.

Comment: One commenter (IV-D-137) said definitions of start-up, shutdown, and malfunction events should be incorporated into the standard which clearly state that the standards do not apply when only fossil fuels are being combusted and which clarify whether the standards apply when fossil fuels and refuse are being combusted together.

Response: The definitions for what qualifies as start-up, shutdown, and malfunction events are defined specifically in Section 60.2 of the General Provisions. The standards do not apply when only fossil fuels are being combusted. However, the standards do go into effect when MSW is introduced into the combustor.

Comment: One commenter (IV-D-22) said the proper title for 40 CFR Part 60 Subpart Ea should be "Standards of Performance for "Municipal-Type" Waste Combustors." The commenter said the title as stands could erroneously lead regulated facilities to believe that they are not included.

Response: The types of sources covered by the standards are clearly described in the definition of "municipal waste combustor" found in Section 60.51a of the regulation. The definition of MSW has also been clarified in the final standards. Changing the title of the subpart to read "municipal-type waste combustor" would not necessarily clarify the description of the regulated affected facility.

Comment: One commenter (IV-D-149) recommended that in Section 60.58a citation of the initial performance testing Methods 6 through 6C and 7 through 7E be added to paragraphs (d)(4) and (f)(5), respectively.

Response: Because CEM's for both SO_2 and NO_x are required to demonstrate continuous compliance with the prescribed emission rates, the Agency believes that MWC facilities would use the CEM tests outlined in Method 19 to determine initial compliance. There is no need to specify alternative methods.

Comment: One commenter (IV-D-188) stated that Section 60.58a(d)(8) apparently refers to the wrong paragraph, (d)(5), instead of paragraph (d)(6) and the wrong units, lb/hr, instead of ppm.

Response: The Agency agrees with the commenter that Section 60.58a(d)(8) in the proposed regulation should have referred to paragraph (d)(5) instead of paragraph (d)(6). This reference has been changed in the equivalent paragraph of the final standards.

In addition, the commenter is correct in pointing out that it is more appropriate to calculate the 1-hour averages for SO_2 in units of ppm rather than lb/hr. Units calculated in ppm are more appropriate because the SO_2 emission limit is either 30 ppmv or the specified percent emission reduction. Therefore, in the final standards, the units have been changed from lb/hr to ppm.

4.0 MUNICIPAL WASTE COMBUSTOR NEW SOURCE PERFORMANCE STANDARDS - MATERIALS SEPARATION

4.1 SELECTION OF MATERIALS SEPARATION REQUIREMENTS

4.1.1 Percent Separation

Comment: Some commenters (IV-F-1.32, IV-F-3.1, IV-D-16, IV-D-55, IV-D-73, IV-D-88, IV-D-95, IV-D-178) were in favor of the 25-percent materials separation requirement as proposed. Some commenters (IV-D-83, IV-D-114, IV-D-173, IV-D-193, IV-D-203, IV-D-215) thought that 25 percent was a reasonable and achievable requirement. Some commenters (IV-D-87, IV-D-142, IV-D-160, IV-D-205, IV-D-208, IV-D-210, IV-D-239) expressed general support for the materials separation provisions.

Response: The Agency believes that the 25 percent materials separation is technically achievable by communities using municipal waste combustors. Achievability was not an issue which led to the Agency deciding not to require materials separation as part of BDT. As explained in the preamble, it was the uncertainty over the net benefits of materials separation, and the potential impacts of the requirement if those benefits did not materialize as anticipated that led the Agency to decide not to require materials separation as part of BDT.

Comment: A vendor of separation equipment (IV-F-1.30 and IV-D-268) said that their mechanical separation processes have been demonstrated to separate and recover over 25 percent of mixed MSW by removing metal, glass, dirt, and wet organics. The commenter added that hand sorting of boxboard, newsprint, and plastics would increase recovery, and that one such facility using mechanical and hand separation currently recovered 35 percent of incoming waste. Another industry commenter (IV-F-1.34) said their RDF process achieves greater than 25 percent separation by removing noncombustibles. Another vendor (IV-D-42) said that mechanical processes are less costly than curbside programs and said that their process achieves 85 percent separation using the materials for RDF, mulch, or feedstock for ethanol production; but other commenters (IV-D-191 and IV-D-282) said that RDF must not be made out of the separated components that are given credit.

However, other commenters (IV-D-68, IV-D-141) said that operators of mass burn MWC's do not have the technical means to mechanically separate 25 percent of the waste and that the goal can only be achieved through community programs. Another (IV-D-138) said that technology is inadequate to achieve 25 percent reduction and that separation systems are costly and most MWC's do not have adequate space to install such systems. One commenter (IV-D-153) said that EPA has not adequately addressed the shortcomings of mechanical (on-site) separation since mechanical systems are not capable of separating paper or plastics by specific type (e.g., paper grade or resin type) and since paper products separated with such systems would likely be too contaminated to recycle. Others (IV-D-174, IV-D-209) also said source separation produces clean, more marketable materials than mechanical on-site separation systems. Commenter IV-D-140 said that separation of paper from unsorted trash yields a product that is contaminated and not very marketable and that it will be difficult for centralized systems separating unsorted waste to reach 25 percent if the percentages of glass and metals in the waste of that area are much less than average.

<u>Response</u>: The Agency believes that 25 percent separation is technically achievable in a variety of ways. Curbside source separation programs are generally more effective in recovering certain materials such as newspapers or office papers because they produce a clean, marketable material with minimum contamination. However, specific separation requirements are not required in the final rule.

Comment: Some commenters (IV-F-3.11, IV-F-3.13, IV-D-42, IV-D-129) said that all MWC's should be required to employ front-end processing to separate materials from the waste stream regardless of the extent of community separation. One commenter (IV-F-3.11) said that such processes are the only way to effectively remove hazardous materials from the waste stream since household hazardous waste collection programs do not capture all of these materials. Commenter IV-D-129 said that front-end processing is needed to maximize recycling since some waste going to MWC's may come from communities with low compliance. Two commenters (IV-D-168, IV-D-191) advocated that household hazardous waste collection programs be required in addition to the requirements proposed.

Response: Although there is no materials separation program required under the rule, the Agency supports such separation efforts whether at the front-end or through community collection programs.

Comment: Several commenters said that 25 percent is too low:

(a) Some (IV-F-1.24, IV-F-1.27, IV-F-1.28, IV-F-2.38, IV-F-2.40, IV-F-2.51, IV-D-07, IV-D-105, IV-D-217, IV-D-227) said that 50 percent or more separation should be required, and one (IV-F-2.24) suggested a level of 75 percent. Commenter IV-D-151 said that 90 percent is easily achievable and that the minimum requirement should be 60 percent. Another (IV-D-191) also suggested a minimum of 60 percent.

(b) Others (IV-F-1.18, IV-F-1.22, IV-F-2.46, IV-F-2.52, IV-D-53, IV-F-2.57, IV-D-121, IV-D-136) cited information showing that 75 percent or more of the waste stream is theoretically recyclable or compostable, and concluded that EPA should require that 100 percent of all recyclable materials be recycled rather than combusted or landfilled.

(c) Some commenters (IV-F-2.38, IV-F-2.44, IV-D-56, IV-D-105) said that recycling results in less air, land, and water pollution, less energy use, and less health risk than combustion of recyclable materials. They, therefore, concluded that more of the waste stream should be recycled and less (or no waste) should be combusted.

(d) Others (IV-F-1.21, IV-F-1.23, IV-F-2.6, IV-F-2.41, IV-F-2.50, IV-F-2.52, IV-F-3.12, IV-D-26, IV-D-57, IV-D-59, IV-D-118, IV-D-201, IV-D-298) did not specify a percent reduction target, but said that it should be greater than 25 percent and that incineration should be reduced to a minimum.

(e) One commenter (IV-D-56) said that a level of 25 percent or less would encourage the construction of larger MWC's than will be needed once markets for recyclables are developed.

(f) One commenter (IV-D-246) said the 25-percent should be an absolute minimum with higher targets set for the future, with review and possible revision in 5 years.

One commenter (IV-F-1.12) thought that his State would not have difficulty meeting the 25-percent reduction level.

However, other commenters (IV-F-1.29, IV-D-174) countered point (b) by saying that 100 percent of recoverable materials is <u>not</u> recyclable on a long-term basis. They said, for example, that there is a limited number of times paper can be recycled and a limited maximum recycled content of some paper products because fibers weaken each time paper is recycled. They and Commenter IV-D-148 said that some of the paper in MSW is contaminated and not usable for recycling and that it is logical to combust this material as fuel. Another (IV-F-1.32) said that recycling 100 percent of anything is impractical because there will always be individuals who will not participate in recycling. Other commenters (IV-D-31, IV-D-107) opposed the 25-percent materials separation as a permit condition citing instances where 25 percent recycling goals were set but have not been met. Commenter IV-D-101 said that only a handful of communities have achieved 25 percent. One commenter (IV-D-116) requested that documentation be presented to verify that a number of cities are already achieving the 25-percent materials separation requirements. This commenter felt that 25 percent is a reasonable level for 1994, but many communities cannot achieve that level much sooner. Commenter IV-D-138 felt that

25 percent reduction is feasible for particular communities, but not for all communities. This commenter said that achieving 25 percent is more a function of community demographics than of the effectiveness of a particular type of recycling program. The commenter added that communities with a low proportion of yard waste in the waste stream would have a difficult time meeting 25 percent. Another commenter (IV-D-175) supported a goal of 25 percent separation but said that the need for source separation should be evaluated on a site-specific basis. The commenter said that clean supplies of various grades of paper are needed by manufacturers, but was concerned that the proposed requirements would result in large quantities of low grade mixed paper.

Response: The Agency evaluated case studies of materials separation programs at several communities in the United States with different locations, populations, and program strategies. These case studies showed that 25 percent separation is technically achievable. Although some communities have achieved separation rates higher than 25 percent, the Agency feels that a level of 25 percent is technically achievable on a nationwide basis.

Comment: One commenter (IV-F-3.7) said that while they supported a minimum level of 25 percent materials separation, urban areas should be required to achieve a greater percent reduction than lower population areas since curbside materials separation programs are more feasible and cost-effective in highly populated areas. The commenter said urban areas should be required to achieve 40 percent materials separation in the short term and 50 percent in the long term. In rural areas where centralized drop-off centers are often the most feasible strategy, a lower percent reduction should be required. Commenter IV-D-187 said that 25 percent should be a minimum, but higher levels should be required in areas with higher concentration levels. One commenter (IV-D-133) said the materials separation requirements should be phased in, starting in those areas with the greatest waste problems such as the Northeast.

In contrast, others (IV-F-1.10, IV-F-3.1, IV-D-103) thought that the 25-percent requirement should apply uniformly to all areas.

Response: The 25-percent separation has been demonstrated to be an achievable performance level in a variety of large and small, urban and rural communities. Thus, the Agency believes that 25 percent is a technically achievable level across a wide range of communities. However, questions concerning whether (a) materials separation will achieve net energy, economic and non air quality environmental benefits, (b) such programs are appropriate in a particular community, and (c) the appropriate performance target for a given program will depend on a number of variable factors that are appropriate issues to be raised in individual BACT determinations.

Comment: Some commenters (IV-F-1.13, IV-D-71, IV-D-167) thought that any percent reduction level will be too low for some communities and too high for others and said that the requirements should be flexible. Commenters IV-D-167 and IV-D-171 said that 25 percent would be unachievable in some cases and such efforts should be left up to individual States or localities. Commenter IV-D-71 suggested that EPA should either pick a lower percent reduction level to minimize the consequences to communities that will have difficulties in meeting higher levels or, better yet, to just state that 25 percent is a goal and urge communities to achieve higher reductions if possible. Some commenters (IV-D-126, IV-D-184, IV-D-222) also thought that the 25-percent reduction should just be a goal to be consistent with State programs and provide flexibility in integrated waste management programs. Some commenters (IV-D-31, IV-D-70, IV-D-167) said the proposed requirements were too inflexible for real-life situations and do not give an alternative for communities that just do not achieve the full percent. Commenter IV-D-282 said that EPA had rejected the judgment of many States that rigid percentage requirements are unacceptable and that goals were preferable.

Commenter IV-D-166 opposed a specific separation requirement, but said that if a specific target must be set, 15 percent is more reasonable since the nationwide rate is presently only about 10 percent. Commenter IV-D-155 said that 25 percent is the uppermost limit of achievability on a national basis.

However, another (IV-D-125) said that 25 percent should be the minimum level required, but that the goal should be higher.

Response: As noted, the Agency has examined a variety of materials separation programs and believes that 25 percent separation is technically achievable on a national basis, although for other reasons, as noted in the preamble, a materials separation requirement is not included as part of the final rule.

Comment: One commenter (IV-D-282) said that EPA should be flexible in evaluating each MWC's separation plan. The commenter said that factors such as the urban or rural nature of the community, the type of waste received, the availability of markets, and the existence of local voluntary or mandatory recycling programs should be considered in evaluating the plan. The commenter thought that if there is a reasonable likelihood of achieving the 25-percent goal and the MWC follows the steps in the plan, the MWC should be deemed in compliance regardless of the waste actually separated.

Response: The Agency has examined materials separation programs in different types of communities and has found that 25 percent separation is technically achievable. However, since no specific separation requirement is mandated, facilities or communities are free to tailor their program to fit their particular community's characteristics.

Comment: One commenter (IV-D-108) supported mandatory separation but thought that the achievement of any specific level was of secondary concern since the level could be evaluated for individual MWC's on a case-by-case basis under the PSD program.

Response: The Agency believes that materials separation is an important part of any solid waste management program.

However, the Agency has not required 25 percent separation as part of best demonstrated technology for MWC's. The appropriateness of separation requirements for individual facilities can be considered as part of the PSD permitting process.

Comment: One commenter (IV-D-11) said that the regulations should consider a phase-in approach to implementing materials separation and that the EPA's schedule for phasing in the requirements and percent reduction levels should be consistent with the States' schedules. Some commenters (IV-F-1.9, IV-F-2.31, IV-F-3.7, IV-F-3.13, IV-D-56, IV-D-103, IV-D-104, IV-D-146, IV-D-186, IV-D-199, IV-D-200, IV-D-238) referred to specific States or cities that already achieve about 25 percent and have goals to increase the percent recycled to 40, 50, or 60 percent over the next 5 to 10 years. They suggested that stricter rules should be phased in over time. Commenter IV-D-191 thought that MWC's should be required to separate 60 percent before start-up and 75 percent within 3 years. One commenter (IV-D-187) thought that the level should start at 25 percent and increase 1 percent per year for 60 years. Commenter IV-D-103 thought that EPA should evaluate the effectiveness of the separation requirement at each 4-year review of the NSPS, and modify as appropriate.

Commenter IV-D-181 said that EPA should set a goal of 10 percent recycling by 1995 increasing to 15 percent by 2000 and 20 percent by 2005.

Another commenter (IV-D-153) thought that the requirements should require 15 percent separation by 1996 which would increase by 5 percent per year for each of the following 2 years.

Response: EPA has decided not to mandate materials separation. However, for purposes of cost analysis, the Agency identified a phase-in schedule it believed was reasonable. After consideration of these comments, the Agency examined several "successful" programs to consider how much time was necessary to achieve 25 percent separation. Although the number of sites considered was limited, the analysis demonstrated that about 2 years are necessary to get started, 1 year to get through the political decision-making processes necessary to implement a program, and the second year to purchase equipment, build facilities, and establish the necessary local ordinances. (The Agency assumed for analytical purposes that a curbside collection program will be instituted to comply with the proposed requirement.) As a general rule, these successful programs achieved increasing levels of separation in stages, beginning with the separation of yard wastes, establishing curbside separation in primary residential areas, and the location of some drop-off centers in the first year. Separation is increased in the second year through the establishment of more drop-off centers, extending curbside pick up to all single-family residential areas, major grocery/retail stores and administrative businesses, and initiating documentation or implementation of cardboard and/or office paper recycling. In the third year, curbside separation is extended to multifamily residences (apartments, highrises), and small businesses are contacted to initiate recycling of cardboard, glass, cans, paper, etc.

As a result of this analysis, the Agency developed a phased-in schedule where during the first full calendar year, 15 percent weight reduction of MSW through materials separation could be met. For the second calendar year, a typical program could achieve 20 percent reduction, and 25 percent reduction could be achieved in the third full calendar year and each subsequent year.

Comment: One commenter (IV-F-2.47) suggested that because of variations in waste stream composition in different areas, each community should be required to conduct a detailed analysis of their waste and establish a reduction level (not less than 25 percent) they can meet. Commenter IV-D-106 thought that a waste composition study should be required for all MWC permit applicants.

Another commenter (IV-F-1.8) agreed with the 25-percent reduction level as a minimum, but added that specific facilities should be required to show how much above the level they can achieve.

Response: The 25-percent reduction level is technically achievable on a nationwide basis although for other reasons materials separation was determined not to be BDT on a nationwide basis. However, individual facilities may want to initiate waste composition studies to obtain valuable information that can be used in planning separation programs such as information on available markets, local scrap prices and other factors. An evaluation of these factors on a case-by-case basis in the context of a permit proceeding is appropriate to determine if materials separation represents best technology for a particular source when other factors such as costs and nonair environmental impacts are considered.

Comment: In response to the question of whether standards should require separation of specific materials versus an overall percent, some commenters (IV-F-1.10, IV-D-51, IV-D-140, IV-D-146, IV-D-155, IV-D-205, IV-D-238, IV-D-246) favored the local flexibility provided by an overall percentage. Commenter IV-D-205 said that to target specific materials, much information must be gathered concerning the composition of the waste and this is costly. Two commenters (IV-D-146, IV-D-238) said materials specific rates would be difficult to set, track, and enforce. One commenter (IV-D-70) suggested that operators should be given some latitude in selecting what items will be recycled based upon volume, financial impact, cost, and market factors. One commenter (IV-D-138) opposed materials specific requirements since they would artificially create oversupplies of materials that do not match demand. The commenter said this would also stifle a regions' ability to take advantage of local demand conditions.

However, other commenters (IV-D-105, IV-D-106, IV-D-114) suggested that specific percent separation levels for select materials be required, rather than an overall percentage. One commenter (IV-D-114) felt that while the flexibility of an overall percentage requirement may be desirable in some respects because of differing waste composition and differing markets on a national level, many communities might resort to just a few easily separated materials such as yard waste and newspapers to meet their goal. The commenter also said that a reliance on a combustible waste such as newspapers could lower the combustibility of the waste, thereby necessitating the use of supplemental fuel or other MSW components such as plastics. These commenters said that this will not achieve the goal of removing materials which contribute to the greatest risk from MWC's. In addition, the commenters said that while the use of old newspapers is increasing, it takes several years to build new capacity to use the materials, and rapid growth in supply may lead to market gluts in the interim. The commenters suggested that at least three types of material from a list which could include specific products (such as old newspapers, office paper, corrugated and others in the paper category) should be separated. They said that requiring separation of multiple materials would help to protect against large market swings which would likely result from reliance on a few particular items.

Response: An overall percent reduction requirement provides facilities maximum flexibility in separating materials according to local market conditions. Determining percent reductions for specific materials would be more difficult to measure since this requires knowledge of the percent of each material in the initial waste stream. This may be impractical.

Comment: Two commenters (IV-F-2.47, IV-D-238) said that all yard waste should be banned from MWC's because it causes combustion problems and NO_x emissions.

Response: The Agency feels that any materials separation program developed by a community is likely to include a significant yard waste separation component as a part of its program. Once yard waste separation and composting programs are implemented by a community, the Agency believes that these will be a significant reduction in the amount of yard waste that will be taken to an MWC, thereby further reducing potential NOx emissions from that source. However, the appropriateness of a specific separation program is being left to individual permitting decisions.

Comment: Commenter (IV-D-xx) felt that EPA should target for incineration only those materials which are combustible, but nonrecyclable and do not contain metal additives or chlorides. This commenter and commenter (IV-D-yy) said that the MWC should assure that the following items are separated: glass, metals, construction debris, all batteries, plastics containing metals or chlorides, chlorinated paper, and food and yard wastes.

Response: The Agency agrees that MWC owners and operators and communities should strive to separate noncombustible materials prior to combustion, and this will aid in compliance with the emission standards. However, no specific materials separation requirements are included in the standards, whether for combustibles or noncombustibles.

Comment: One commenter (IV-D-98) thought that only local governments that document 25 percent waste reduction should be allowed to incinerate MSW. This commenter felt that local governments and its citizens have more incentives to reduce waste, and they should be responsible for waste reduction instead of the MWC operator, especially since the MWC operator depends on certain amount of waste to fuel the MWC.

Response: The final standards do not require materials separation. However, as noted in the proposal, the question of responsibility for complying with any requirement of the NSPS is constrained by statute. Under Section 111 of the CAA, "it is unlawful for any owner or operator of any new source to operate in violation of any standard of performance." In the case of sources which may be required to undertake materials separation (as a result of an individual determination that materials separation represents BACT for that source), it is expected that many MWC's will rely on community separation programs to comply in whole or in part with the requirements. EPA structured the requirements in the proposal so that in cases where the MWC sought to rely on another party to do the materials separation, other parties could become co-operators for the purposes of demonstrating compliance with the materials separation provisions.

Comment: Two commenters (IV-D-138, IV-D-277) said that many States already have goals or mandates for various levels of recycling which are tailored to the needs of the individual State. The commenter felt that the EPA's approach is not sensitive to waste management difficulties on a community level, and EPA should not mandate regulations that hinder State programs.

Response: As the final regulations do not set a specific performance standard for materials separation, they will not hinder State or local waste management programs. It should be noted, however, that even if a 25 percent standard had been established it would not have interfered with state programs. EPA's proposal set a minimum percent reduction that is demonstrated to be achievable for MWC's and allowed flexibility in terms of the specific materials separated the techniques used for separation and the methods used to demonstrate compliance. A State or local agencies can design and implement a separation program in a way they believe is best for that application and consistent with state goals and permit requirements. Nothing in the proposal limited that flexibility except to ensure that it met or exceeded the 25-percent separation requirement.

Comment: Some commenters (IV-F-1.22, IV-F-1.31) said that requiring levels of only 25 percent separation will encourage the proliferation of more MWC's which will make it more difficult to achieve higher levels of recycling. However, another commenter (IV-F-1.32) thought that people would begin to recycle more than 25 percent once markets for recyclable materials improve and people realize that recycling reduces costs.

Response: As noted above, the finding that 25 percent is technically achievable is on a nationwide basis and is based on EPA's evaluation of the performance of several materials separation programs in the United States. Since EPA has not included the 25 percent requirement in the final rule, whether higher levels are appropriate for given communities, and whether materials separation will have overall environmental, economic and energy benefits is a matter best determined on a case-by-case basis. The Agency anticipates that communities considering construction of an MWC will take into account the appropriate role of materials separation as a component of its solid waste management plan. As described in the "Agenda for Action," MWC's are a valid and necessary part of integrated waste management. Nevertheless, while source reduction and recycling are preferred waste management options, not all materials can be recycled, and disposal will be required. Given that many landfills are nearing capacity and there is a shortage of available space, MWC's are needed to reduce the volume of waste prior to landfilling. Combustion of MSW also provides the benefit of electric energy production.

Comment: One commenter (IV-D-71) said that charging households for the marginal costs of waste disposal (such as charging per unit of waste disposal) is preferable to setting a mandatory percentage separation requirement. This commenter added that this approach works well to encourage recycling in large and small communities.

Response: Charging households for the marginal cost of disposal is an option for the local waste management authority. Communities with MWC's may find it advantageous to adopt such a strategy as a method to promote materials separation and waste reduction, but the financial aspects local waste management programs are best left in the hands of local officials.

Comment: Two commenters (IV-D-163, IV-D-282) said that some wastes from commercial or industrial establishments in certain cases may contain a high proportion of nonrecyclable materials (e.g., sludge, wastes from industrial APCD's, demolition debris, empty cans coated with tar, dirt from contaminated underground storage tank cleanups, asbestos), and in such cases EPA should exempt these wastes from the requirement or require a lower percent separation level.

Response: EPA is not requiring any level of separation in today's rules. In any event, industrial process and manufacturing wastes, construction and demolition debris, sludges, and dirt are not considered MSW under the final standards, and combustion of industrial wastes alone is not covered under the NSPS. Furthermore, since the NSPS currently being promulgated only covers MWC's with unit capacities above 225 Mg/day (250 tpd) with a fuel feed containing more than 30 percent (by weight) or MSW or RDF, many combustors at industrial sites will not be covered.

Comment: One commenter (IV-D-181) said that EPA is assuming that the composition of solid waste will remain constant, but new packaging materials may not be recyclable in the future and achieving a specified level of recycling may become more difficult.

However, another commenter (IV-D-186) said that higher recycling goals will become easier to achieve since manufacturers will be making products which are easier to recycle.

Response: Public concerns about the environment are continually encouraging manufacturers and businesses to reduce the amount of packaging needed and to develop products and packaging which are recyclable and/or composed of recycled materials. The Agency expects this trend to continue and believes that such efforts will increase the efficacy of recycling MSW materials in the future.

4.1.2 Lead-Acid Vehicle Battery Prohibition

Comment: Several commenters (IV-F-1.27, IV-F-1.30, IV-F-2.3, IV-F-2.30, IV-F-2.39, IV-F-2.41, IV-F-2.52, IV-F-3.1, IV-F-3.12, IV-D-57, IV-D-62, IV-D-105, IV-D-106, IV-D-111, IV-D-113, IV-D-117, IV-D-134, IV-D-146, IV-D-184, IV-D-186, IV-D-191, IV-D-205, IV-D-246, IV-D-268) said the prohibition on combustion of lead-acid vehicle batteries should be retained because it reduces lead emissions to the air and lead content of MWC ash. Some (IV-F-1.30, IV-D-105, IV-D-117, IV-D-268) cited a study showing that the small percentage of lead-acid vehicle batteries that are not recycled and are received at MWC's contain over 50 percent of the lead in the waste combusted at MWC's. Commenter IV-D-105 also recommended that the standard include best available technology for long-term storage of batteries.

<u>Response</u>: The Agency supports the position that lead acid batteries should not be introduced into an MWC. However, the prohibition on their combustion has not been retained in the final standards for reasons discussed in detail in the preamble to the final rule.

<u>Comment</u>: Several commenters (IV-F-2.39, IV-F-2.40, IV-F-2.45, IV-F-2.47, IV-D-219) said that all lead-acid batteries should be subject to a deposit system. Commenter IV-D-205 said that their State had a successful deposit/return system for automobile batteries, and 95 percent are recycled. One commenter (IV-F-2.39) said that they should not be incinerated regardless of whether the heavy metals in the batteries are reused are not. This commenter said that the primary rationale should be to prevent the heavy metals from entering the air or contaminating the ash. Commenter IV-D-170, however, opposed deposit/return systems saying they impose costs on consumers and retailers and have little impact. But, the commenter favored a mandatory take-back system which would require everyone in the recycling chain to take back used batteries. The commenter said that a ban on combustion or landfilling is preferable to mandatory deposit/return systems and is less costly. The commenter said that used lead-acid batteries are a source of valuable materials.

<u>Response</u>: Deposit/return or mandatory take-back programs are an option that communities or States may want to consider to encourage separation and recycling of lead-acid batteries, but such programs are better left in the hands of State or local officials. EPA believes that such programs in tandem with the regulatory incentives to discourage combustion of lead-acid batteries will accomplish essentially the same result as the proposed prohibition.

<u>Comment</u>: Several commenters (IV-F-2.41, IV-D-105, IV-D-117, IV-D-134, IV-D-168, IV-D-170) favored prohibition on

combustion of all lead-acid batteries, not just those greater than 5 kg (11 lb). Commenter IV-D-170 said that some household batteries are composed of lead and these should be separated also.

Response: For the reasons stated above, the Agency has decided not to include an absolute prohibition against combustion of lead-acid batteries as a national standard at this time. Nevertheless, the Agency, agrees with the commentors that lead acid batteries less than 11 pounds should not be introduced into the combustor.

Comment: One commenter (IV-D-268) said that restrictions on the shipping of lead-acid batteries with cracked cases make it difficult for persons to recycle these batteries, and they usually end up in the MSW stream. The commenter said that EPA should carefully consider any new restrictions on lead-acid battery processing which could hinder recycling.

Response: This NSPS contains no restrictions on lead-acid battery handling.

Comment: One commenter (IV-D-66) said that while he supports a prohibition on combusting or landfilling lead-acid batteries, it has been his experience that burning these batteries does not significantly increase lead emissions.

Another commenter (IV-D-206) questioned whether batteries are really a major source of lead in MWC emissions or ash. They said that they do not combust lead-acid batteries in their MWC but still have lead in their emissions and ash.

Response: Lead-acid batteries are believed to be a significant source of lead in MSW. Nevertheless, the Agency recognizes that its exact contribution to the total volume of lead in a waste stream will vary based on the inconsistent and occasional nature of their disposal. Obviously, there are other wastes such as lead-soldered tin cans which may contribute to lead emissions. Lead-acid batteries are a noncombustible material and when charged to an MWC, the lead will end up either as lead air emissions or in the fly ash or bottom ash. While the Agency is unaware of data showing what proportion of lead from combustion of lead-acid batteries ends up as air emissions versus ash, reductions of the amount of lead in air emissions and/or ash would be environmentally beneficial. Section 129 of the Clean Air Act Amendments of 1990 requires EPA to establish a numerical emission limit for lead within one year. EPA will address the lead acid battery issue further in the context of this rulemaking.

Comment: A commenter (IV-F-1.30 and IV-D-268) said that his company sells an electronic system that detects lead-acid vehicle batteries, so a prohibition is feasible. He added that the labor costs to separate the batteries are generally higher than the worth of the battery for recycling, but that this cost is justified to offset environmental consequences of lead emissions. Some commenters (IV-D-105, IV-D-117) referred to the above technology saying that the technology provided means for separating all size lead-acid batteries.

However, another commenter (IV-D-132) said that the removal of the batteries must be done manually and this is expensive and impractical. Commenter IV-D-155 said that since EPA refers in the proposal to a specialized metal detector for large lead-acid batteries, EPA should identify the names, owners, and locations at which these detectors are in use, so their efficiency can be verified.

Response: One company sells a device which detects lead-acid batteries in the waste stream. The detector has been used to identify batteries and aid workers at manual separation stations as waste travels on a conveyor. Once the batteries are identified, they are manually removed from the waste stream. The Agency is not aware of any device which performs the removal of these batteries mechanically.

Persons wanting additional information on the lead-acid battery detection device should refer to Docket No. A-89-08, Item No. IV-D-268.

Comment: One commenter (IV-F-1.30) in favor of the prohibition on lead-acid batteries said that while lead in lead-acid batteries is relatively insoluble, incineration converts the lead into a form which is much more soluble.

Response: This may be another environmental reason to reduce the combustion of lead-acid batteries.

4.1.3 Household Battery Separation

Comment: Some commenters (IV-F-1.10, IV-F-1.27, IV-F-1.31, IV-F-2.30, IV-F-2.39, IV-F-2.41, IV-F-2.52, IV-F-3.1, IV-F-3.8, IV-F-3.12, IV-D-14, IV-D-20, IV-D-21, IV-D-57, IV-D-62, IV-D-100, IV-D-106, IV-D-117, IV-D-134, IV-D-146, IV-D-178, IV-D-186, IV-D-189, IV-D-246) endorsed the battery separation requirement, and said the combustion of household batteries should be prohibited to reduce emissions of toxic metals such as mercury, cadmium, and other metals. One commenter (IV-D-191) thought that the ability to demonstrate a 75-percent reduction should be demonstrated before the MWC is permitted. One commenter (IV-F-1.11 and IV-D-158) felt that batteries should be removed prior to combustion, but did not think that the CAA was the appropriate authority. Commenter IV-D-155 supported off-site removal programs, but not on-site efforts. Commenter IV-D-209 thought that the separation requirements should be limited to button batteries since these can be recycled in the United States, but others must be stored or disposed of as hazardous waste.

Several commenters (IV-F-1.24, IV-F-2.39, IV-F-2.40, IV-F-2.45, IV-F-2.47) said that all household batteries should be subject to a deposit system. One commenter (IV-D-217) favored both curbside separation and mandatory take-back by retailers. One commenter (IV-F-2.39) added that they should not be incinerated regardless of whether the heavy metals in the batteries are reused are not. This commenter said that the primary rationale should be to prevent the heavy metals from entering the air or contaminating the ash. Commenter IV-D-191 said that the batteries should be stockpiled until appropriate methods are found to manage them. One (IV-F-1.24) added that all battery manufacturers should be required to accept their return. Commenter IV-D-134 favored deposit/return systems but said they should be the responsibility of the individual States. One commenter (IV-D-21) in favor of the household battery separation requirement said that there are several successful battery collection programs in the United States and that their company accepts mixed household batteries. They recover mercury and silver from small batteries and dispose of larger batteries in a hazardous waste landfill. This commenter also said that even if mercury levels in new batteries are reduced in the next few years, there will be many batteries containing higher levels of mercury that will need to be disposed of for many years to come. Other commenters (IV-F-1.31, IV-D-105, IV-D-117) also said that Japan and some European countries have battery separation programs, and that there is evidence to show that these programs have helped reduce mercury emissions significantly.

Commenter IV-D-165 said that there are no commercial facilities in the United States present or projected for reclaiming the metallic components of household batteries and that the economics of reclaiming mercury will drop as the use of mercury in batteries drops. Two commenters (IV-D-184, IV-D-219) also opposed mandatory separation because of the lack of markets. Commenter IV-D-205 said that only small button batteries are currently recyclable, and, therefore, problems would result from storage of separated batteries.

One commenter (IV-F-1.17), who runs a regional household battery separation program, believed it may be premature to require nationwide collection of mixed household batteries. He was concerned that safe and affordable means of battery disposal after separation are not yet available. Their program collects batteries at several drop-off centers. The collection rate is estimated to be only about 8 percent. He said that only mercury and silver oxide batteries are currently recyclable in the United States. The other batteries they collect are disposed of in a hazardous waste landfill at a cost of $350 per 55-gallon drum. Another commenter (IV-D-111) said that there is not sufficient data to support household battery removal since the effectiveness of battery collection programs and the percent of metals removed by such programs have not been demonstrated. The commenter also was not sure about what should be done with the separated batteries. Other commenters (IV-D-2.3, IV-D-113) said that battery separation programs are not likely to remove an appreciable proportion of the batteries from the waste stream.

Some commenters (IV-D-138, IV-D-153, IV-D-165) opposed a requirement for household battery separation saying that: (1) the battery industry has voluntarily reduced the mercury content of alkaline batteries by over 90 percent, (2) the battery industry has voluntarily adopted the 0.025 percent mercury content level for alkaline batteries effective by 1993, (3) most mercuric oxide batteries are used in commercial, hospital, or military applications and are not household batteries, (4) many mercuric oxide batteries used in hearing aids are being replaced by zinc-air batteries, (5) battery separation programs would have little effect on mercury emissions from MWC's, and (6) the contribution of other mercury-containing materials in the waste stream is not clear.

Response: After thorough consideration, the Agency has decided not to require mandatory programs for separation of household batteries. Between proposal and promulgation, the Agency met with representatives of several community household battery separation programs in the United States. In general, these programs have achieved household battery recycling rates of less than 15 percent. The most successful programs in Europe and Japan have only achieved battery recycling rates of 20 to 30 percent.

Also, over the last 6 to 7 years, the amount of mercury used in alkaline batteries in the United States has declined by about 90 percent. According to U. S. battery manufacturers, by 1993 alkaline batteries sold in the United States will contain no more than 0.025 percent mercury. Given the low battery separation rates achieved, the declining amount of mercury in household batteries, and the fact that there are many other sources of mercury in the waste stream, the Agency concluded that battery separation programs do not represent best demonstrated technology for reducing mercury emissions from MWC's.

Representatives of the household battery programs in the United States also said that there were no cost-effective means for disposing of separated mixed household batteries. They generally dispose of them in hazardous waste landfills since there are no facilities in the United States for recycling mixed household batteries.

Indeed, the Agency was unable to identify any company in the United States that recovers metals from mixed household batteries. One company was identified that recovers mercury and silver from mercury oxide and silver oxide batteries including small button batteries such as those found in hearing aids and watches. Two other companies expressed a willingness to accept separated household nickel-cadmium batteries. However, there is currently no option available for the recycling of the majority of household batteries.

While the amount of mercury used in alkaline batteries has declined to low levels, mercury oxide batteries contain higher proportions of mercury (about 35 percent) and this level is not expected to decline since the mercury in these cells is part of the energy producing electrode. Therefore, MWC's or communities that want to remove specific mercury-containing materials from the waste stream may want to target mercury oxide batteries.

Following proposal, the Agency gathered additional information and examined mercury emissions data from several MWC's with various acid gas and PM control systems and other types of add-on controls for reducing mercury emissions. Consideration was given to including a mercury emission limit in the standards. However, Section 129 of the CAA Amendments of 1990 requires that mercury (and other) emission limits be promulgated within 12 months of the date of enactment of the CAA amendments. Therefore, proposed mercury emission limits and other additions to the MWC standards required by the CAA amendments will be forthcoming, but are not included in this standard.

Comment: One commenter (IV-F-1.30, IV-D-75, IV-D-238) said that there is automatic sorting equipment that will remove small household batteries from mixed MSW and will produce a waste stream with lower levels of cadmium and mercury. He felt that mechanical equipment should be accepted as an alternate to the household separation program requirement. Another commenter (IV-D-257) said that studies of their RDF process have shown that over 50 percent of household batteries are removed either with the ferrous metals magnetically or with the small, dense materials separated by a trommel.

Another commenter (IV-D-184) said that mechanical technologies are unavailable for on-site separation. One commenter (IV-D-149) recommended that if battery separation is required, it should only require that vehicle batteries and steel-cased batteries be included because of the difficulty involved in hand sorting waste to separate other batteries.

Response: The separation equipment referred to by the commenter and equipment available from some other vendors removes household batteries either magnetically or by concentrating them in small or dense waste fractions. However, the Agency is unaware of any automatic equipment that subsequently separates the batteries from the magnetic ferrous fraction. Batteries concentrated in small or dense waste fractions may be subsequently screened to further concentrate the batteries, but the Agency is unaware of, and commenters have not identified, any automatic process to specifically separate the batteries. While these technologies may be effective in separating most household batteries from MSW prior to combustion, many nickel-cadmium batteries and some silver oxide and mercury oxide button batteries may not be removed by this equipment since they may be encased in items such as watches, cameras, and small appliances.

Comment: One commenter (IV-D-205) said that one community which had undertaken a household battery separation program had to obtain a hazardous waste generator permit to dispose of the batteries, and this is not desirable.

Response: Since household battery separation programs are not required in the final standards, communities would not have to implement household battery separation programs or obtain associated permits.

Comment: One commenter (IV-D-100) supported provisions for battery separation, but felt that EPA should impose standards for final disposal, not just separation. This commenter felt that standards for separation without standards for final disposal will lead to the landfilling of the batteries which the commenter felt was not an appropriate waste management strategy.

Response: This NSPS addresses air emissions from MWC's. The Agency has concluded that household battery separation programs are not an appropriate technology for reducing air emissions from MWC's. Therefore, this NSPS will not lead to the collection of batteries which must be landfilled. Regulations under RCRA address the safety of landfills. In addition, the "Agenda for Action" outlines the Agency's objectives to increase the safety of both landfills and MWC's by providing technical guidance in minimizing toxic constituents in the waste stream and in designing and operating landfills and MWC's.

Comment: Two commenters (IV-F-1.5, IV-D-279) said that both separated batteries and ash from combustion of waste containing batteries would end up in a landfill. They suggested that a better solution would be source reduction such as replacing disposable batteries with rechargeable batteries.

Response: Using rechargeable batteries is an important method of source reduction to reduce the number of batteries discarded; however, rechargeable batteries also contain heavy metals which must be handled properly by a waste management system. Recent steps taken by the battery industry to reduce the amount of mercury in alkaline batteries to low levels (0.025 percent by 1993) will help to reduce the risks of disposing of these batteries in landfills or MWC's. This NSPS sets emission limits for MWC metals to protect public health and the environment from MWC air emissions. Specific emission limits for mercury will also be forthcoming as specified under the CAA Amendments of 1990. Regulations under RCRA set standards for design and operation of landfills to ensure their safety as well.

Comment: One commenter (IV-D-117) said that EPA should either require all batteries to be separated and stored according to best available storage technology while battery recycling processes are being developed or ban the use of toxic heavy metals in batteries. One commenter (IV-D-62) said that programs to recover metals from the batteries are needed because storage of separated batteries is as bad as landfilling them.

Response: In evaluating the feasibility of household battery separation programs, the Agency examined current options for handling separated household batteries. The Agency found that there are no facilities in the United States for recycling the majority of household batteries. Since recycling options are currently limited and the Agency is unaware of any planned recycling facilities, the Agency does not believe that household batteries should be stockpiled. Recent steps taken by the battery industry to lower the amount of mercury in alkaline batteries will reduce the risks of disposing of these batteries in properly designed and operated landfills or MWC's.

Comment: One commenter (IV-D-62) said that if add-on controls cannot be relied upon to remove mercury from the flue gas stream, removal of mercury- containing batteries, switches, and thermostats is the only way to remove mercury.

However, Commenter IV-D-183 said that mercury may be found in such diverse sources as chlorine bleach, mercury mildew proofing in paints, and mercury pigments and catalysts in plastics. The commenter said it was too early to determine the significance of removing batteries in reducing mercury emissions.

Response: The Agency agrees that there are a number of mercury sources in MSW, and that data regarding the amount of mercury due to batteries or any other specific item in the waste stream, are currently limited. The Agency is currently studying add-on pollution controls for removing mercury from the flue gas stream, and proposed mercury emission requirements will be forthcoming as specified under the CAA Amendments of 1990. While the final standards do not require household battery separation programs, MWC's or communities are free to use any method to reduce MWC metals emissions including the separation of household batteries or any other particular material.

Comment: One commenter (IV-F-1.11 and IV-D-158) thought that EPA, along with battery manufacturers, should explore methods to reduce heavy metals in household batteries and methods to recycle such batteries. One commenter (IV-D-117) suggested that EPA propose measures to limit the amount of mercury used in materials that enter the solid waste stream as a back-up measure to the battery separation requirement. Another commenter (IV-D-253) said that EPA should limit the amount of mercury used in batteries as Switzerland does and that this would be more effective than household separation.

Response: Over the last 6 to 7 years, the battery industry indicates they have voluntarily reduced the amount of mercury used in alkaline batteries by about 90 percent. Battery manufacturers in the United States have indicated that by 1993, all alkaline batteries sold in the United States will contain less than 0.025 percent mercury. This is equivalent to the European standard. Some companies have investigated the feasibility of recycling mixed household batteries, but the Agency is unaware of any plans to construct facilities in the United States. Although the amount of mercury in batteries is declining, the CAA Amendments of 1990 specify that a numerical emission limit for mercury must be promulgated with 12 months of the enactment of the 1990 Amendments. Thus, proposed emission limits for mercury will be forthcoming.

Comment: One commenter (IV-D-187) thought that on-site separation of batteries should be required as a backup measure to off-site separation programs.

Response: Since the proposed household battery separation requirements have not been included in the final standards, neither on-site nor off-site separation of household batteries will be required.

Comment: One commenter (IV-F-2.39) was concerned that requirements for separation of nickel-cadmium batteries should not be aimed at consumers since many nickel-cadmium batteries are sealed inside of appliances and cannot be easily removed. This commenter suggested that battery recycling legislation be aimed at the battery manufacturers instead.

Response: While separation of nickel-cadmium batteries or any other type of household batteries is not required under the final standards, companies are available in the United States for recycling nickel-cadmium batteries, and some manufacturers of appliances are now designing their products so that the batteries can be easily removed.

Comment: Commenter IV-D-184 said EPA has not addressed what should be done with separated batteries. The commenter said that there are no markets for them, there is a shortage of hazardous waste landfills, and combusting them in a hazardous waste incinerator is as bad as in an MWC.

Response: In evaluating the feasibility of household battery separation programs, the Agency found that, with the exception of button batteries and nickel-cadmium batteries, there are no markets for accepting used household batteries for recycling. This NSPS will not create a disposal problem for household batteries since the final standards do not require that they be collected.

Comment: One commenter (IV-F-2.39) stated that battery manufacturers oppose battery separation programs maintaining that alkaline batteries contain less than 0.5 percent mercury, while the EPA's figures state that these batteries contain 7 percent mercury. This commenter stated that battery separation programs are needed because air pollution controls are inadequate to control mercury emissions.

Response: The amount of mercury used in alkaline batteries has been decreasing over the last 5 or 6 years. The Agency figures stating that alkaline batteries contain 7 percent mercury were derived from estimates from the early 1980's. Battery manufacturers have shown significant reductions in the amounts of mercury used in the manufacture of batteries in recent years. Manufacturers indicate that alkaline batteries currently contain about 0.025 to 0.05 percent mercury and that all alkaline batteries will contain about 0.025 percent mercury by 1993.

Comment: One commenter (IV-F-1.31) said that mercury in batteries has a low bioavailability, but when it is vaporized in an MWC and released in the air, it becomes more bioavailable.

Response: The Agency agrees that airborne mercury is potentially bioavailable. The Agency will develop a mercury emission limit for proposal under Section 129 of the 1990 Amendments to the CAA.

Comment: Commenter IV-D-209 said that if EPA requires separation of alkaline and carbon-zinc batteries, EPA should address the costs associated with this requirement, including disposal as a hazardous waste.

Response: Household battery separation programs are not required under the final standards, and there are no associated costs. However, the Agency intends to propose a mercury emission limit in the near future as discussed in the previous response, and the costs associated with this requirement would be included in that proposal package.

4.2 IMPACTS OF MATERIALS SEPARATION STANDARDS

4.2.1 Environmental

Comment: Some commenters (IV-F-1.3, IV-F-1.13, IV-F-1.35, IV-F-2.11, IV-F-2.15, IV-D-28, IV-D-29, IV-D-56, IV-D-58, IV-D-66, IV-D-90, IV-D-101, IV-D-107, IV-D-115, IV-D-137, IV-D-138, IV-D-145, IV-D-155, IV-D-159, IV-D-162, IV-D-164, IV-D-166, IV-D-179, IV-D-222, IV-D-225, IV-D-231, IV-D-232) said that there are no data supporting the conclusion that air quality benefits will result from requiring separation for MWC's especially when considered in conjunction with at-the-stack controls. Commenter IV-D-115 said that EPA had not shown in its background documents or anywhere else that materials separation will result in emissions reduction. One commenter (IV-F-2.15) suggested that air emissions may increase by concentrating pollutant precursors in the combustible waste. Two commenters (IV-D-66, IV-D-138) said that it is absurd to consider glass as a source of air pollution, and Commenter IV-D-66 also felt that it was absurd to consider ferrous metals as a source of emissions. This commenter also said that PVC is the only plastic which negatively affects air emissions, and it is not normally recycled. He added that paper and paperboard are excellent fuels and may make GCP easier to achieve. Commenter IV-D-179 doubted whether separation of certain types of paper, wood, plastics, or yard waste would improve emissions. Some commenters (IV-F-1.3, IV-F-2.8, IV-D-137) argued that the materials separation requirements would not lead to a decrease in total air emissions at combustors, because available capacity resulting from these provisions would be purchased immediately by outlying areas looking for a place to store or burn their wastes. One commenter (IV-D-101) said that if EPA believes that recycling improves air quality, it should support this with data which considers emissions from facilities burning fossil fuels to replace the energy not generated by the MWC. Commenter IV-D-167 said that available control technologies for MWC's adequately protect the environment and human health without separation and said that these conclusions were reached in the Agency's "Report to Congress."

Commenter IV-D-200 said that while data supporting the requirements are scarce, they are based upon sound science and should be retained. One commenter (IV-F-2.53) said that recycling can reduce pollution by as much as 97 percent compared to using virgin materials.

Response: As documented in the separate BID on materials separation and other materials in the docket, while the Agency has decided not to adopt a mandatory materials separation requirement on a nationwide basis, the Agency nevertheless believes that separation and recycling of both combustible and noncombustible materials are consistent with the overall goals of pollution prevention. In certain instances the benefits of materials separation will include both primary benefits at the MWC (both from downsizing new sources and from reduced emissions from removing pollutants) and secondary benefits in reduced air emissions, energy usage, and natural resources consumption at the materials mining or harvesting point and the materials processing point. For instance, our best information indicates that when compared to production of goods using virgin materials, recycling of glass, steel, and aluminum will result in energy savings of about 35 percent, 60 percent, and 95 percent, respectively. Ash quality is also expected to improve as a result of removing noncombustibles. Furthermore, the Agency believes materials separation for combustor areas would lead to reduced energy use by, and pollution from, landfills due to diversion of waste from the landfill to maintain the throughput level of the MWC.

Comment: One commenter (IV-D-291 and IV-D-295) said that the EPA's assertion that separation of noncombustibles reduces metals emissions is based upon the assumption that the materials are exposed to high temperatures and the metals are converted to metal oxides. The commenter said that their MWC process separates the organics from the metals through pyrolysis at 430 to 540°C (800 to 1,000°F) in a primary chamber. The commenter said that separation prior to combustion is not necessary to reduce emissions from their MWC's.

Response: When noncombustible materials are charged to an MWC, the associated metals end up as either MWC emissions or fly ash or bottom ash. If these materials are separated prior to combustion, they will not become part of air emissions or ash. Many metals such as lead are volatilized at temperatures below those specified by the commenter. In addition, recycling separated materials may result in secondary benefits such as energy savings, reduced pollution impacts, and conservation of natural resources.

Comment: Commenter IV-D-255 said that the materials separation requirements are inconsistent since EPA ruled in the Spokane PSD case that no hard data exist to show that materials separation would result in a reduction of the emissions which could be achieved with a dry scrubber/FF control system. The commenter said that the BACT analysis referred to in that case states that the scrubber system provide better control of metals and dioxins/furans than materials separation.

Response: EPA is not imposing requirements for separation under Section 111. The Spokane decision illustrates that whether materials separation is BACT for any particular PSD permit applicant depends on an evaluation of the factual record pertaining to that applicant. The record of this rulemaking includes information which may be useful in such proceedings.

Comment: Another commenter (IV-D-125) said that in order for environmental benefits to be realized, the proposal should specify that the throughput to MWC's be reduced by 25 percent.

Response: The Agency believes that for many communities, many of the environmental benefits are secondary benefits resulting from source reduction or from the recycling of separated materials. Materials separation provisions would help foster more source reduction and recycling, activities which are consistent with the goals outlined in the "Agenda for Action." As more waste is managed using more favorable options, overall pollution prevention benefits will be achieved. Therefore, air emission and other environmental benefits can be achieved even if the throughput to MWC's is not reduced by 25 percent. However, as noted, because of the uncertainty of whether these benefits will materialize overall, separation is not being required as a national requirement at this time.

Comment: One commenter (IV-D-116) said that EPA is inconsistent in its statements about the relationship between materials separation and air emissions. The commenter said that in one instance EPA claims that there are a number of studies documenting air emissions benefits from separation, but in another instance claims that there are little data indicating such a relationship.

Response: It is true that there are little data providing definitive evidence showing MWC emissions reductions that can be achieved through materials separation when at-the-stack controls are used. However, the Agency believes that separating materials prior to combustion will reduce the amount of materials entering the MWC that could be converted to air pollutants, and some direct air emissions benefits will result. The available studies have procedural limitations that make the precise quantification of air emissions benefits difficult. Also, many of the benefits will be secondary benefits associated with source reduction and recycling, and these benefits could not be measured at the MWC stack. In addition, primary emissions will be reduced as a result of downsizing new combustion units.

Comment: One commenter (IV-D-116) disagreed with the EPA's statement that recycling glass will lead to reductions in lead emissions because of the lead in television picture tubes. The commenter said that lead is permanently bound in the glass matrix and would not be emitted upon combustion nor leach from the residue. The commenter added that it is not feasible to recycle television picture tubes due to their multi-component nature. Commenter IV-D-134 agreed that recycling of picture tubes is not feasible, but thought that they should be separated anyway because of possible detrimental effects on emissions.

Response: Materials such as television picture tubes are often associated with other electrical components which may contain heavy metals which could potentially contribute to MWC air emissions. While they may not be readily recyclable, they are not combustible, and therefore, there is no reason to try to burn them in an MWC since they would probably end up in a landfill regardless of whether or not they passed through an MWC.

Comment: Two commenters (IV-D-116, IV-D-174) said that EPA had not substantiated claims that materials separation will contribute to a reduction in global warming. The commenter and others (IV-D-115, IV-D-138, IV-D-164, IV-D-181, IV-D-235) questioned whether EPA had considered that any emissions reduced from not burning MSW would be offset by: (1) increased emissions from fossil fuel plants which must produce additional energy, (2) increased emissions from increased landfilling, (3) increased emissions from recycling processes, and (4) increased emissions from collection and transportation of separated materials. Commenter IV-D-116 referred to a study indicating that for a given portion of MSW, landfilling contributes to the greenhouse effect far more than combustion. Commenter IV-D-179 concurred that the separation provisions will cause more materials to be landfilled, thereby increasing methane emissions.

Response: The final rule does not contain materials separation requirements.

Comment: Commenters IV-D-114 and IV-D-164 said that the bulk of air emissions associated with waste management results from transporting, not combusting waste, and Commenter IV-D-181 said that because of the increased transportation, emissions of hydrocarbons, CO, NO_x, CO_2, and fine particulates would likely increase. Others (IV-D-138, IV-D-145, IV-D-153) said that national air pollution goals may be impacted since energy not produced by MWC's will be offset by fossil fuel plants. Commenter IV-D-138 questioned how the increased SO_2 from burning more fossil fuel to meet energy needs will impact the CAA's cap on utilities. Commenters IV-D-145 and IV-D-153 said that typical coal-fired power plants release more SO_2, NO_x, CO, and particulates per energy unit generated than an MWC operating with the controls required under the proposed rules. Commenter IV-D-115 said that the air emissions problems EPA hopes to solve through requiring separation will just be shifted to other industries which process the materials.

Response: EPA believes that separation of materials prior to combustion will lead to air emissions benefits. Nevertheless, for reasons stated in the preamble, materials separation is not required in the final rule.

Comment: One commenter (IV-F-1.30, IV-D-75 and IV-D-268) submitted test data which he claimed showed that separation of noncombustibles and wet organic materials reduced MWC emissions of PM, heavy metals (including mercury), hydrocarbons, NO_X, CO, and will also reduce the quantity of ash generated. The commenter said that removing noncombustibles is clearly GCP and gives lower emissions of CO, unburned hydrocarbons, and complex organics such as dioxins/furans. The commenter also said that separation of noncombustibles reduced unabated heavy metals emissions by about 50 percent. The commenter said that this is important because particulate filters do not always perform at their peak at all times. This commenter said that air emissions benefits come more from removing particular items rather than just reducing a set percentage of the waste stream.

Commenter IV-D-105 referred to the above test data and said that reductions of some metals, such as mercury, achieved through separation are comparable or superior to those achieved through add-on controls.

However, Commenters IV-D-101 and IV-D-155 said that the data referred to above showed that separation caused emissions of CO to increase. These commenters also said that while the data showed reductions in unabated emissions of some heavy metals, these reductions were not nearly as effective as good APCD's. Commenters IV-D-115 and IV-D-138 also referred to the data and said that the tests were not properly controlled and the data is inconclusive. The commenter added that the studies showed that combusting separated waste caused emissions to increase for about the same number of pollutants as those that showed decreases in emissions.

Commenter IV-D-115 said that EPA should critically examine any conclusions regarding emissions reductions at MWC's based upon the above data.

Response: While add on controls will significantly reduce emissions, EPA believes that materials separation can provide additional air emissions reductions. However, as stated in the preamble, the uncertainty over whether there would be net positive impacts of materials separation led the Agency to decide not to require pre-combustion removal of materials as part of national best demonstrated technology standards at this time on this record.

Comment: One commenter (IV-F-1.30) advocated the precombustion removal of noncombustibles primarily because it improves combustor performance and recovery efficiency, reduces ash volume, and improves emission levels.

Response: These benefits are expected in most instances and are among the reasons that EPA found materials separation to be technically feasible. However, several other factors, as noted above, created uncertainty about the overall net benefits to materials separation at this time. Given the uncertainties in the record at this time EPA could not conclude that materials separation constituted BDT.

Comment: One commenter (IV-D-101) referred to the EPA's studies published in the early 1970's which compared the environmental, energy, and economic trade-offs between single use and reusable products, and between combustion of paper with energy recovery versus recycling of paper. This commenter said that, in general, these studies showed little difference in total environmental impact between options.

Some commenters (IV-D-90, IV-D-101, IV-D-107, IV-D-115, IV-D-153, IV-D-154, IV-D-164) said that recycling operations such as secondary metal smelting, paper de-inking, and composting have environmental impacts as well.

Commenters IV-D-90, IV-D-115, and IV-D-153 said that recycling processes require energy from other polluting sources and concentrated residues from recycling processes are likely to end up in landfills and MWC's. These commenters suggested that when EPA considers the benefits of recycling, it should also consider the secondary environmental impacts of recycling. Commenters IV-D-107 and IV-D-115 said that before establishing materials separation standards, EPA should determine the impacts of the proposed standards with regard to environmental impacts of increased recycling and landfilling. Commenter IV-D-138 asked if EPA had developed a scale of comparison between environmental impacts posed by MWC's and separated materials going to landfills, storage areas, and reprocessing centers. Commenter IV-D-115 thought that EPA should not try to avoid the difficult work of answering tough questions about the ultimate benefits of recycling. Two commenters (IV-D-158, IV-D-232) said that the EPA's benefits analysis is incomplete because it does not consider adverse environmental consequences associated with alternative management options for separated wastes.

Response: It is true that producing products from recycled materials produces some air, water, or solid waste impacts, but overall, EPA believes that these impacts are reduced when compared to the manufacture of products from virgin materials. In the case of newspapers, the industry trend towards using inks with much lower metals concentrations will greatly reduce any potential environmental impacts from the de-inking process. Producing newspapers from recycled paper uses less energy and each ton of newspaper recycled saves about 1,700 kg (3,700 lb) of wood. In addition, there are many unquantified environmental benefits resulting from the reduced wood cutting such as reduced wildlife habitat destruction and reduced runoff from logging areas. Secondary metal smelting for aluminum, steel, and lead uses less energy than production from virgin materials, and the water, air, and solid waste impacts associated with mining the raw materials is greatly reduced. Furthermore, there are environmental regulations that apply to secondary metals smelters. Also, the Agency's analyses in the docket indicate landfilling of waste would be expected to decrease, not increase as a result of materials separation. While the Agency would not want to suggest that there are no environmental impacts from recycling, it does believe that overall environmental benefits will result from recycling even though many of the benefits are difficult to quantify. However, because these benefits are difficult to quantify and the extent of benefits will vary among sources, and because the costs are dependents on such highly variable factors as scrap prices, program costs, and alternative disposal costs, the Agency at this time, based on available information, materials separation should not be required as BDT.

Comment: One commenter (IV-D-111) disagreed with the EPA's statement that no significant water pollution impacts are projected; the commenter said that the processing of recyclable will produce a wastewater stream.

Commenter IV-D-164 said that paper de-inking is a water-intensive process that generates wastewater and sludge, unlike incineration.

Response: It is true that some recycling processes produce a wastewater stream, but other standards for wastewater discharges should protect waters of the United States, and overall environmental benefits from recycling will be positive. In the case of paper de-inking, the industry trend towards using inks with very low metals content will make these wastewaters easier to treat, and potential environmental impacts would be greatly reduced.

Comment: One commenter (IV-F-1.16) felt that EPA should make efforts to ensure that separated materials are reprocessed in an environmentally sound manner, so that the environmental impacts of recycling do not exceed those of incineration.

Response: As noted, the NSPS does not require that materials be separated for recovery.

Comment: Commenter IV-D-105 referred to a study they said indicated that trace amounts of copper, cadmium, zinc, antimony, chromium, and lead catalyze the formation of dioxins/furans and their precursors, chlorinated benzenes and phenols. Thus, they concluded that removing sources of the metals from the waste stream could reduce the opportunity for such reactions, as well as lessening the load on the APCD, lessen the quantity of vaporized metals which escape the APCD, and reduce metals in the fly ash and bottom ash.

Response: Some articles in the literature have suggested possible catalytic relationships between heavy metals and chlorinated organic compounds. If such reductions do indeed occur, it would be yet another potential benefit of materials separation that should be considered by sources.

Comment: In arguing that separation of chlorinated materials would have positive impacts on air emissions, some commenters (IV-D-105, IV-D-117, IV-D-120) referred to studies which they said indicated that relationships exist between the level of chlorinated plastics in the waste and emissions of Hcl, dioxins/furans, and precursors of dioxins/furans. One commenter (IV-D-143) stated that if the proposed 25-percent separation regulation is adopted, the resulting removal of plastics would reduce Hcl emissions and dioxin/furan emissions from MWC's.

Response: The Agency agrees that the separation of chlorinated materials such as chlorinated plastics would have positive air emissions benefits.

Comment: Some commenters (IV-D-114, IV-D-148, IV-D-174) said that old newspapers are a safe source of energy since the heavy metal content of newspaper color inks are controlled to trace levels through industry efforts. Commenter IV-D-148 and IV-D-174 disagreed with the EPA's statements concerning environmental benefits from reduced combustion of paper products impregnated with lead-based inks and mercury-based fungicides. The commenters said that the industry stopped using mercury-based fungicides years ago, and the EPA's own study showed that the contribution of lead in ink-impregnated paper was less than 0.1 percent of the total lead in MSW. Commenter IV-D-114 said that newspapers are not a significant source of chlorine since most manufacturers use peroxide instead of chlorine bleach. Commenter IV-D-148 said that when paper is bleached with chlorine, the chlorine generally does not remain with the fibers made into pulp and paper.

Response: Old newspapers are a source of energy, but there are also environmental benefits if those newspapers are recycled. EPA believes that recycling newsprint saves about 30 percent of the energy needed to make newsprint from virgin materials. Paper recycling also reduces air emissions and consumption of forest stocks. The reduction in the metals content of inks will make the recycling of paper even more environmentally sound. However, in those instances where recycling markets are not available for old newspapers, combustion of that materials for energy recovery would be preferable to landfilling.

Comment: Commenter IV-D-236 submitted a study showing that burning nonrecyclable paper is much like burning coal or wood and is in many instances more environmentally sound. The commenter said that combusting (or cofiring) nonrecyclable paper is better environmentally than combusting MSW; therefore, boilers burning nonrecyclable paper should not be regulated like those burning MSW.

Response: It is true that some paper products can be a valuable fuel. Under the definition of MSW in the final standards, those units that burn just industrial process waste would not be covered under the NSPS. Also, cofired combustors (i.e., those combustors that combust a fuel stream containing 30 percent or less MSW or RDF) are not subject to the MWC emissions,

Comment: One commenter (IV-F-1.24) questioned the environmental rationale of any policy which allows the combustion of marketable materials such as paper and plastic which may contain toxic additives such as heavy metals.

Response: The Agency encourages the separation of marketable materialsm including recyclable combustibles such as separated paper and plastic materials. However, in areas where markets are not fully developed some responsible means for disposal is needed, and combustion in an MWC may be appropriate.

Comment: One commenter (IV-D-154) questioned whether it is wise for EPA to promote yard waste recycling and composting since EPA does not have any standards for metals in compost, and therefore, a greater environmental problem may result.

Response: EPA's standards do not include specific requirements for materials separation of yard waste or any other materials. Standards for compost are currently under development in a separate Agency action.

Comment: One commenter (IV-D-62) said that recycling glass, newspapers, and cans does not reduce the toxicity of the waste stream, but merely reduces its volume thereby concentrating the toxics. This commenter suggested that household hazardous waste separation is the only way to make the waste safe for incineration, composting, or landfilling.

Response: The Agency agrees that separation of household hazardous waste would result in environmental benefits for MWC's and other waste management options and encourages such separation.

Comment: Some commenters (IV-D-101, IV-D-116, IV-D-155) disputed the statement made in the proposal that materials separation will reduce the leachability of MWC ash. Commenter IV-D-101 submitted data which they said showed no relationship between materials separation and ash quality, and Commenter IV-D-155 said that their data shows no difference in MWC ash quality from communities with or without recycling programs. Commenter IV-D-116 said that heavy metals are bound in the matrix of the MWC ash and the ash is nontoxic. Commenter IV-D-116 and IV-D-155 referred to an EPA study they said showed that leachate from ash monofills approximates drinking water standards; therefore, the commenter concluded that materials separation is not necessary to render the ash nontoxic. Commenter IV-D-141 said that they may have developed a process which stabilizes fly ash and that materials separation will not be needed to reduce potential environmental problems associated with fly ash.

Commenter IV-D-115 said that the studies relied on by EPA to show that materials separation reduces metals in ash do not support that proposition. The commenter said that the reductions in heavy metals were really due to the smaller quantity of ash produced by the noncombustibles separation process, but the concentration of metals was not reduced. The commenter added that the separation process creates process residue which must be landfilled, and the same amount of heavy metals may be landfilled.

However, some commenters (IV-D-105, IV-D-106, IV-D-268) favored separation of noncombustibles and said that incineration of noncombustibles produces ash containing metals than can leach from MWC ash and contaminate groundwater. They referred to studies they said showed that separation of noncombustibles reduced the quantity of ash generated and improved its quality. They also said that significant quantities of heavy metals are found in combustible wastes (plastics and pigmented paper) and separation of these items would also reduce ash toxicity.

Response: The Agency is aware of leachability studies showing that some MWC ash is hazardous and studies showing that other MWC ash is not hazardous. The leachability of ash depends upon the nature of a particular ash and its environment. (See e.g., Section 5 of BID on materials separation).

Comment: Commenter IV-D-101 disputed the EPA's comments made in the proposal that separation of noncombustibles will reduce the weight of ash by 30 percent. The commenter said that this does not account for the fact that ferrous metals, nonferrous metals, and glass can be recovered after combustion and would not be disposed of as ash. The commenter also said that their operating data showed no reduction in ash quantity in areas with intensive recycling. They speculated that areas with intensive recycling may separate proportions of noncombustibles and combustibles similar to that in the original waste stream, and, therefore, the percent of ash residue per unit of waste combusted may not decline.

Response: If the relative proportions of combustibles and noncombustibles separated are roughly similar to their proportions in the original waste stream and the amount of waste combusted by a particular MWC is not decreased, the amount of ash generated by that MWC would not decrease.

However, a community separating and recycling a high proportion of noncombustibles before or after combustion would reduce the amount of ash that must be disposed of.

Comment: One commenter (IV-D-02, IV-D-04) questioned whether reduced timber demand from increased paper recycling would actually result in reductions in atmospheric CO_2 since timber stands harvested for paper production are almost always replanted, and young forests may grow more vigorously than more mature stands.

Response: It may be true that the CO_2 assimilation capacity of forest stands might not be diminished if trees were always replanted, but trees may not be replanted in all cases.

Comment: Eleven commenters (IV-D-105, IV-D-106, IV-D-117, IV-D-121, IV-D-138, IV-D-154, IV-D-163, IV-D-184, IV-D-190, IV-D-238, IV-D-253, IV-D-282) favored yard waste separation and said a reduction in high nitrogen yard waste will reduce NO_x emissions. Some commenters (IV-D-105, IV-D-106, IV-D-268) said that food waste is also high in nitrogen and should also be separated. These commenters said that moisture-laden food and yard waste may also lead to products of incomplete combustion. One commenter (IV-D-117) advocated the separation of food waste in addition to other materials saying that composted food waste can provide ecological benefits when added to soil, and separation of food waste may reduce emissions of NO_x, CO, and CO_2.

Two commenters (IV-D-138, IV-D-184) objected to the 10-percent separation credit limit for yard waste. These commenters felt that the 10-percent limit would encourage combustion of yard waste in areas such as the southeast that have a proportionally higher level of yard waste in the waste stream. These commenters felt that this encouragement would favor the generation of NO_x emissions over other emissions. One commenter (IV-D-184) argued that the yard waste credit provides a disincentive for maximizing yard waste composting and that the limit for yard waste credit toward materials separation should be deleted.

Three commenters (IV-D-105, IV-D-117, IV-D-190) suggested that yard waste be eliminated from MSW because this elimination has the potential for reducing NO_x emissions by 25 percent. Two commenters (IV-D-105, IV-D-117) cited a study of NO_x emissions to support the effect of yard waste separation on NO_x emissions from MWC's. This study showed a seasonal correlation for NO_x emissions. The commenters pointed out that NO_x emissions measured in the spring and summer months, when nitrogen-rich grass disposal was at its peak, were higher than emissions measured in the winter months, when yard waste decreases. According to submitted data, the commenters estimated that the overall effect of yard waste separation (summer vs. winter values) was roughly a 25-percent reduction of uncontrolled NO_x values. The commenters recommended that a requirement be included in the NSPS to prevent yard waste from entering the MWC. The commenters concluded that this would serve as one means of NO_x control which is neither difficult nor costly to implement.

One commenter (IV-D-121) cited another study which documented that 75 to 80 percent of the NO_x generated from refuse burners is attributable to fuel nitrogen conversion. According to this report, removing materials high in nitrogen content is one possible way of lowering the mass emission rate of NO_x. The commenter pointed out that nitrogen in MSW is found predominately in food waste, yard waste, and textiles. The commenter cited data supporting source separation and subsequent composting of food waste and yard waste as a feasible and cost-effective alternative to incineration. The commenter estimated that food and yard wastes, which account for only about 20 percent of the total waste stream, account for approximately 49 percent of the nitrogen in MSW that could be burned in an MWC.

One commenter (IV-D-163) stated that if an MWC can demonstrate that separated yard waste is actually recycled, then EPA should waive the limit on the amount of credit allowable for yard waste.

Commenter IV-D-115, however, referred to the study comparing NO_x emissions in summer versus winter and said that this study was not sufficient to determine that separation of yard waste reduces NO_x emissions.

Response: As noted the Agency has not included a materials separation requirement in the final rule for the various reasons stated in the preamble to the final rule. However, the Agency agrees that the separation of yard waste can result in lower NO_x emissions. Yard waste separation is encouraged since yard waste is a material which is easily separated from the waste stream and can be composted in an environmentally sound manner.

Comment: One commenter (IV-D-66) said that while yard waste has a high water content and is a poor fuel, well-designed facilities can handle it without causing air pollution problems.

Response: Regardless of the type of MWC, separation of yard waste would be expected to yield NO_x emissions benefits by removing a large source of nitrogen from the waste stream.

Comment: One commenter (IV-D-143) stated that paper and paper products incinerated in MWC's help maintain high combustion temperatures. The commenter felt that the amount of paper incinerated would be reduced by the 25-percent materials separation requirement, so that combustion temperatures would decrease and presumably emissions of dioxins and furans would increase.

Response: The Agency believes that any materials separation program that may be required as the result of a source specific determination should target a balanced approach in which the proportion of combustibles removed is not much greater than the proportion of noncombustibles removed. A balanced separation program should not adversely impact the combustibility of the waste stream. Programs which separate a higher proportion of noncombustibles, however, may increase the Btu content of the waste. Moreover, the Agency notes that GCP and the emission limits for dioxins/furans and CO will prevent MWC's from emitting high levels of MWC organics.

Comment: Commenter IV-D-138 felt that post-combustion recycling should be credited the same as precombustion recycling and asked EPA what are the air emissions differences between the two.

Response: The final rule does not include any requirements for materials separation.

Comment: Commenter IV-D-161 said that EPA cannot justify statements that recycling ferrous metals will reduce coke oven emissions since it cannot demonstrate that separation of steel cans will automatically result in the use of more scrap and less iron ore.

Response: Representatives of the steel industry have stated that supplies of scrap steel cans are less than current demand, and they expressed a desire to obtain more scrap. Furthermore, scrap stell prices are consistently positive. When scrap is used to manufacture steel, it replaces some production that would have required virgin materials.

Comment: Commenter IV-D-161 disagreed with the EPA's statement that materials separation will reduce litter if the material discarded as litter never entered the targeted waste stream and would never be sent to the MWC.

Response: The Agency did not mean to suggest that its proposed materials separation requirement would eliminate litter.

Comment: Commenter IV-D-282 said that an oversupply of materials will result in prolonged storage of recyclable in a manner potentially threatening to the environment. The commenter referred to an instance where stockpiled newspapers were stored outside where rain could cause metals from ink to leach into the groundwater. Commenter IV-D-300 said that the materials separation standards will lead to more landfilling which has a greater environmental impact than combustion, especially since their State has many unlined landfills.

Response: The final standards have been changed, and do not require materials separation and therefore the concern over storage of the materials for 120 days is a moot issue.

4.2.2 Health and Risk Assessment

Comment: One commenter (IV-D-21) said that in their experience, storage and transportation of household batteries has not proven to be a serious safety risk. This commenter also said that separation of batteries at the household does not pose a serious health threat from ingestion of small batteries. They referred to a study showing that ingestion of batteries does not result in serious health effects in most cases.

However, Commenter IV-D-165 said that many organizations oppose battery separation because of the risk of small children ingesting the batteries or possibly lodging the batteries in the nose or ear and the risk of elderly persons possibly mistaking them for pills. The commenter said that serious health effects could result. The commenter also said that stored batteries can generate hydrogen and heat possibly leading to explosions.

Response: The final standards do not require separation of household batteries, and will not lead to an increase in safety risks associated with their separation and storage.

Comment: Some commenters (IV-D-71, IV-D-138, IV-D-154) said that in setting materials separation regulations, EPA should also consider the health risks associated with recycling such as: (1) increased pollution resulting from trucks collecting materials at curbside or from the MWC and transporting them to their ultimate destination, (2) increased air emissions from materials processing centers, (3) the increased risk of a traffic accident, and (4) increased hazardous waste generated from materials reprocessing centers. One commenter (IV-D-164) said that crushing activities involved with recycling glass exposes workers to respirable quartz particles and lead emissions from secondary lead smelters are high enough to cause brain damage in children.

Response: EPA did not require materials separation in the final rule. One component in that decision was the concern over whether in the aggregate the economic, energy, and nonair environmental benefits would materialize.

Comment: Some commenters (IV-D-78, IV-D-138, IV-D-153) said that the materials separation provisions, in particular the requirement for a 120-day storage period for a combustion permit, may result in stockpiling of materials which may have adverse health effects related to disease vectors such as insects and rodents or increased risk of fires. Commenter IV-D-138 asked if risk from stockpiling or landfilling increased to one in 10,000 or one in 100,000, how would EPA justify the risks of materials separation. Commenter IV-D-232 said that EPA had not followed its "Agenda for Action" because no where does it ensure that alternative management programs do not pose greater health risks than existing approaches. One commenter (IV-D-138) asked if EPA had determined what environmental controls and facility standards should be required at storage areas for separated materials.

Response: The final rule does not include a material separation requirements. Therefore, the issues associated with concerns over the proposed 120 storage requirement are moot. However, EPA notes that for some recyclers it is common practice to stockpile certain noncombustible materials, such as aluminum, in anticipation of future price increases and to reduce the transportation costs associated with making multiple trips to the market, and this does not necessarily lead to problems.

Comment: Commenter IV-D-107 said that EPA should determine the health implications of using products containing recycled materials before establishing mandatory recycling standards.

Response: The final standards do not require materials separation. However, adverse health impacts are not expected from the use of recycled materials. For example, today glass and aluminum are remelted and used in new food contact containers, but paper and plastics generally are not. Container materials that contact food, drugs, cosmetics, or health care products are regulated by the FDA. Recycled materials are often used in the same types of products as virgin materials and would not be expected to result in different health impacts.

Comment: Commenter IV-D-138 asked whether EPA had assessed the work place safety and health risk associated with hand-picking operations at separation facilities. The commenter also asked if EPA had assessed the work place safety and population health risk associated with reprocessing facilities such as plastics, glass, or paper recycling facilities.

Response: The Agency has examined the work place risks associated with handpicking operations at separation facilities. While there are risks, they can be greatly minimized through the use of safety attire and work place safety procedures. In general, work place and population health risks from reprocessing recyclable materials are not expected to be greater than risks from extraction and processing of virgin materials. However, for the reasons cited in the preamble, the Agency has not required a materials separation requirement.

4.2.3 Energy

Comment: One commenter (IV-F-2.38) stated that while an MWC recovers heat from combusting waste, recovering and recycling materials such as paper, plastics, cardboard, glass, and metals saves a greater amount of energy than that recovered in an MWC. Another commenter (IV-F-2.53) said that recycling reduces energy usage by as much as 97 percent compared to using virgin materials.

However, some commenters (IV-D-140, IV-D-148) said that paper mills using virgin materials get much of their energy from process residues, but mills using recycled paper use more fossil fuels because these energy containing residues are not produced. One commenter (IV-D-167) said that while thermal recovery does not always produce the same level of environmental benefit as recycling, it does avoid the need to mine, process, transport, and utilize some fossil or radioactive fuels.

Response: While the Agency believes that in many instances net energy savings are realized by recycling, and this is yet another benefit of the materials separation, the Agency is not adopting national separation standards for combustors at this time for reasons discussed in the preamble.

Comment: Commenter IV-D-101 said that results from their MWC plants showed no relationship between recycling activity and heat content of the waste. However, Commenters IV-D-105 and IV-D-268 said that separation will have a positive effect on the combustibility of the waste. Commenter IV-D-268 said that separation of noncombustibles will increase the heat content of the waste and will increase MWC efficiency.

Response: EPA believes that materials separation would be expected to increase the specific heat content of the waste (i.e., kJ/kg [Btu/lb] of MSW) in some cases, but this is dependent on the relative proportions of combustibles and noncombustibles separated which will vary depending on any particular separation program. However, the question of the specific impact of the 25 percent separation requirement on heat content is no longer a concern given the Agency's decision not to include that requirement in the final rule.

Comment: Some commenters (IV-F-1.29, IV-D-141, IV-D-153) said the downsizing of new MWC's and reduced energy production projected to result from separation would increase the U. S. dependence on foreign oil for energy. One commenter (IV-D-02 and IV-D-04) recommended excluding paper products from the separation requirements because of their high energy value. Another (IV-D-70) felt that an MWC operator should never be required to separate materials if he has unused capacity and is generating energy offsetting consumption of other natural resources. Commenter IV-F-1.30 said that 0.9 Mg (1 ton) of fuel grade wastepaper is equivalent to 2 barrels of oil which directly replaces oil resources, and Commenters IV-D-101 and IV-D-155 said that 0.9 Mg (1 ton) of MSW combusted in an MWC replaces 0.5 Mg (1/2 ton) of coal or 2/3 of a barrel of oil. Commenter IV-D-141 said that energy produced at their MWC replaces 136 million liters (36 million gallons) of oil that would have been burned at the nearby electric utility. Commenter IV-D-232 said that EPA had not adequately analyzed the impacts of energy losses from separation and said that combustion of renewable energy sources such as paper should be favored over nonrenewable sources such as oil and coal.

Response: The Agency has elected not to include the materials separation requirement in the final standard. One reason for that decision was the uncertainty of the overall net energy benefits attributable to materials separation. EPA believes that combustion of waste materials can replace some fossil fuel combustion, but that in many instances materials separation will result in secondary energy savings since recycling materials uses less energy than production from virgin materials. For instance, recycling newspapers saves about 30 percent of the energy required to make newspapers from virgin materials.

Comment: Commenter IV-D-167 said that specific materials such as tires are good sources of energy and the rules should not discourage this type of energy recovery by requiring separation across the board.

Response: The materials separation provisions are not included in the final rule. Moreover, combustors that fire 100 percent tires, 100 percent RDF derived solely from tires, or combustors that cofire tires or tire-derived RDF with other non-MSW fuels are specifically excluded from the standards under this NSPS. Over 220 million tires are discarded in the United States each year. Tires are often described as an orphan waste, in that few options are available for their disposal. One dedicated (and well controlled) tire combustion facility in Modesto, California, which began operation in 1988, burns tires in a specially designed combustor fitted with air pollution control devices. This facility burns about 4.5 million tires per year generating the equivalent energy contained in 200,000 barrels of oil. Similar projects have been recently initiated in other areas of the United States.

Since tires are a national problem and since few options exist for their safe disposal, the Agency does not want to take premature action to discourage projects for disposing of tires and, therefore, dedicated tire combustion facilities are not regulated under this NSPS for MWC's. However, a combustor that burns tires or tire-derived RDF with MSW would be covered under this NSPS if the combustor has a unit capacity above 225 Mg/day (250 tpd).

4.2.4 Cost, Economic, and Market

4.2.4.1 Control Cost.

Comment: One commenter (IV-F-1.30) said costs of separation and recycling are small when benefits to the combustor operation and to public health are included. One commenter (IV-D-56) said that materials separation is the only cost-effective way to control air emissions. Another commenter (IV-D-98) stated that, in general, waste reduction is a cost-effective way of improving environmental quality.

Response: The Agency believes that the prevention of pollution in the first instance should be a primary goal of any community addressing solid waste disposal issues. Source reduction and materials separation are means to achieve this goal. However, as noted in the preamble, a specific national standard mandatory separation program has not been included in this rule.

Comment: Some commenters (IV-F-1.35, IV-D-139, IV-D-154, IV-D-164) said that EPA has underestimated the economic impacts of materials separation. These commenters estimated that total program costs are likely to range from $110 to over $220/Mg ($100 to over $200/ton) of recycled material, taking into account collection, processing, and marketing.

Commenter IV-D-164 said that EPA underestimated the cost and time associated with data collection, planning, education, design, implementation, and monitoring and that these costs are tremendous. This commenter and Commenter IV-D-232 said EPA should state that short-term costs will be high, but that long-term costs are unknown since markets cannot be predicted. Commenter IV-D-153 suggested that the EPA's estimates may be off by more than an order of magnitude and referred to a study showing that costs could range from $9 to $210/Mg ($8 to

$190/ton) of separated material. Commenter IV-D-177 referred to a small rural area where the costs of transporting the materials to market was twice the amount received from their sale, and this did not include pick-up and separation costs.

Commenter IV-D-101 said that the EPA's model for determining materials separation costs disregards the cost of separate collection of recyclable and does not constitute a rigorous cost/benefit analysis. The commenter said that the net costs of materials processing are likely to range from $50 to over $100/Mg ($45 to over $90/ton) considering collection, processing, materials sales, and transportation. The commenter and others (IV-D-135, IV-D-190) said that EPA provides no data to show that the long-term net cost of separation for a community will be zero. Another commenter (IV-D-116) said that it is not proven that revenue generated from recycling will offset costs.

One commenter (IV-D-56) said that when calculating national costs for complying with the materials separation provisions, EPA should include avoided waste disposal costs that result from recycling.

Response: The model relied upon by the Agency in proposing the materials separation requirements provided reasonable estimates of the range of potential net costs based on the use of on-site separation equipment. The model results were relied upon based on the premise that communities could always choose to use off-site strategies if those were more cost-effective, even with the cost-factors unique to off-site programs mentioned by commentors (e.g. data collection, eduction etc.) However, the Agency decided to perform additional analyses more oriented toward costing out off-site approaches based on the view emerging after proposal that most communities would probably rely on off-site programs. Significantly, all three analyses ultimately demonstrated that net financial costs of materials separation could be positive or negative, depending on critical assumptions such as discussed in the preamble. Indeed, the uncertainty surrounding the net costs of separation programs was a major reason the Agency has decided not to require the proposed materials separation requirement as a national standard at this time.

Comment: Commenter IV-D-151 said that for their community, the start-up costs for a recycling program would be 62 percent less than that for building an MWC and hauling costs would also be reduced. The commenter said that the costs to dispose of MWC ash cancels the revenue received from electricity sales.

Response: If, in the commenter's case, a recycling program would substantially reduce their community's waste management costs, then it would be in the best interest of that community to pursue a recycling program. However, some disposal facility, such as an MWC, would always be needed in addition to a recycling program since recycling programs are not normally capable of managing the entire MSW stream. Materials separation and recycling programs vary in cost depending on the type of program, the community, the waste composition, and the availability of markets. In communities where the costs of managing MSW through materials separation programs are partially favorable, those communities may want to separate and recycle significant percentages of the waste stream.

Comment: One commenter (IV-D-232) said that the EPA's Paperwork Burden Analysis does not report the costs that will be incurred by the government or the regulated community involved in applying for combustion permits.

Response: The final rule does not include materials separation requirements and therefore does not include a combustion permit provision.

Comment: Commenter IV-D-138 said that the following assumptions used in the EPA's analysis of materials separation costs are faulty: (1) the model assumes that yard waste will be separated off-site, but the costs of separate yard waste collection and composting are not included, (2) the model assumes that glass will be collected off-site but collection costs are not included, and (3) revenue from the sale of postcombustion scrap is not included even though it may be more valuable than precombustion scrap. Commenter IV-D-232 said the costs did not consider differences between large cities and small rural areas with respect to the types of waste generated and the availability of markets.

Commenter IV-D-116 strongly disagreed with the EPA's assumption that operating a materials separation program is a one-time initial cost and said that operation and maintenance costs are significant and should be factored into the economic analysis.

Response: The original model did include costs for off-site collection of yard waste and glass through a premium for separate collection over regular refuse collection costs. As for postcombustion scrap, if revenues were greater (which is unclear, particularly since at least one steel company has refused to accept postcombustion steel scrap while accepting precombustion steel scrap), this would only improve cost-effectiveness. Nevertheless, the Agency's more recent analyses were, as noted above, focused more directly on off-site approaches and all three analyses indicated net financial costs be positive or negative. However, as noted above, the evaluation of these provisions is dependent on numerous assumptions that are highly variable and uncertain and thus certain benefits to materials separation may not materialize. Thus, the Agency concluded that at this time, on this record, materials separation could not be required on a national basis.

Comment: Commenter IV-D-138 said that the EPA's model for materials separation costs erroneously assumes that costs from a downsized MWC will be less. The commenter said that a smaller facility with equivalent equipment would have a higher tipping fee because of economies of scale.

Response: The original model assumed that per ton disposal costs woud be higher, not lower for smaller facilities due to economics of scale.

Comment: One commenter (IV-F-3.11) claimed that their studies have shown that front-end separation processes are cost effective even if source separation programs are already reducing the waste stream by as much as 50 percent. He added that the costs saved by reducing MWC capacity are more than enough to pay for front-end separation systems. Another commenter (IV-F-1.30 and IV-D-268) referred to a privately owned and operated centralized separation facility which cost effectively separates materials from MSW. The commenter said that the value of materials recovered pays all operating and capital costs for separation. The commenter also said that their facility would allow the MWC to increase capacity by about 30 percent. They said that the capital cost of their centralized separation process is much cheaper than combustion on a daily processed Mg (ton) basis.

Response: If such front-end separation systems are indeed more cost effective than MWC's, then those sources could adopt materials separation as part of its disposal program.

Comment: One commenter (IV-D-138) said that only a few MWC's in the country recover materials other than ferrous metals, and that if it were cost effective to recover other materials, more companies would be in the business of recovering materials on-site. This commenter referred to many companies that began such ventures but did not pursue them because of technical infeasibility of cost effectively separating high-quality materials.

Response: The variability and uncertainty of secondary markets for various materials is one of the reasons that EPA decided not to require materials separation.

Comment: Two commenters (IV-D-71, IV-D-155) said that in considering the costs of materials separation, EPA should also consider the following costs: (1) the administrative costs associated with siting recycling facilities, (2) the increased use of petroleum for transporting the materials from the MWC to their ultimate destination, (3) costs associated with health risks from increased pollution from trucks, (4) increased risks of traffic accidents, (5) aesthetic and environmental costs associated with recycling facilities such as compost piles, and (6) costs associated with any increased use of water or resources in recycling processes.

Commenter IV-D-143 said that the new regulations would require negotiations of contracts and questioned whether EPA had included the cost of renegotiation in their cost estimates. Commenter IV-D-107 said that EPA must consider environmental and health costs associated with materials separation and that this technology cannot be considered "best" if its benefits are less than its costs and impacts. Commenter IV-D-113 thought that the cost of implementing materials separation will be greater than the benefits gained. One commenter (IV-D-164) said that since markets for recyclable materials are not well established in most parts of the United States, the combined cost of storage, transfer, and long-haul transportation will easily outweigh the cost of landfilling.

One commenter (IV-D-71) said that for any given situation, the benefits of recycling will outweigh the costs of alternative disposal. While the market price of recycled materials (or disposing of the materials) are visible indicators of a particular situation, the true costs of society are not reflected in these prices. This commenter urged EPA to attempt to demonstrate these societal costs. One commenter (IV-F-1.20) said that even in communities with the highest tipping fees, whether a curbside recycling program saves money or not depends on the accounting system used. Benefits of cleaner air and less groundwater pollution are usually not accounted for, and often community managers will be reluctant to invest large sums of money in recycling programs when many of the benefits will not enter the accounting system. Commenter IV-D-143 said that if such costs could be internalized instead of being externalized to society, the economic balance would shift in favor of recycling. Commenter IV-D-115 said that the EPA's RIA states that control costs and benefits of materials separation are not included in the regulatory benefits analysis, and it would be impossible for EPA to perform the Congressionally-mandated task of balancing emission reductions from materials separation, if any, with adverse nonair quality environmental impacts of the technology.

Response: EPA recognizes that there may have been unquantified costs for the separation requirements as proposed, however as noted, these requirements are not included in the final rule.

Comment: One commenter (IV-D-78) said that deposits on items such as glass, aluminum, other metal containers, household batteries, and automotive batteries are a more cost-effective way to separate these materials and that requiring the MWC to separate them from mixed MSW is costly to the MWC and to taxpayers.

Response: The materials separation requirements are not being required in this rule.

4.2.4.2 Economic and Market Impacts.

Comment: Some commenters (IV-F-1.35, IV-F-2.11, IV-D-30, IV-D-31, IV-D-32, IV-D-34, IV-D-35, IV-D-37, IV-D-39, IV-D-41, IV-D-42, IV-D-43, IV-D-44, IV-D-45, IV-D-46, IV-D-48, IV-D-49, IV-D-53, IV-D-58, IV-D-77, IV-D-78, IV-D-99, IV-D-107, IV-D-115, IV-D-155, IV-D-164, IV-D-166, IV-D-222, IV-D-230, IV-D-260, IV-D-261, IV-D-265) said that the separation provisions will complicate the permitting process and delay permits as MWC's and governments negotiate who has responsibility and liability for separation. They said that this will impede the ability of local governments to secure financing for MWC's and to negotiate long-term performance guarantees from the private sector which will result in a reduction in the number of new MWC's and the projected amount of MSW combusted. One commenter (IV-D-115) said that the financial community has indicated that tying this uncertain requirement to air permits threatens the status of financing for MWC's. Some commenters (IV-D-153, IV-D-164) said that when municipalities are considering new waste management alternatives, landfills will seem preferable to MWC's due to the difficulty in organizing and financing separation programs.

Response: The materials separation provisions are not included in the final rule.

Comment: One commenter (IV-D-23) said that the 25-percent materials separation requirement would hamper the development of waste-to-energy projects, especially in small communities. The commenter said that if there is no curbside separation program in the community, the high capital and operation and maintenance costs associated with meeting the 25-percent reduction level would be cost prohibitive for smaller projects. This commenter said that their types of MWC facilities already separate noncombustibles, but that meeting the 25-percent reduction level would require separating combustibles which are more economical to use as fuel to produce electricity. They added that in a small community, removing a substantial portion of the combustible waste stream may lessen the feasibility of waste-to-energy projects by restricting the amount of available waste fuel below the minimum amount needed to operate a facility economically.

Response: First, this NSPS only covers MWC's with unit capacities above 225 Mg/day 9250 tpd), so most MWC's in smaller communities will not be covered. Second, the materials separation provisions have been deleted from the final rule.

Comment: Two commenters (IV-F-1.22, IV-D-205) said markets for recycled materials will develop as the supply of separated materials and public awareness increase. Commenter IV-D-160 said that the provisions will go a long way towards ensuring a stable supply of recyclable materials that may eliminate disincentives to market development. Others (IV-F-1.22, IV-D-136) claimed studies have shown that market fluctuations should not hinder recycling programs designed to reduce the waste stream by over 50 percent. Another (IV-D-121) said that market limitations, in principal, should not hinder recycling since when avoided costs of alternative disposal are figured in, recycling will almost always be economically competitive. Commenter IV-D-105 referred to a study they showed that there would be greater demand for recyclables if there were a more consistent flow of materials into recycling programs.

However, others (IV-F-1.3, IV-F-1.13, IV-F-1.16, IV-F-1.29, IV-F-2.11, IV-F-2.12, IV-F-2.15, IV-D-30, IV-D-32, IV-D-34, IV-D-35, IV-D-37, IV-D-38, IV-D-39, IV-D-41, IV-D-42, IV-D-43, IV-D-45, IV-D-46, IV-D-48, IV-D-49, IV-D-52, IV-D-53, IV-D-54, IV-D-66, IV-D-77, IV-D-78, IV-D-90, IV-D-99, IV-D-101, IV-D-107, IV-D-115, IV-D-122, IV-D-128, IV-D-138, IV-D-145, IV-D-153, IV-D-155, IV-D-161, IV-D-162, IV-D-163, IV-D-164, IV-D-166, IV-D-194, IV-D-206, IV-D-221, IV-D-222, IV-D-223, IV-D-229, IV-D-230, IV-D-251, IV-D-252, IV-D-259, IV-D-260, IV-D-261, IV-D-265, IV-D-274, IV-D-282, IV-D-287) said that increasing the supply of separated materials will not necessarily increase the markets for them. The commenters said a lack of markets would result in separated materials being stockpiled, landfilled, or combusted under a combustion permit, which are less desirable alternatives in the waste management hierarchy than recycling. Commenter IV-D-299 said that his State already had an oversupply of materials which were piling up in warehouses. Commenter IV-D-101 referred to studies showing that utilization of materials will only increase with increased demand and incentives. Commenter IV-D-138 referred to information showing that in areas where recycling has been mandated, markets have reacted with declining prices or collapse. Commenters IV-D-115 and IV-D-197 referred to gluts in the newspaper market and said that it would be futile to encourage more separation of this material. Commenter IV-D-153 said that EPA never evaluated the fate of materials that would be separated. Commenter IV-D-297 said that if the Agency cannot guarantee markets for all separated materials, the proposed standards simply impose unnecessary costs on towns.

Some commenters (IV-F-2.12, IV-D-126) said they favored a Federal goal of 25 percent separation, but that because of the immaturity of recycling markets in all areas of the country (particularly for paper), the volatility of these markets, and municipal market procurement restraints a requirement of 25 percent is unrealistic and will be unreasonably expensive. One commenter (IV-D-107) said that in the "Agenda for Action," EPA slated market fluctuations are an impediment to recycling and that both supply and markets need to be stabilized since recycling is often demand driven and markets need to be stimulated to avoid gluts. Two commenters (IV-D-78, IV-D-164) thought that the separation requirements would create such a large influx of recyclable materials that markets for these materials would collapse and remain flat for many years. These commenters thought that EPA should study such potential impacts on communities as well as the whole Nation before establishing such requirements. Commenter IV-D-158 thought that markets do not exist for levels of recycling much greater than being achieved currently.

Commenter IV-D-111 said that an oversupply of materials would cause private groups to stop recycling as the price for materials drops, and citizens would be turned against recycling because it will not be cost effective. Commenter IV-D-115 said that many nonprofit groups no longer collect recyclable because of price declines.

Response: The Agency recognizes that there is significant controversy over whether adequate secondary markets would exist for separated materials had the proposal's requirements been incorporated into the final rule. The uncertainty associated with future scrap prices is one of the reasons, as outlined in the preamble, that EPA determined that materials separation could not be determined to be BDT on a nationwide basis on the basis of the record before the Agency at this time.

Comment: Commenter IV-D-173 said that the greatest limitations to higher recycling rates are distortions in the fiscal policies of most cities and States that favor landfills and MWC's such as: (1) contracts guaranteeing delivery of waste through "put or pay" agreements, (2) substantial tipping fees, (3) clauses that pass financial risks to communities, (4) donations of land, (5) assistance with ash disposal, (6) favorable contracts for electricity, and (7) large State grants. The commenter suggested that all waste management financing should be on a "level playing field" and that recycling should be considered equally when considering waste management options.

Response: The authorities of the CAA do not allow the Agency to mandate changes in State and local fiscal policies but many cities and States have acted to promote recycling. For example, Seattle, Washington, has a "put or pay" contract with one recycler and has taken on market risk in return for lower tipping fees for another. Other towns such as Woodbury, New Jersey, have provided capital and funding for operations for recycling facilities.

States have augmented local efforts by encouraging both recycling and the use of recycled materials. To induce recycling, 23 States and the District of Columbia, representing almost 68 percent of all U. S. citizens, have set recycling goals ranging from 10 to 50 percent to be achieved within 10 years. Over 35 million Americans reside in States mandating municipal recycling. Nine other States have set recycling goals of 20 to 50 percent which localities must meet. To encourage use of secondary materials, seven States give tax credits and/or sales tax exemptions to producers of goods containing recycled materials. Seven other States give loans and/or grants to these manufacturers.

Whether or not one judges the playing field to be level, municipal and State governments are clearly taking steps that actively promote recycling.

Comment: Commenter IV-D-145 cautioned that the costs associated with the materials separation requirements would drive waste away from the city's MWC to landfills in surrounding counties.

Response: In the near term, some MSW may be diverted to landfills as a result of the higher costs associated with materials separation and emission control requirements. Also, some planned MWC's may be deemed uneconomic. These issues are addressed by the substitution analysis in the revised economic impact analysis.

Comment: One commenter (IV-F-3.10) said that a large percentage of separated papers are not readily marketable because they are contaminated with food, plastics, or other materials and combustion of these materials should be favored. Some commenters (IV-D-131, IV-D-148, IV-D-174) said that paper can only be recycled so many times before the fiber gets too weak. Commenter IV-D-115 said that "recycled paper" is only 50 percent secondary fiber since no process is currently able to rid the paper of contaminants. One commenter (IV-D-131) opposed mandatory separation requirements which include paper saying that: (1) many types of wastepaper, such as mixed wastepaper are undesirable for recycling, (2) paper manufacturers will be unwilling to incur costs associated with plant modifications and additional transportation in order to use wastepaper, and (3) manufacturers will continue to purchase a minimum amount of recycled fiber. Therefore, the commenter felt that the providers of wastepaper would be at an economic disadvantage in trying to move the product. Commenter IV-D-181 said that the real demand for old newspaper will not increase in the mid-Atlantic area for at least 5 to 7 years, and communities would be penalized in the meantime since they would have to give it away or pay to have it taken away instead of using it to produce energy.

Several commenters (IV-F-1.29, IV-D-02, IV-D-04, IV-D-131) said that there are practical limitations on the amount of paper products than can be recycled in a short time frame since it takes years to add new paper recycling capacity. These commenters cautioned that creating a large supply in a short time frame may create market gluts. Two commenters (IV-F-1.29, IV-D-140) speculated that mandatory recycling would make available large amounts of low quality or contaminated paper which may be undesirable to manufacturers. Commenter IV-D-138 also said that EPA had not addressed the incongruity between the timing for recycling infrastructure development and widely fluctuating markets. The commenter said that forcing supplies may drive down prices if capacity to accept the materials is not available and this may discourage investors from investing in recycling.

However, one commenter (IV-F-1.2) said that it is incorrect to say that there is no market for paper. He said that the wastepaper stream must be separated in a way that industry can depend on it.

Commenter IV-D-115 said that recycled steel scrap and plastics are weaker and less suited for some products than virgin products because of the inability to remove contaminants from the secondary materials.

Response: The final rule does not include materials separation requirements.

Comment: Several commenters (IV-D-15, IV-D-17, IV-D-74) said that since markets for separated mixed wastepaper are not well developed, EPA should allow this material to be combusted as fuel (possibly cofired with other fuels in industrial boilers) until alternative markets are developed. They added that the high cost of meeting the proposed standards would eliminate a potential fuel market for mixed wastepaper and would result in increased landfilling of this material. Commenter IV-D-174 felt that EPA should let the market determine whether source separated paper is combusted for energy or recycled. The commenter said that the proposed regulations make it uneconomical to burn separated paper even though this is preferable to landfilling.

Response: Cofired combustors (those combustors that combust a fuel stream containing 30 percent or less MSW or RDF) are not subject to the MWC standards. Facilities that burn small amounts of wastepaper or other MSW materials with other fuels would not be subject to the NSPS. Facilities that fire more than this amount of MSW or components of MSW would be subject to the NSPS but the final rule does not include materials separation requirements.

Comment: Some commenters (IV-F-1.26, IV-F-3.1, IV-D-06, IV-D-14, IV-D-122) thought that materials separation should not be mandated if it is uneconomical or if markets for recyclable are unavailable.

Response: The materials separation provisions are not included in the final rule. One of the concerns which led EPA to conclude that these requirements did not represent BDT was the uncertainty at this time over the impact of scrap prices would have on the overall benefits of materials separation on an aggregate basis.

Comment: Some commenters (IV-F-3.6, IV-F-3.8, IV-D-216, IV-D-238) from Alaska said that the 25-percent materials separation requirement is not appropriate for most Alaskan communities since there are limited markets for separated materials in the State of Alaska, and, with the exception of nonferrous metals, it would be prohibitively expensive to ship the materials to the nearest markets which are in Seattle. Also, many Alaskan communities do not have year-round surface access outside of their community. These commenters added that separated materials would probably be landfilled, and this would significantly reduce landfill life. In Alaska, combustion is strongly favored over landfilling because climatic conditions make landfills difficult to operate, and landfills attract bears which could prove to be a danger to the community. Other commenters (IV-D-103, IV-D-200, IV-D-232) referred to small towns or rural areas which may have special difficulties in locating markets and meeting the 25-percent goal and thought that these areas should be exempted from the requirement. One commenter (IV-D-112) said that small MWC's will be impacted more than larger facilities by the materials separation requirements since they are at greater distances from markets and they will not have an economy of scale.

Response: First, these standards do not apply to facilities with unit capacities less than 250 tons per day (225 Mg/day). Second, the materials separation provisions are not included in the final rule.

Comment: One commenter (IV-F-1.16) asserted that the Federal Government should make funds available for States, counties, and municipalities implementing separation programs like they did in the 1960's and 1970's for improving water and sewage treatment facilities. Otherwise, States and local areas with MWC's will have trouble financing facilities or programs needed to comply with the separation requirements. One commenter (IV-F-1.14) stated that the citizens see the EPA's actions as mandatory expensive projects without providing any funding for them. Commenter IV-F-1.13 also felt that the Federal Government should fund the fiscal impact resulting from the proposed rules.

Response: EPA has decided not to require material separation part of national BDT standards at this time.

Comment: One commenter (IV-F-3.6) was concerned that since tipping fees in their State are regulated by the State Public Utility Commission, their private MWC facility could possibly have to subsidize community recycling activities if the commission does not grant tipping fee increases consistent with the real costs of complying with the 25-percent materials separation requirements.

Response: The materials separation provisions have not been included in the final rule.

Comment: Several commenters (IV-F-2.36, IV-F-2.44, IV-F-2.50, IV-F-2.52, IV-D-57) said that recycling is preferable to incineration because recycling creates more jobs.

Response: If recycling creates more jobs than combustion, this may be a benefit of materials separation that communities can consider in individual cases.

Comment: One commenter (IV-D-11) said that his State had limited staff in air and solid waste programs and that monitoring commercial and municipal generators from out of State to comply with the materials separation requirements will be cost prohibitive. This commenter suggested that the Federal Government should pay the associated monitoring costs.

Response: There will be no costs associated with the proposed requirements as they have not been included in the final rule.

Comment: Several commenters (IV-F-1.1, IV-F-1.13, IV-F-1.16) expressed concern that financially stressed communities in the northeastern United States will be adversely impacted by the materials separation requirements. One commenter (IV-F-1.1) said that the EPA's worst case impacts for the materials separation requirement ($10 to $20 tipping fee increase) would be unaffordable for many municipalities, and short-term costs are likely to be much higher.

Response: Concern over the potential impacts on communities where the costs of separation were high and the potential for the benefits to materialize uncertain was one of the reasons EPA decided not to require materials separation on a nationwide basis at this time.

Comment: One commenter (IV-D-107) said that EPA neglected to analyze the cost impacts of materials separation with respect to MWC technology and size. The commenter was concerned that the materials separation requirements may provide competitive advantages for certain types of MWC technologies.

Response: The requirements for materials separation are not included in the final rule.

Comment: Commenter IV-D-90 said that in order to effectively recycle any material, the material must be acceptable to the market place and must be provided at a cost below that of new materials with which the recycled material competes.

Commenter IV-D-115 said that materials sorting and grading is much more difficult than many fledgling recyclers realize. The commenter said that there are over 40 different grades of paper and 200 grades of metal, and that recyclable must be treated as commodities whose values are determined by demand.

Response: It is true that effective recycling requires a steady supply of quality materials at a competitive price. The Agency encourages citizens, businesses, and organizations to adopt the frame of mind that when one separates materials for recovery, they are supplying a raw material -- not simply discarding waste. Statment's by representatives of the paper, plastic, glass, and metals industries indicated that demand for each of these recyclable materials will increase and that capital investments are being made into facilities to use these recyclables.

Comment: Commenter IV-D-106 said that incineration of glass and metal should be minimized because if separated, they are easily recycled, but processing them in an MWC destroys their value as a resource.

However, Commenter IV-D-101 said that incinerating noncombustibles such as ferrous metals is desirable because these materials are rendered biologically inert and are easier to market.

Response: Metals separated after combustion may be clean and marketable, but metals separated prior to combustion are also favorable for market, and separation programs generally encourage residents to rinse containers before separating them. Separating metals after combustion can lead to secondary benefits when these materials are recycled, but primary benefits are lost since they pass through the MWC and may contribute to air emissions. Furthermore, some steelmakers disfavor scrap steel which has gone through an incinerator.

Comment: One commenter (IV-D-122) said that repeated recycling can adversely affect product quality and suggested that the long-term potential impact of the materials separation requirements on product quality be evaluated.

Response: Since major manufacturers are seeking supplies of recyclable glass, paper, plastic, and metals, it is believed that product quality will not diminish since product manufacturers would not seek recyclable materials if they would adversely affect their products. Product manufacturers have their own quality specifications, and they purchase raw materials that can be made into products meeting these specifications.

Comment: One commenter (IV-D-138) cautioned that the proposed standards may encourage further consolidation of the waste management industry since MWC's may want to buy out recycling operations in order to gain control of the recycling processes to ensure compliance with the 25-percent requirement.

Response: The materials separation requirements are not mandated by this rule and therefore the projected concern would not materialize as a result of this rule.

Comment: Commenter IV-D-166 said that nothing will turn citizens away from recycling more than reports of separated materials being landfilled or stored in warehouses.

However, Commenter IV-D-173 said that with intelligent planning and investment, no community should have to stockpile materials. The commenter said that initially, programs could de-emphasize materials with problematic markets, but could invest in market development to improve markets by the time the regulations take effect. The commenter said that the most problematic commodity market, newspapers, will be much expanded by the time the regulations take effect.

Response: The materials separation provisions are not mandated therefore materials separation should occur when local communities determine that they can recycle those materials.

Comment: Commenter IV-D-138 suggested that brokers may stall acceptance of separated materials in order to artificially adjust prices, thereby putting communities at an economic disadvantage in moving the materials.

Response: A market is competitive when there are low (or no) barriers to entry and exit, many rival firms sell a homogeneous product, and each seller only holds a small portion of the total market. Most recycled goods markets are characterized by these statements.

The barriers to entry and exit in the recycled materials brokering markets are very low. The condition of homogeneity is satisfied in the recycled materials markets, the problem of contamination aside. The large number of communities and the potentially large number of brokers involved in the trade prevent concentration of market share by any single actor. Given the low barriers to entry and exit, no single broker could easily obtain a large enough market share to exert control over prices. If such a broker were to stall acceptance of materials, other brokers could enter the market and contract with the material supplier.

Comment: Commenter IV-D-161 and IV-D-167 said that a fixed national recycling requirement ignores differences in geography, commodity, time, and demand, and, therefore, is flawed. Commenter IV-D-153 said that EPA has underestimated both the costs of recycling and the complexity of markets.

Response: The proposed materials separation requirements are not included in the final rule.

Comment: One commenter (IV-D-138) said the materials separation provisions would lead to the siting of many very small MWC's in a region instead of one large regional facility.

Response: The materials separation provision are not included in the final rule.

4.3 COMPLIANCE PROVISIONS FOR MATERIALS SEPARATION

4.3.1 Calculation of Percent Separation

Comment: Some commenters (IV-F-1.10, IV-F-1.30, IV-F-2.15, IV-F-2.41, IV-F-2.47, IV-F-2.56, IV-F-3.1, IV-D-51, IV-D-83, IV-D-98, IV-D-108, IV-D-114, IV-D-126, IV-D-128, IV-D-134, IV-D-138, IV-D-139, IV-D-146, IV-D-153, IV-D-164) said that the list of materials that count toward the 25 percent should be broadened to include all types of waste that are being recycled including textiles, wood chips, construction and demolition waste, junk cars, commercial grease rendering, asphalt, dirt, and rubber as well as any other reductions that are achieved. Five commenters (IV-F-1.30, IV-D-117, IV-D-121, IV-D-186, IV-D-268) said wet organic foodstuffs, which can be composted, should be counted toward the 25 percent. Some commenters (IV-D-114, IV-D-128) said that broadening the list of creditable items could help minimize the use of combustion permits. These commenters suggested that preconsumer recycling by businesses, such as the recycling of pressroom waste and returned (unsold) newspapers, be included in the list of creditable items or activities. Another commenter (IV-D-116) also questioned why the proposed NSPS offered no credit for industrial recycling. One commenter (IV-D-139) said there should be no limits placed on any recyclable as to how much of the 25-percent requirement it could meet. Some requested that the baseline against which the 25 percent is measured and the materials counted toward the 25 percent also be more clearly defined.

Response: Because the Agency has decided not to impose materials separation, it is unnecessary to address to this comment.

Comment: Several commenters (IV-F-1.27, IV-F-1.28, IV-F-2.47, IV-F-2.50) said composting of yard waste should be mandatory, but should not count toward the overall percent separation. Another (IV-D-16) also said composting should not be included in the 25 percent. One commenter (IV-F-1.27) said that yard waste should not be credited toward the 25 percent, but that at least 50 percent of all yard wastes should be separated. Others (IV-F-2.50, IV-F-3.7) said that all yard waste removed should be credited, but the overall 25-percent requirement should be increased accordingly. Another commenter (IV-D-238) thought yard wastes should be excluded from incinerators based on their NO_x emissions, high moisture content, and seasonal variation.

Conversely, several commenters (IV-D-101, IV-D-108, IV-D-126, IV-D-128, IV-D-153, IV-D-184) said that there should be no limit on the credit for yard waste. Some commenters (IV-D-108, IV-D-134, IV-D-147) said that the cap on creditable yard wastes discourages efforts to recycle or compost such wastes. Two commenters (IV-D-164, IV-D-282) said that the proposed materials separation requirement's 10-percent credit limit on yard waste was technically inappropriate, since yard waste is not a good combustible (and is therefore a good candidate for separation). One of these commenters (IV-D-282) said that EPA could promote the separation of several kinds of material by putting a 15-percent cap on credit available for any one class of materials. Commenter IV-D-164 also said it is inconsistent with the "Agenda for Action" emphasis on yard waste composting. One of the commenters (IV-D-148) said that an alternative to giving full credit for all yard wastes is to allow only a percent for yard wastes separated after the first 10 percent credit is given. A third commenter (IV-D-153) said it will be difficult to accurately reflect an appropriate credit for backyard composting of yard waste, even though it may be a significant portion of the overall waste volume. One of the commenters said all composted yard waste, even that left in place ought to be credited, so long as it were fit to make a marketable compost. However, another (IV-F-1.9) said there should be a maximum credit available for yard wastes. Another commenter (IV-D-116) asked that some credit must be available for backyard composting.

Another commenter (IV-D-108) was concerned that composted yard waste that is not actually resold for a profit might be excluded from the 25-percent determination, even though it still would not be burned or landfilled.

Response: Because the Agency has decided not to impose materials separation, it is unnecessary to address to this comment.

Comment: One commenter (IV-D-180) said that the limitation on creditability of yard waste conflicts with California law, which allows full credit for yard waste diversion. One commenter (IV-D-191) said that a mandatory composting program should be a prerequisite for permitting an MWC, and that the final product must be demonstrated.

Response: Because EPA has decided not to impose materials separation requirements, it is unnecessary to respond to this comment.

Comment: Two commenters (IV-D-154, IV-D-184) said that allowing increased credit for composting of yard waste would result in increased composting which then results in better NO_x control.

Response: Because EPA has decided to impose materials separation requirements, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-108) argued that credit should not be given for materials that are separated at the MWC but ultimately end up in a landfill. The commenter said it was preferable for the Administrator to allow a lower compliance rate for a given operator who cannot find a reuser for the separated materials, than to fictitiously report that material as recycled.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Several commenters (IV-F-2.41, IV-D-116, IV-D-132, IV-D-168, IV-D-171, IV-D-205, IV-D-219) said that some communities already achieve 25 percent separation and that it would be unfair to consider current practices as the baseline and require an additional 25 percent. These and other commenters (IV-D-277) said credit should be given for separation already achieved. Another commenter (IV-D-134) said the 25 percent should be based on all waste produced in the areas served by an MWC, not just the amount brought to the combustor.

In contrast, two commenters (IV-F-2.47, IV-F-2.50) said the Federal materials separation requirements should be based on current waste disposal practices and should not give credit toward the 25-percent requirement for reductions currently being achieved. One commenter (IV-D-134) said that a baseline year against which to compare the 25-percent reduction should be established, as is currently done in New York.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-98) said reductions due to source reduction programs should be creditable. Another commenter (IV-D-116) agreed, noting that source reduction is higher on the solid waste management hierarchy found in the "Agenda for Action." Another commenter (IV-F-2.62) suggested the calculation of 25 percent separation should give credit for waste reduction resulting from nonrecycling activities, such as a shift to products with less packaging.

However, two commenters (IV-D-16 and IV-D-186) said the 25-percent separation should not include credit for source reduction. One commenter (IV-D-186) noted that the State of New York has a combined source reduction and recycling goal of 50 percent already. Another commenter (IV-D-187) said that credit should not be given to an MWC for off-site (source) reduction to the extent that no separation on site is necessary, because the MWC ought always to have to sort out batteries and to reduce the load to the MWC.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Some commenters (IV-D-138, IV-D-139, IV-D-146) said the regulations should provide specific estimation methods for accounting for credit due to source reduction programs, backyard composting, and bottle bills. The commenters requested that this credit ought to be plainly stated within the regulation, rather than just expressed in the preamble. Some commenters (IV-D-116, IV-D-279) asked if bottle bill returns would be credited and how they would be measured. Another commenter (IV-D-134) requested that credit for deposit/return systems be measured by scales or very specific calculations rather than estimation methods which must be reviewed by EPA. This commenter (IV-D-134) also said that EPA needed to develop specific estimation methods for calculating the percent credit allowed for materials that cannot be weighed directly. One commenter (IV-D-146) noted that the State of Washington had developed some expertise in crediting off-site programs that could be modeled in this rulemaking.

However, some commenters (IV-F-2.47, IV-F-2.48, IV-F-2.50, IV-D-268) said that only materials which actually enter the municipal waste collection system should be given credit. No credit should be given for materials that are not typically collected with MSW such as white goods, bottles and cans returned under bottle bills, and backyard compost.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Eight commenters (IV-F-1.29, IV-D-101, IV-D-116, IV-D-131, IV-D-139, IV-D-153, IV-D-155, IV-D-158) thought "back-end" recycling of materials, such as metals and ash, recovered after combustion in an MWC should be credited toward the 25 percent. Another commenter (IV-F-3.9) representing an alternative combustor process concurred with the proposal's requirement for 25 percent materials separation. The commenter went on to say, however, that in his process, glass and aluminum were actually more easily separated from the ash residue than at the front end (i.e., by separation prior to combustion).

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Four commenters (IV-F-2.56, IV-D-66, IV-D-101, IV-D-153) said energy recycling achieved by recovery of heat from incinerated waste should be credited toward 25 percent because the energy offsets the pollution which would result from producing an equivalent amount of energy by burning a fossil fuel. One commenter (IV-F-2.56) said this is currently allowed in Ohio. One commenter (IV-D-153) suggested a maximum credit of 5 percent (out of 25 percent) be allowed for waste-to-energy facilities because they produce energy in an environmentally protective manner. Other commenters (IV-D-163, IV-D-282), however, said no credit should be given for separated materials that are processed into RDF. The commenters did stipulate, however, that separated tires burned for fuel should be credited.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-116) was concerned that if prices for recyclable materials increased enough, individuals would sell the recyclables themselves. The commenter wondered how this would impact compliance.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Two commenters (IV-F-2.47, IV-F-2.50) said batteries should be separated, but not counted toward the 25 percent. However, other commenters (IV-D-101, IV-D-209) said lead-acid and household batteries should count toward the 25-percent requirement. The first commenter (IV-D-209) said this would give operators an additional incentive to thoroughly monitor the incoming waste for lead-acid batteries which have not been source separated.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-153) said credit should also be given to a municipality having requirements for the use of recycled products, because those requirements increase demand, thus promoting recycling.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Two commenters (IV-D-139, IV-D-209) said that since local governments are responsible for waste management, a local government should be allowed to "distribute" credit for materials separation which occurs anywhere within its jurisdiction among any operators serving the locality, so long as the whole management area achieves the 25-percent reduction. The commenter argued that this allowed day to day flexibility in solid waste management while accomplishing the overall goal of 25 percent separation. Another commenter (IV-D-219) said that a community ought to receive credit for anything it separated out as a result of a State or local ordinance or prohibition.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

4.3.2 Contractual Arrangements

Comment: One commenter (IV-F-1.10) said that the need to become a co-operator should not be mandated in the standards. Rather, responsibilities should be specified in individual contracts. However, two commenters (IV-D-190, IV-D-235) argued that it was necessary to involve the community as a co-operator in order to ensure compliance because the facility has no way to control and/or validate recycling efforts. The commenter recommended the compliance provisions be strengthened by EPA through more developed procedures for certification, co-operator contracts, and auditing. Some commenters (IV-F-1.1, IV-D-222, IV-D-229) said that assigning responsibility for the materials separation requirements would complicate and prolong contract negotiations. These and other commenters (IV-D-115) said the materials separation requirements would hinder the ability of operators to obtain financing. One commenter (IV-D-225) said that tying the materials separation provisions to a preconstruction permit or permit to operate would cost many applicants who were already several years into an MWC project 2 to 3 more years, even in the case where recycling is already being aggressively implemented. Another commenter (IV-D-282) said the materials separation provision would tip the scales toward delay for any project facing uncertainty.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Two commenters (IV-D-155, IV-D-158) said that the consent decree envisioned by the proposal was unworkable because it was voluntary, and needed to have all parties contractually bound, with one of them having authority to bring about corrective actions. Another commenter (IV-F-3.6) thought this regulation provided no help for entities (i.e., MWC owners or operators) that have no control over contractual arrangements, and no authority to force communities to separate wastes, recycle, or even reveal quantities separated or recycled.

Two commenters (IV-D-106, IV-D-186) thought that the threat of enforcement action against the owner or operator or even shutdown was appropriate, in order to provide the incentive to perform separation, or to require it of any and all contractors or subcontractors.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Some commenters were concerned that MWC's may need to rely on the word of others that waste has been separated prior to delivery to the MWC. One commenter (IV-D-153) said that the regulation needed to provide protection to those operators who rely in good faith on the word and records of an off-site entity under this type of cooperator contractual arrangement. Another commenter (IV-D-138) recommended that the regulations clearly state that where an MWC has contracts which specifically state that delivered wastes will have undergone separation, the contracts themselves be accepted as a demonstration of compliance.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

4.3.3 Combustion Permit

Comment: Several commenters (IV-F-1.9, IV-F-1.28, IV-F-2.6, IV-F-2.41, IV-F-2.52, IV-F-2.53, IV-F-3.13, IV-D-56, IV-D-57, IV-D-105, IV-D-106, IV-D-158, IV-D-201, IV-D-217) favored elimination of the proposed combustion permit provisions. They saw this as a potential loophole that would take away from achieving the goal of recycling. One commenter (IV-D-238) said that materials incinerated under the combustion permit should never be accounted for as "recycled." Another commenter (IV-D-186) said that composting of separated materials should be considered before either landfilling or combustion, when recycling is not available. Another commenter (IV-D-246) said the combustion permit should only be allowed when the 25-percent requirement cannot be achieved through the separation of other materials.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-114) favored the combustion permit as proposed.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Some commenters (IV-F-1.2, IV-D-105, IV-D-120, IV-D-121, IV-D-209) said that a comparison between the cost of paying a recycler to accept separated combustibles and the landfill tipping fee is not always an appropriate basis for a combustion permit, since landfill tipping fees are influenced by many factors and are not a good reflection of true disposal costs. One commenter (IV-D-117) said the landfill tipping fee was inappropriate to use in justifying an application for a combustion permit because landfilling was at the bottom of the solid waste hierarchy. The commenter was concerned that even though the availability of landfill space was likely to decrease in the future, landfill tipping fees were not representative of the true costs of disposal, and, as such should be avoided in the combustion permit decision. Another commenter (IV-D-186) said that the tipping fee often does not represent the cost of landfilling in a landfill meeting all the applicable regulations because so many landfills are currently out of compliance with many ordinances. The commenter also noted that the tipping fee also seldom includes the long term cost of maintenance after closure. However, another commenter (IV-D-209) said that in some counties landfill tipping fees include the cost of community recycling programs. Other commenters (IV-D-146, IV-D-246) said the cost of transportation should be figured into the comparison wherever transportation costs occur.

Some commenters (IV-F-1.10, IV-D-51, IV-D-238) thought a comparison between the cost that would be paid to a recycler to accept the material and the MWC tipping fee or landfill tipping fee for the given weight of material was a more appropriate comparison. Another commenter (IV-F-1.2) said it must not be easy to obtain a combustion permit, and that the avoided MWC tipping fee must be less than the cost to have it recycled before a permit should be granted. Most of these commenters thought better guidance ought to be provided as to the baseline for such comparisons.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Some commenters (IV-F-1.5, IV-F-1.29, IV-D-83, IV-D-115) said that if there is no market for separated materials, separation should not be required prior to combustion (under a permit) or landfilling. They said separation in such cases would be costly, unnecessary, and inefficient. One commenter (IV-D-115) argued that storing these materials would be difficult due to space constraints, and would result in health and sanitation problems.

However, others (IV-F-1.10, IV-D-186) said that separation should still be required regardless of whether separated materials are recycled or disposed of because markets often rebound. One commenter said that only if the markets show no recovery for a prolonged period of time should separation be allowed to stop.

One commenter (IV-D-135) said that any combustion permit should be based on the overall marketability of a given recyclable material, and not result in an entire year of exemption. This commenter said markets will rebound, and the exemption granted would be irrelevant and contrary to the intent of the proposed standards. However, one commenter (IV-D-219) said that most solid waste management programs are not able to respond quickly to changes in the recycling market by separating an alternate material in greater demand, especially when the specifics of source separation and reduction programs are embodied in local ordinances. The commenter said a community should not be penalized for market forces beyond its control.

Another commenter (IV-D-121) said that the cost effectiveness of the overall materials separation should be the basis for granting a combustion permit, not just the costs involved in recycling one unsuccessful component. The commenter argued that sale of a highly profitable material, such as aluminum, can help support the recycling of a material which needs to be subsidized in order to be recycled.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Two commenters (IV-F-3.13 and IV-D-56, IV-D-121) said that if costs for recycling and landfilling are to be compared for the purpose of exempting facilities from separation requirements, then environmental costs should be assessed for global warming effects and ozone destruction as well as for toxic air emissions, toxic ash leaching, and resource destruction.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Some commenters (IV-F-1.1, IV-D-116, IV-D-138, IV-D-153, IV-D-154, IV-D-155, IV-D-158, IV-D-164, IV-D-167, IV-D-174, IV-D-184, IV-D-235, IV-D-257) saw the combustion permit provision as unworkable. The commenters said that MWC owners or operators would have to spend an inordinate amount of time in negotiations with EPA for combustion permits, especially where markets are highly volatile. Another commenter (IV-D-184) said that new MWC's may not be able to burn the unrecyclable materials for which a combustion permit has been granted because many States will seldom permit any excess capacity at MWC's.

Another commenter (IV-D-140) noted that there are some areas where a 1-year combustion permit would not help, such as Fargo, North Dakota, which is very far from any mills where used paper could be used. The commenter recommended that the permit granting authorities ought to be granted flexibility to respond to local and regional situations. One commenter (IV-D-221) said that the authority to grant combustion permits ought to be given to the States, when a State has an approved SIP with RCRA authorization.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Many commenters (IV-D-101, IV-D-108, IV-D-155, IV-D-158, IV-D-193, IV-D-235, IV-D-279) said the 120 days necessary prior to applying for a combustion permit was too long. Some of these commenters felt the long time period would provide fire hazards and opportunities for "sham" recycling operators who might collect revenues from municipalities for storing waste which they would subsequently abandon. One commenter (IV-D-108) stated that this sort of operation has already been a problem in his State, particularly with tires. The commenter recommended a holding time of 30 days.

Other commenters (IV-F-1.1, IV-D-101, IV-D-116, IV-D-128, IV-D-138, IV-D-153, IV-D-154, IV-D-155, IV-D-158, IV-D-164, IV-D-167, IV-D-174, IV-D-184, IV-D-235) commented that wastes held for 120 days would present a health hazard. Additionally, some commenters (IV-F-1.1, IV-F-1.5, IV-D-116, IV-D-138, IV-D-153, IV-D-154, IV-D-155, IV-D-158, IV-D-164, IV-D-167, IV-D-174, IV-D-184, IV-D-193, IV-D-235, IV-D-257) were concerned that the facilities would never have enough space to store 120 days worth of stocked wastes. One of the commenters (IV-D-138) said that this is simply a physical impossibility. Some commenters (IV-D-155, IV-D-158, IV-D-166) opposed the 120-day holding provision prior to combustion because they believed the combustion permit provisions would result in landfilling rather than burning the materials separated and stockpiled, resulting in an increased use of landfills. Two commenters (IV-D-101, IV-D-128) suggested a permit ought to be available as soon as the price turned negative. Other commenters (IV-D-101, IV-D-155, IV-D-158) opposing the 120-day holding period noted that many State and local laws currently prohibit the storage of waste for any protracted time periods. Some commenters (IV-D-138, IV-D-155, IV-D-257) said that since the proposal only requires that 25 percent of the waste stream be separated, and not that it be recycled, many operators would therefore landfill anything that it could not recycle immediately rather than wait to combust it under a permit. One commenter (IV-D-138) said any health or environmental benefit gained by diverting the waste from the combustor would be more than offset by increased landfill gas emission levels at the landfill.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Two commenters (IV-D-105, IV-D-106) recommended that owners or operators applying for the combustion permit must first do extensive waste analysis and market studies to document that a market is not expected to develop in the near future.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-167) wondered who would be responsible for wastes separated at an MWC when they cannot be recycled if 25 percent reduction is also required at landfills sometime in the future.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

4.3.4. Enforcement Guidance and General Enforcement Comments

Comment: Some commenters (IV-F-1.35, IV-D-138, IV-D-282) were concerned that owners and operators of MWC's do not have control over the level of separation achieved by individuals in the waste shed. One commenter (IV-F-1.32 and IV-D-28) said that neither the MWC nor the community should be held responsible if separation is not achieved because individuals failed to recycle. Another commenter (IV-D-193) said that the penalties for prohibited items that are found in the waste stream should be levied against the homeowner that slipped them into the trash bag. One commenter (IV-D-187), however, said that off-site processors should not be penalized for any shortfall in the 25-percent requirement and that all penalties should apply against the MWC operator.

Some commenters (IV-F-1.26, IV-F-2.8, IV-F-2.11, IV-D-166) wondered if noncompliance meant the MWC could be shut down, because the garbage would be on the curb every morning, whether or not the 25-percent requirement were met.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: One commenter (IV-F-1.2) expressed doubt that EPA would enforce sanctions on municipalities in cases where the municipality providing MSW to the MWC is responsible for separation.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Some commenters (IV-F-1.4, IV-D-146, IV-D-166, IV-D-205) said that State air agencies have little control over solid waste disposal. They said it makes little sense for State air agencies to keep records on waste separation, and that the State solid waste offices should be involved. The commenters recommended that development of the scheme for enforcement be left up to the States, provided it meets the specified goals of the Federal regulation. Other commenters (IV-D-101, IV-D-282) said that it was preferable for EPA to develop the system for compliance demonstrations through OSW.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-18) suggested that the regulations for materials separation should regulate weighing operations so that compliance would be based on standard weighing practices. Another commenter (IV-D-104) suggested that daily weights be used in determining the 25-percent reduction required, in order to be more representative of the incoming waste profile. A third commenter (IV-D-171) recommended that the enforcement compliance provisions specify the units of measurement, base dates, and what may be included in the count. The commenter further recommended that only actual weights or volumes be used and argued that estimations should be avoided for all but rural or smaller communities. Another commenter (IV-D-184) said that weighing and measuring solid waste is currently more of an art than a science. The commenter believed that the workload required to account for separated materials is therefore underestimated. Another commenter (IV-D-60) said that even though he approved of the separation requirements, weighing the incoming garbage would be too much of a burden for very small incinerators.

Response: Because EPA has decided not to impose materials separation requirements, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-116) said that a merchant plant operator might be forced to separate materials for many, or even every, "spot" load of waste the operator accepts, even if their long-term contractors bring only processed waste. A second commenter (IV-D-173) said that enforcement for merchant MWC's would involve random inspections of incoming loads to verify that the waste has been pretreated. The commenter recommended that such MWC's be allowed to accept waste only from communities having effective recycling programs in place. Another commenter (IV-D-11) asked how the material separation requirements would be enforced when wastes are brought from other States.

Response: Because EPA has decided not impose materials separation requirements, it is unnecessary to respond to this comment.

Comment: Several commenters (IV-F-1.27, IV-D-56, IV-D-105) felt that compliance should be demonstrated 1 year rather than

2 years after start-up to ensure health protection. Several (IV-D-106, IV-D-117, IV-D-186) agreed that the compliance times allowed are unnecessarily long. One of these (IV-D-186) suggested that interim enforceable requirements are needed. However, several commenters (IV-D-138, IV-D-153, IV-D-155, IV-D-158) thought 2 years was too short a time in which to develop a program which could demonstrate compliance with a 25-percent requirement. One commenter (IV-D-155) cited several examples of large scale separation systems built in the 1970's which failed "spectacularly," while another commenter (IV-D-153) said that the materials separation programs envisioned by the proposal would require political activities which require longer time frames to execute. Another commenter (IV-D-138) reported that programs achieving 25 percent reduction have been in operations for 2 years or more.

Response: Because EPA has decided not to impose materials separation requirements, it is unnecessary to respond to this comment.

Comment: Some commenters (IV-D-117, IV-D-178, IV-D-186, IV-D-238) recommended that MWC's be required to submit equipment specifications and other aspects of their plans for compliance with the materials separation requirements in advance of implementing them or obtaining an operating permit. Two commenters (IV-D-117, IV-D-238) recommended that applicants be required to characterize their waste stream prior to obtaining a permit, in an effort to improve separation efficiency.

Response: Because EPA has decided not to impose materials separation requirements, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-238) said the materials separation plan should include a description of significant educational or promotional efforts underway or in progress in the service area.

Response: Because EPA has decided not to impose materials separation, it is unnecessary to respond to this comment.

Comment: Two commenters (IV-D-105, IV-D-117) said the regulation needs to be strengthened in the area of compliance monitoring by establishing specific responsibilities for who is to provide regulatory oversight. Another commenter (IV-D-138) noted that a specific entity providing oversight needs to be established up front in order to ensure that all deliveries to the facility have undergone pretreatment, since not all deliveries are under the direct jurisdiction of the operator.

One commenter (IV-D-181) said the materials separation requirements will greatly increase the workload and paperwork of EPA regional offices.

Several commenters (IV-D-114, IV-D-155, IV-D-158, IV-D-167) said EPA needs to provide guidance to municipalities of the design of separation programs, and/or how to measure compliance. One commenter (IV-D-167) felt enforcement issues are of such fundamental importance to the rulemaking that enforcement guidance documents for the materials separation requirement should be subject to public notice and comment.

One commenter (IV-F-1.8) said enforcement of separation would be no more difficult than enforcement of many other programs already in place. He gave the complex technical requirements of the PSD program as an example of something that is currently enforced and is at least as difficult to enforce as separation.

Response: Because EPA has decided not to impose materials separation requirements, it is unnecessary to respond to this comment.

4.3.5 Battery Separation Compliance

Comment: Many commenters (IV-D-107, IV-D-111, IV-D-113, IV-D-137, IV-D-170, IV-D-181), although in support of the exclusion of batteries from the waste stream, felt an absolute prohibition was unworkable. Some commenters (IV-F-1.8, IV-F-1.30, IV-D-125) said visual identification of lead-acid vehicle batteries by the crane operator is not a feasible way to prevent battery combustion. One commenter (IV-F-1.8) said EPA should make it clear that this method will not be acceptable to demonstrate compliance with the battery combustion prohibition. One commenter (IV-D-113) said that mandatory battery separation programs are unenforceable and, therefore, would flounder. Two commenters (IV-D-107, IV-D-181) said that requiring 100 percent removal of lead-acid batteries is an unachievable requirement because neither deposit/return systems or battery screening devices can effectively ensure 100 percent removal. The commenter felt that requiring "best efforts" or "reasonable efforts" to remove the batteries was more reasonable and enforceable.

One commenter (IV-D-137) suggested that more feasible methods of excluding lead-acid batteries would be:
(1) agreements between MWC operators and waste haulers stating that batteries are prohibited, (2) signs posted at the MWC,
(3) routine inspections of incoming waste, and
(4) deposit/return incentives for the batteries. Another commenter (IV-D-111) said that the regulations should require documentation of local programs and regulations sufficient to keep batteries out of MWC's. One commenter (IV-D-170) said that the materials separation provisions for lead-acid batteries should include mandatory recycling in order to prevent the possibility that the separated batteries would end up in a landfill.

Response: Because EPA has decided not to impose battery separation requirements, it is unnecessary to respond to this comment.

4.4 REPORTING AND RECORDKEEPING REQUIREMENTS FOR MATERIALS SEPARATION

Comment: One commenter (IV-D-78) said MWC's and communities do not have adequate scale capacity to keep records of the weight of MSW collected and separated. Others (IV-D-155, IV-D-158) said they lacked authority to collect data about household habits regarding separation.

Response: Because EPA has decided not to impose materials separation requirements, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-114) suggested that secondary materials brokers should also submit information on the quantities of materials collected, so that efforts by civic groups could be given credit. Another commenter (IV-D-138) recommended that the final regulations provide a means to safeguard against sham recyclers, such as documentation that separated materials are actually recycled.

Response: Because EPA has decided not to impose materials separation requirements, it is unnecessary to respond to this comment.

Comment: One commenter (IV-F-2.41) suggested that the recordkeeping and reporting provisions should require that compliance data be provided on computer format.

Response: Because EPA has decided not to impose materials separation requirements, it is unnecessary to respond to this comment.

Comment: One commenter (IV-D-153) asked that the final regulations clarify that the reporting requirements are fulfilled by submission to the appropriate State authority, rather than sending reports to both the State agency and EPA.

Response: Because EPA has decided not to impose materials separation requirements, it is unnecessary to respond to this comment.

Comment: Some commenters (IV-F-1.29, IV-F-2.3, IV-D-112, IV-D-113, IV-D-140, IV-D-164) said recordkeeping will be burdensome. One commenter (IV-F-1.29) said this would be especially true where multiple communities bring their waste to the same MWC's. However, another commenter (IV-D-186) said that the recordkeeping and reporting requirements were inadequate, and that interim reports should be required prior to the start-up of the materials separation program. And another commenter (IV-D-205) said the requirements would not be burdensome whether the separation takes place at the incinerator or in the community. One commenter (IV-D-268) said that the recordkeeping and reporting requirements should not be burdensome, but that it will be easier to obtain accurate data from a mechanical separation processing plant than from source separation programs.

Response: Because EPA has decided not to impose materials separation requirements, it is unnecessary to respond to this comment.

4.5 LEGAL AUTHORITY TO ISSUE MATERIALS SEPARATION STANDARDS

Comment: Many commenters (IV-F-1.1, IV-F-1.3, IV-F-1.5, IV-F-1.12, IV-F-1.13, IV-F-1.19, IV-F-1.26, IV-F-1.32, IV-F-1.35, IV-F-2.5, IV-F-2.7, IV-F-2.11, IV-F-2.15, IV-F-2.48, IV-F-3.2, IV-F-3.4, IV-D-28, IV-D-29, IV-D-33, IV-D-40, IV-D-47, IV-D-48, IV-D-52, IV-D-66, IV-D-71, IV-D-78, IV-D-90, IV-D-107, IV-D-112, IV-D-113, IV-D-115, IV-D-116, IV-D-128, IV-D-131, IV-D-132, IV-D-133, IV-D-137, IV-D-138, IV-D-139, IV-D-143, IV-D-145, IV-D-149, IV-D-153, IV-D-154, IV-D-155, IV-D-156, IV-D-158, IV-D-159, IV-D-162, IV-D-164, IV-D-166, IV-D-184, IV-D-193, IV-D-195, IV-D-204, IV-D-219, IV-D-221, IV-D-223, IV-D-229, IV-D-230, IV-D-231, IV-D-232, IV-D-235, IV-D-249, IV-D-251, IV-D-252, IV-D-255, IV-D-256, IV-D-277, IV-D-282 and IV-D-190, IV-D-284, IV-D-285, IV-D-287) said that while the requirements may be achievable, the CAA is not the appropriate authority to require separation or recycling. Most of these commenters recommended that recycling should be implemented as part of a comprehensive solid waste management program under either: (a) existing RCRA authority, (b) new legislative provisions developed during the RCRA reauthorization process, (c) the President's recycling initiative, or (d) local agencies. Another commenter (IV-F-1.10) recommended that all parts of this proposal not consistent with the forthcoming RCRA rules be rescinded when those rules are promulgated.

Several commenters (IV-F-1.3, IV-F-1.13, IV-F-2.11, IV-F-2.15, IV-D-101, IV-D-106, IV-D-107, IV-D-111, IV-D-115, IV-D-116, IV-D-122, IV-D-128, IV-D-137, IV-D-138, IV-D-153, IV-D-155, IV-D-158, IV-D-164, IV-D-192, IV-D-232, IV-D-255) considered the materials separation requirements to be illegal because they were not a demonstrated technology of emission reduction. Some of these commenters said the cost of the emission reduction could not be considered in selecting best demonstrated technology because there was no data linking material separation to emission reductions. Several also noted that the Administrator himself had said that data are inadequate to demonstrate the effect of materials separation on either emissions or ash. Another commenter (IV-D-101) cited data from four MWC's which the commenter said show no correlation between separation and either emissions or ash volume. However, other commenters (IV-D-117, IV-D-268) thought the data were adequate to show that materials separation reduces MWC emissions.

One commenter (IV-D-268) said that even when add-on controls result in a 98-percent reduction in emissions, the initial reduction obtained by preprocessing was sufficient to justify the materials separation provisions of the proposed standard.

One commenter (IV-F-2.47) stated that materials separation was appropriate as a part of best demonstrated technology, as a consideration of nonair quality health, and environmental impacts. Other commenters (IV-D-107, IV-D-138, IV-D-155, IV-D-158), however, argued that it was a misuse of the provisions regarding the consideration of nonair quality health benefits to base a standard solely upon such impact, because the proper consideration of such impact was as it relates to air emissions reductions achieved by the standard under consideration. The commenters said these impacts could not be considered because an emission reduction was not demonstrated first. Another commenter (IV-D-115) argued that the provision regarding "nonair quality health and environmental impact" was being improperly interpreted as being a grant of power to regulate, rather than a limit of power, and cited Congressional records and court records to support this position.

Other commenters (IV-D-115, IV-D-138, IV-D-153) argued that materials separation itself results in adverse nonair quality health and environmental impacts, which were not properly taken into consideration. One commenter (IV-D-115) said the air and other environmental impacts resulting from increased use of secondary rather than raw materials had not been examined in a manner consistent with the statutory directives of, nor the underlying intent of, the CAA.

One commenter (IV-F-2.39) defended the inclusion of the requirements for materials separation in the air emission standard based on the provisions in the CAA for a technological system to include precombustion cleaning or treatment of fuels. One commenter (IV-D-107) argued that separation could not properly be considered a pretreatment, rather it was actually an elimination of a fuel or a portion of the fuel, not a treatment removing pollutants from a fuel. Other commenters (IV-D-155, IV-D-158) argued that materials separation could not be considered a precleaning of fuel because MSW does not meet a true definition of fuel because many MWC's do not produce either heat or electricity for sale, they simply burn waste. However, another commenter (IV-D-108) said that materials separation would result in a fuel that has lower amounts of toxic constituents, is more readily and consistently combustible, and that produces a residual ash posing less environmental concerns.

Some commenters (IV-D-115, IV-D-138, IV-D-155, IV-D-158) said that the materials separation provisions are illegal because they are an operational or work standard which is not supported by the conditions allowed by the CAA in Section 111(h)(2)(a) or (b). According to these commenters, since an emission limit is practicable for MWC's, EPA cannot require an operation or work practice such as materials separation to reduce emissions. The commenters presented several arguments from case law limiting the use of operation or work practice standards where emission limits could be set or performance measured. Another commenter (IV-D-134) recommended EPA develop a numerical emission limit based on materials separation technology or practices. One commenter (IV-D-180) said that the proposed regulations should only limit emissions, and not specify how the emission limits are to be met.

However, another commenter (IV-D-136) said that materials separation is a demonstrated technology and said that the

EPA's Region II recently recognized materials separation as a work practice method for separating items such as batteries, tires, and hazardous wastes. The commenter added that separation technology can be applied to any component of the waste stream. Another commenter (IV-D-117) said that some jurisdictions, such as the State of Vermont, are now requiring pretreatment, specifically, the exclusion or separation of certain materials as a means of reducing emission levels at newly permitted MWC's.

One commenter (IV-F-1.10) said that battery recovery has been addressed in RCRA legislation introduced in Congress, and that RCRA would be a better authority than the CAA for addressing battery disposal and recovery issues.

Commenter IV-D-115 said that the main identifiable benefit of recycling, resource conservation, is outside the ambit of air emission reduction.

Response: In the notice of proposed rulemaking the Agency asserted that it possessed the legal authority under Section 111 to impose materials separation. As summarized above, some commenters attacked the EPA's legal rationale, while others defended it. In view of EPA's decision to delete mandatory materials separation from the final rule, it is unnecessary to respond to these comments.

4.6 OVERALL AGENCY STRATEGY TO PROMOTE MUNICIPAL SOLID WASTE REDUCTION AND RECYCLING

4.6.1 Separation for Landfills

Comment: Over forty commenters (IV-F-1.2, IV-F-1.3, IV-F-1.4, IV-F-1.5, IV-F-1.19, IV-F-1.16, IV-F-1.26, IV-F-1.32, IV-F-1.35, IV-F-2.15, IV-F-2.48, IV-D-06, IV-D-11, IV-D-28, IV-D-30, IV-D-66, IV-D-68, IV-D-70, IV-D-71, IV-D-73, IV-D-114, IV-D-116, IV-D-126, IV-D-131, IV-D-134, IV-D-143, IV-D-153, IV-D-154, IV-D-155, IV-D-158, IV-D-161, IV-D-164, IV-D-168, IV-D-184, IV-D-189, IV-D-193, IV-D-204, IV-D-205, IV-D-206, IV-D-208, IV-D-219, IV-D-224, IV-D-232, IV-D-240, IV-D-246, IV-D-247, IV-D-279, IV-D-284) said that if separation is required for MWC's, it must also be required for landfills. Reasons given included:

(a) Separation at MWC's alone will not significantly increase national recycling. About 80 percent of our waste goes to landfills, so this is where we need to encourage recycling.

(b) Separation requirements will increase costs and delay permitting of MWC's, thereby increasing the amount of MSW going to landfills, which is in conflict with the waste disposal hierarchy in the "Agenda for Action."

(c) If separation is not required for landfills, materials separated at the MWC may be landfilled rather than recycled.

(d) Landfill air emissions and water pollution would be reduced if materials were recycled rather than landfilled.

(e) By imposing the requirement on MWC's without applying similar requirements on landfills, an economic bias has been created against MWC technology.

Several of the commenters said separation for landfills could be required as a change to the proposed regulations for landfills under Subpart D of RCRA. Others mentioned the NSPS being developed for landfills.

Response: The Agency is currently considering materials separation for landfills under RCRA. Furthermore, markets for secondary materials are expanding, and it is expected that separated materials will be recycled rather than landfilled.

Comment: Some commenters (IV-D-107, IV-D-155, IV-D-158) said that the separated materials which cannot be recycled will end up in a landfill, and the energy contained in the separated materials would be lost.

Response: The Agency agrees that the landfilling of separated combustible materials would result in a loss of the energy that could be derived by combusting them.

Comment: One commenter (IV-D-282) raised several objections to the proposed materials separation provisions based on the assumption that similar provisions might be required at landfills. The commenter said that any recycling program should be implemented through the RCRA solid waste management planning process.

Response: As mentioned above, the Agency is currently considering separation for landfills under RCRA. The focus of this rulemaking is on the reduction of air emissions and the benefits of separation at MWC's.

4.6.2 Overall Strategies

Comment: Over 90 commenters (IV-F-1.3, IV-F-1.5, IV-F-1.6, IV-F-1.12, IV-F-1.14, IV-F-1.15, IV-F-1.16, IV-F-1.18, IV-F-1.20, IV-F-1.21, IV-F-1.23, IV-F-1.29, IV-F-2.1, IV-F-2.5, IV-F-2.7, IV-F-2.11, IV-F-2.12, IV-F-2.13, IV-F-2.24, IV-F-2.36, IV-F-2.39, IV-F-2.45, IV-F-2.48, IV-F-2.50, IV-F-2.52, IV-F-2.53, IV-F-2.61, IV-F-3.6, IV-F-3.7, IV-F-3.13, IV-D-30, IV-D-31, IV-D-32, IV-D-33, IV-D-34, IV-D-35, IV-D-36, IV-D-37, IV-D-38, IV-D-39, IV-D-40, IV-D-41, IV-D-42, IV-D-43, IV-D-44, IV-D-45, IV-D-46, IV-D-47, IV-D-48, IV-D-49, IV-D-52, IV-D-53, IV-D-54, IV-D-56, IV-D-57, IV-D-58, IV-D-59, IV-D-66, IV-D-67, IV-D-74, IV-D-77, IV-D-78, IV-D-90, IV-D-95, IV-D-99, IV-D-101, IV-D-111, IV-D-114, IV-D-115, IV-D-121, IV-D-122, IV-D-123, IV-D-126, IV-D-128, IV-D-133, IV-D-135, IV-D-138, IV-D-153, IV-D-155, IV-D-156, IV-D-158, IV-D-159, IV-D-161, IV-D-164, IV-D-166, IV-D-167, IV-D-173, IV-D-186, IV-D-203, IV-D-205, IV-D-206, IV-D-209, IV-D-259, IV-D-260, IV-D-261, IV-D-265, IV-D-267, IV-D-282, IV-D-299) said that, in addition to or instead of, requiring separation for MWC's under this rule, the Federal government should concentrate on stimulating markets for recycled materials. Some claimed that until stable markets exist, separation and recycling programs will be costly and will fail. Specific suggestions for actions the government should take included:

(a) Fund technological development of products made from recycled waste.

(b) Set Federal procurement standards that require government and/or civilian procurement departments to use recycled products.

(c) Set national standards for the minimum recycled materials content of products labeled as recycled.

(d) Set standards for the packaging industry.

(e) Develop tax policies favoring recycling (e.g., taxes for use of virgin materials, tax credits for purchase of equipment for recycling programs) or provide economic incentives for the use of recycled materials.

(f) Undertake public education campaigns promoting use of recycled material products, and increasing public awareness of varying levels of toxicity and recyclability between alternative consumer products.

(g) Begin a national public information program to encourage consumers to purchase products packaged with recycled materials.

(h) Stimulate source reduction of contaminants.

(i) Take the lead in requiring designers of new manufactured goods to take into account the entire life cycle of the products, i.e., "to design for recycling."

(j) End subsidies which promote harvesting of virgin timber and other virgin materials, and reduce electric power prices artificially.

(k) Redefine solid waste as a renewable resource.

(l) Design and fund disposal centers for sorting and recovery.

(m) Spread the cost of pollution control across competing industries.

(n) Require landfills to accept recyclable such as glass and metals in separate cells where they can be held until market conditions favor recycling.

(o) Enact a Federal bottle bill.

One commenter (IV-F-2.39) suggested a Federal leadership role is necessary to overcome retailer opposition to the competition from recycled goods. One commenter (IV-F-1.20) said the bottom line was going from a throw-away economy to a recycling economy. The commenter suggested that placing the true economic costs of waste disposal in (or on) the manufacturing process would be the first step in evaluating the true cost of recycling. One commenter (IV-F-1.20) suggested we need a national materials policy that combines national regulatory and fiscal policies to make it more profitable for industries to reduce the volume of packaging and to use less toxic materials.

Response: The Federal government is involved in a leadership role promoting recycling, including the stimulation of markets. The Agency has been involved in an ongoing effort to consider strategies for waste reduction and recycling. This has involved the development of procurement guidelines for all government agencies, the development of a proposed pollution prevention policy statement, and the policies enumerated in the "Agenda for Action."

The procurement guidelines designate specific items which governments must procure containing recycled or recovered materials. Four procurement guidelines have been issued thus far, for paper and paper products (53 FR 23546, June 22, 1988), lubricating oils (53 FR 42699, June 30, 1988), retread tires (53 FR 46558, November 17, 1988), and building insulation (54 FR 7328, February 17, 1989). These guidelines are being implemented at this time. For example, in the first 6 months of fiscal year 1990, over 98 percent of EPA letterhead and publications printed at the Government Printing Office were printed on recycled paper.

The proposed pollution prevention policy statement (54 FR 3845, January 26, 1989) lists source reduction and recycling as primary pollution prevention strategies. The proposed statement also commits the Agency to working with States to develop and implement specific strategies and technical assistance programs to encourage commercial and manufacturing industries, the agricultural sector and the general public to reduce the amount of pollution generated. The "Agenda for Action" (EPA-530/SW-89-019, February 1989) establishes a hierarchy for integrated solid waste management and presents the Agency's stated goal of managing 25 percent of MSW nationwide through source reduction and recycling by 1992. It also discusses a number of initiatives with specific activities and timetables. The initiatives fall into six general areas: (1) increase available information, (2) increase planning, (3) increase source reduction activities, (4) increase recycling, (5) reduce risks of combustion, and (6) reduce risks of landfills. Actions are presently being taken to carry out these initiatives.

Many of the ideas presented by the commenters are included within the broad programs envisioned by these documents, and others may be incorporated into the final pollution prevention policy statement, any future updates to the "Agenda for Action," and the programs which result.

Comment: One commenter (IV-D-138) said the proposal did not acknowledge the tremendous glut of recyclables that would result from 25 percent separation. The commenter noted that if separation is required at landfills as well as MWC's, the volume of recyclables would triple. The commenter was doubtful that a reprocessing infrastructure could be developed to accommodate the increased materials within the proposed time frame.

Response: The final rule does not include a materials separation provision. However, the Agency notes that while the possibility exists that as recycling efforts grow there may be some temporary glut of materials, EPA anticipates strong growth in the demand for these products. For example the American Paper Institute recently announced a program to achieve a goal of 40 percent paper recycling by 1995. The president of the American Paper Institute said at least 37 new recycling facilities will be opening over the next few years, and that the industry wanted the public to double the collection of paper from today's level. Markets for recycled glass, steel, and plastics are also expanding.

Comment: Some commenters (IV-F-1.20, V-F-2.32, IV-F-2.41, IV-F-2.47, IV-F-2.50, IV-D-28, IV-D-55, IV-D-72, IV-D-73, IV-D-88, IV-D-95, IV-D-103, IV-D-108, IV-D-168, IV-D-178, IV-D-205, IV-D-208, IV-D-215, IV-D-217, IV-D-226, IV-D-259) expressed support for the proposal to require separation for MWC's. One commenter (IV-D-95) noted that allowing credit for composting, curbside separation, source waste reduction programs, the combustion permit, and a 2-year time frame gave the materials separation requirements proposed every opportunity to succeed.

However, several commenters (IV-F-1.2, IV-F-1.9, IV-F-1.27, IV-F-1.28, IV-F-2.10 and IV-D-13, IV-F-2.18, IV-F-2.23, IV-F-2.24, IV-F-2.41, IV-F-2.44, IV-F-2.46, IV-F-2.47, IV-F-2.49, IV-F-2.50, IV-F-2.51, IV-F-2.52, IV-F-2.53, IV-F-2.57, IV-F-2.58, IV-F-2.62, IV-F-3.7, IV-D-07, IV-D-20, IV-D-56, IV-D-58, IV-D-59, IV-D-85, IV-D-105, IV-D-118, IV-D-278) also suggested a broader waste management program. The overall theme was that incineration and landfilling should be last resort. Although each commenter did not identify each area below, some common recommendations were: waste reduction programs, mandatory composting, separation, and mandatory Statewide recycling. Some of the commenters (IV-F-1.9, IV-F-1.24) suggested that all separated materials must be recycled whether or not the 25-percent requirement has been met, not landfilled or burned.

Response: The Agency and the Federal government are involved in a broad program to promote source reduction and recycling. And, as detailed in the "Agenda for Action," incineration and landfilling are indeed, the last resort. Source reduction and recycling are higher in the waste management hierarchy.

Comment: One commenter (IV-F-3.1) suggested that even private incinerators at industrial facilities should be required to accomplish a 25-percent reduction in the waste stream to the incinerator.

Response: The final standards do not require materials separation.

Comment: Some commenters (IV-F-1.3, IV-F-1.13, IV-F-1.16, IV-F-2.4, IV-D-174, IV-D-180, IV-D-299) said that a Federal mandate for separation was unnecessary, and would be ineffective and difficult to enforce. Many said that State and local solid waste management agencies should be allowed freedom to develop their own programs for waste management. One commenter (IV-D-282) recommended that only MWC's that were not complying with State or local legislation intended to achieve a recycling rate of 25 percent at or near the EPA's proposed compliance date be required to submit a plan supporting a "goal" of 25 percent recycling. Many commenters (IV-F-2.4, IV-F-2.8, IV-D-30, IV-D-31, IV-D-32, IV-D-34, IV-D-35, IV-D-36, IV-D-37, IV-D-38, IV-D-39, IV-D-41, IV-D-43, IV-D-45, IV-D-46, IV-D-47, IV-D-48, IV-D-49, IV-D-52, IV-D-53, IV-D-54, IV-D-77, IV-D-138, IV-D-153, IV-D-223, IV-D-225, IV-D-229, IV-D-240, IV-D-243, IV-D-247, IV-D-252, IV-D-277, IV-D-282, IV-D-297, IV-D-299, IV-D-300) said that many States and counties already had effective recycling programs. Many of these commenters said that an NSPS requiring 25 percent separation was inflexible, was not needed, would interfere with their existing programs, and would compromise efforts to develop a balanced and realistic approach to solid waste problems at the State and local level. One commenter (IV-F-1.3) said these provisions would increase the paperwork burden on States that are already recycling without increasing the level of recycling.

Other commenters (IV-F-1.16, IV-D-243, IV-D-246), noted that their States have recycling goals equal to or exceeding the proposed level in the NSPS, and were requiring each county or solid waste management district to develop comprehensive plans to achieve the goals. The commenters preferred that method to a Federal mandate. However, one commenter (IV-F-2.40) disagreed, stating that Federal regulations are necessary because municipal officials want to get re-elected, and have difficulty raising fees to cover retrofits or more costly technologies. The commenter said Federal regulations establishing a minimum level of control through the best demonstrated technology decision is necessary to force them to install best demonstrated technology. One commenter (IV-D-267) suggested the rule require States that have not adopted aggressive laws aimed at achieving this level of reduction to do so.

One commenter (IV-D-290) submitted copies of the comments and proposed amendments to the Connecticut Recycling law recommended by the Connecticut Municipal Solid Waste Recycling Advisory Council. The commenter pointed out that the comments and amendments are designed to aim enforcement efforts at the waste generators rather than the disposal facility.

Some commenters (IV-F-1.2, IV-F-2.41) wanted to be sure the NSPS would not prevent a State or local area from requiring more than 25 percent materials separation.

Response: The final standards do not contain a nationwide mandatory separation requirement. The appropriativeness of requiring materials separation for a particular facility is an issue that can be addressed on a case-by-case basis.

Comment: One commenter (IV-F-1.3) said that EPA could help recycling more by helping to site and finance one de-inking plant than by the proposed rules.

Response: The Agency notes that the industry itself is taking the lead in both siting new plants, as evidenced by the statement from the American Paper Institute discussed above, and in the development of alternative inks, with lower metal content.

Comment: Some commenters (IV-F-1.1, IV-D-223, IV-D-232) were concerned that the proposal reflects a shift in the EPA's policy as expressed in the "Agenda for Action," where landfilling is the least preferable option in the waste disposal hierarchy. Several commenters (IV-F-1.2, IV-D-232) asked that the "Agenda for Action" be reflected in each rule affecting wastes. Some of these commenters (IV-F-1.1, IV-D-164) felt these provisions would hinder the goals of the "Agenda for Action" because it would increase the tonnage put into landfills both directly and indirectly due to slower negotiations for combustor contract arrangements. These and other commenters (IV-F-1.1, IV-D-101, IV-D-164, IV-D-179) were also concerned because an increase in landfilling would result in an increase in the generation of methane, a greenhouse gas, at the landfills where additional waste deposition occurred as a result of these regulations.

One commenter (IV-D-164) said that the proposed materials separation requirements differ from the goals of the "Agenda for Action" in that the 25 percent in the Agenda was a nationwide average based on integrated waste management practices, not a mandatory reduction at each MWC as in this action.

One commenter (IV-D-282) said the materials separation provisions would actually discourage source reduction, which is higher in the waste disposal hierarchy presented in the "Agenda for Action," because no credit is given for source reduction.

Response: The final standards do not include uniform nationwide mandatory materials separation requirements.

Comment: Five commenters (IV-F-1.12, IV-D-135, IV-D-154, IV-D-164, IV-D-266) stated that the proposed standards went after the solid waste problem backwards, by putting the burden on the facility, while the individuals, municipalities, and haulers were all free to carry on business as usual. Other commenters (IV-D-138, IV-D-279) noted the MWC operator would not be able to enforce the 25-percent separation requirements in the community. The first commenter (IV-F-1.12) recommended that a decentralized, community-based program was necessary, so that individuals would become aware of the impact of their choices (i.e., to purchase products with excessive packaging, etc.). These commenters said the States and municipalities are better able to develop and implement an effective recycling program.

Response: The final rule does not require materials separation by an MWC.

4.7 WORDING OF REGULATION

Comment: Several commenters (IV-D-103, IV-D-134, IV-D-164) requested that EPA clarify all definitions so that the actual baseline upon which the 25-percent requirement depends is less subjective.

Some commenters (IV-D-108, IV-D-109, IV-D-171, IV-D-219) recommended that definitions be included, or expanded, within the NSPS for MSW "recycling," "recovered materials," "processed MSW," and "recovery" because a consistent understanding of these terms would be necessary to achieve the 25-percent requirement. One commenter (IV-D-219) requested that the term "curbside source reduction program" be deleted from the regulations because if it reaches the curb it enters the solid waste stream, and source reduction means the introduction of less waste into the solid waste stream. One of the commenters (IV-D-108) offered a definition for recycling which depended on the materials being diverted from both landfills and MWC's and being functionally returned to the economic mainstream, even when the operator had to pay for the acceptance of the material.

One commenter (IV-D-148) thought a miscellaneous wood and other biomass category should be established in the definitions of "processed MSW" and "recoverable materials" as a recoverable material to include Christmas trees and other pieces of wood that do not fit in the yard waste definition.

Response: The final rule does not include provisions for materials separation. Therefore issues related to the definition of "recycling" or "processed waste" are no longer of concern.

The definition of MSW has been revised by the deletion of the qualification that MSW is a mixture, and the deletion of the requirement that the mixture must contain 50 percent or more municipal waste. The revision is based on the intent of the standard, which is to regulate the combustion of any waste material or mixture of waste materials which is typically considered part of the municipal waste stream. Additional clarification has been given by listing materials not meant to be included. The revised definition is:

Municipal waste consists of household, commercial/retail, and institutional waste:

- Household waste is material discarded by single and multiple residential dwellings, hotels, motels, and other similar permanent or temporary housing establishments or facilities
- Commercial/retail waste is material discarded by stores, offices, restaurants, warehouses, non- manufacturing activities at industrial facilities, and other similar establishments or facilities
- Institutional waste is material discarded by schools, hospitals, nonmanufacturing activities

at prisons and government facilities, and other similar establishments or facilities

-- Household, commercial/retail, and institutional waste does not include sewage, wood pallets, construction and demolition wastes, industrial process or manufacturing wastes, motor vehicles (including motor vehicle parts or vehicle "fluff"), but does include motor vehicle maintenance parts including vehicle batteries, used motor oil, and tires.

Wastes discarded by households, commercial, and institutional facilities are considered part of the municipal waste stream and are, therefore, appropriately covered by the final standards. Refuse-derived fuel is also considered MSW since it is derived from waste discarded by household, commercial, or institutional sources. However, industrial process wastes are excluded from the definition of MSW. These wastes are usually different in character than MSW and were not intended to be covered under this standard.

As stated in the above revised definition, other materials which are not normally a part of MSW such as wood pallets, construction/demolition debris, scrap automobiles, and automobile fluff are not included in these standards. In response to the commenters' questions, source-separated paper is considered MSW since it is one of the materials normally discarded by household, commercial, or institutional sources.

Comment: One commenter (IV-D-140) said the regulation needed to provide a precise understanding of the ownership of the waste as it moves from curb to incinerator, rather than to leave it up to individual plans to determine.

Response: The final rule does not require a materials separation plan, therefore the ownership of the waste should not be an issue.

Comment: Many commenters (IV-D-02, IV-D-04, IV-D-15, IV-D-17, IV-D-74, IV-D-200) suggested that the definition of MSW needed to be clarified in order to make the materials separation regulation workable. Some suggested the definition be amended to exclude source-separated clean, combustible fuels such as mixed wastepaper and wood pallets. One (IV-F-3.10) said industrial boilers burning nonrecyclable paper should not be covered by the materials separation provisions of the NSPS. One commenter (IV-D-174) suggested that the definition of MSW exclude clean streams of individual components which may otherwise be a part of the mixture defined as MSW, so that these clean streams may be combusted without subjecting the MWC to the emission limits or materials separation requirements. Another commenter (IV-D-17), suggested that mixed wastepaper separated for use as a fiber fuel should not be allowed to count toward the 25-percent separation requirement.

Other comments on definitions of MSW that do not necessarily pertain to materials separation are included in Chapter 3.0.

Response: Although the final rule does not include materials separation requirements, the definition of MSW has been revised and clarified in the final standards to address numerous commenters concerns. Wastes discarded by residential, commercial, and institutional facilities is considered MSW, whether it is a single material such as source-separated paper or a mixed waste. Some specific items, including wood pallets and automobiles, that are specialty wastes that are not typically considered part of the municipal waste stream are specifically excluded in the definition. Industrial process and manufacturing wastes are also excluded from the definition.

In addition, under the final standards, cofired combustors, (those combustors that burn a fuel stream containing less than 30 percent MSW or RDF) are exempt from all provisions of the MWC standards. Combustors with capacities above 225 Mg/day (250 tpd) firing more than 30 percent of a single material or a mixture of materials considered MSW would be subject to the NSPS. Combustors firing or cofiring small amounts of paper or other MSW materials, therefore, would not be covered.

Comment: Two commenters (IV-F-3.10, IV-D-174) suggested that a definition of nonrecyclable paper be developed, and that the combustion of this nonrecyclable paper could be an important component of an integrated waste management program. Commenter IV-D-174 defined nonrecyclable paper as paper which may not be recycled because it is contaminated, commingled with other materials, coated or laminated, part of a composite material, unrecoverable due to lack of effective materials separation programs, or unmarketable due to oversupply or at a prohibitive distance from markets.

Response: A definition of nonrecyclable paper is not needed because thee are no specific requirements for materials separation.

Comment: One commenter (IV-D-160) said the wording of the regulation should be strengthened to specify that separated materials must be recycled. (Other comments summarized in this chapter also suggested recycling should be required but did not specifically request a change in the wording of the regulation.)

Response: The final rule does not contain a requirement for materials separation.

Comment: One commenter (IV-D-122) recommended that "off-site source reduction or materials separation (recycling) program" be replaced with "off-site or generation site source reduction or materials separation (recycling) program" in recognition that, unlike for commercial MWC units, industry waste generation and the MWC may be on the same site.

Response: The final rule does not contain requirements for materials separation, therefore the wording of the standards has not been revised as requested by the commenter. The focus is on the combustion of municipal-type waste, and excludes MWC's firing industrial wastes except combustors greater than 225 Mg/day (250 tpd) capacity cofiring industrial waste and/or other fuels containing more than 30 percent MSW or RDF. Since the generation, source reduction, recycling, and/or combustion of industrial waste is not covered by this standard, there is no reason to revise the wording to include industrial waste.

4.8 MISCELLANEOUS COMMENTS ON MATERIALS SEPARATION

Comment: One commenter (IV-F-1.12) said that MWC's will not want to risk penalties by relying on other parties to achieve separation, but will opt for on-site processes under their control. He said the proposed standards would, therefore, have the undesirable result of discouraging community source separation programs which are more efficient. One commenter (IV-F-2.41) favored off-site separation of recyclable, because it causes individuals to become involved and increases awareness of the problem. The commenter suggested this would drive society toward a strategy of waste minimization. They said that source separation results in high purity at a low costs and gets citizens involved.

Response: The final standards do not include requirements for materials separation. Therefore, the commenters concerns will not be realized because of this rule.

Comment: An environmental group (IV-F-1.18) outlined their 5-point strategy for addressing the solid waste program as follows:

(1) ban new MWC's and phase out existing ones;

(2) reduce garbage generation, especially unnecessary packaging materials, and disposable diapers;

(3) reduce use of toxics that enter the waste stream, especially plastics and polystyrene;

(4) require intensive recycling and composting, preferably a cooperative effort at all levels to achieve the highest levels possible; and

(5) develop markets for recycled products.

Others (IV-F-1.18, IV-F-1.24, IV-F-1.28, IV-F-1.31, IV-F-2.18, IV-F-2.19, IV-F-2.20, IV-F-2.34, IV-F-2.45, IV-D-20, IV-D-85, IV-D-136, IV-D-298) agreed with the strategy, including the ban on MWC's.

Several commenters (IV-F-2.45, IV-F-2.47, IV-F-2.50) suggested incineration is only a temporary solution at best. One commenter (IV-F-2.51) from Canada reported that incineration is being discouraged in Canada, and will not be considered until all the other alternatives have been exhausted. One commenter (IV-F-2.14) said we do not need incinerators; if we are very careful and aggressively work at recycling and other methods of waste reductions, we can achieve the same percentage of reduction. Several commenters (IV-F-1.18, IV-F-1.24, IV-F-1.31, IV-D-120) said combustion destroys valuable resources that could be reused and competes with and discourages recycling. Several commenters (IV-F-1.21, IV-F-1.22, IV-F-1.28, IV-F-1.31, IV-F-2.23, IV-D-59, IV-D-121, IV-D-298) stated that recycling and incineration are competing for the same garbage. Several commenters (IV-F-1.24, IV-F-2.24, IV-D-120) said that incinerators convert useable materials into toxic and unnecessary emissions and waste. Some commenters (IV-F-1.22, IV-F-2.2, IV-F-2.36, IV-F-3.12, IV-D-16, IV-D-151, IV-D-191, IV-D-298, IV-D-301) said the United States and EPA must move away from incineration and landfilling toward more responsible methods of waste management through reduction, recycling, and composting. The commenters argued that this shift would never occur as long as we keep increasing our MWC capacity. Another commenter (IV-F-1.21) said recycling is much cheaper and cleaner than incineration, preserves our material wealth, reduces mining, timbering, and chemical manufacturing, thereby avoiding the use of water and energy resources. These commenters argued that the proposal "sells recycling short." The commenters recommended EPA build on successful recycling efforts, which they claimed can achieve levels of 50 percent or more.

Another commenter (IV-F-1.31) went so far as to say that recycling and incineration are incompatible, because once an incinerator is constructed, it will require a steady amount of waste to operate efficiently. This commenter submitted an analysis of the MWC proposal which had been endorsed by 25 environmental groups. The analysis called the 25-percent requirement a token effort providing a cloak of legitimacy for inadequate recycling efforts and for incinerating or landfilling the remaining 75 percent of the waste stream. Two commenters (IV-F-2.10, IV-D-13) felt the rules legitimize trash incineration and place the burden of the adverse effects on residents of working class and minority communities where the incinerators are almost always sited. Several commenters (IV-F-1.31, IV-F-2.1, IV-F-2.13, IV-F-2.19, IV-F-2.20, IV-D-136) concluded that if the Federal government is serious about pollution prevention, incineration should be banned, and municipal governments should be required to guarantee that all recyclable are, in fact, recycled. One commenter (IV-D-151) noted that recycling is the optimum method of air pollution control because "if you don't burn it, you don't breathe it."

Response: The Agency cannot agree with the commenters who believe that combustors should be banned, or that combustors are incompatible with recycling or source reduction. As discussed in the "Agenda for Action," although source reduction and recycling are preferred over incineration in the waste management hierarchy, incineration is an important part of an integrated solid waste management program. The Agency is promoting recycling, source reduction, and composting.

The Agency is promulgating emission limits under these MWC standards to further reduce the level of MWC emissions. Combustion may still be an important part of some solid waste management program, because not all materials can be recycled, or the market for the material is currently inadequate. Some examples of materials that cannot be recycled are contaminated papers. Since there is inadequate and shrinking capacity in landfills for nonrecyclable materials, combustion may be useful to reduce the volume of materials that will be otherwise disposed of in landfills. Additionally, energy can be produced through the incineration of combustibles, which offsets the need for increased fossil fuel combustion.

It is not expected that combustion at MWC's will discourage recycling by competing for the combustible materials in MSW. The Federal government, many States, and many individual communities are promoting recycling. Recycling is on the increase, and this has not typically been reversed by the siting of new MWC's. In many communities, the siting of an MWC has been accompanied by the development of a recycling program, and in others, recycling is seen as a way to put off the need for new landfills or combustors. However, there will always be some waste that must be disposed of, and in some cases, combustion may be preferable to landfilling.

The Agency is hopeful that in the future, as markets grow, and innovative uses of secondary materials are developed, the recyclable fraction of the solid waste stream will continue to increase.

Comment: One commenter (IV-F-1.31) noted that most recyclable materials make poor fuel. Another commenter (IV-F-1.30) reported that his firm's precombustion separation process increases the efficiency of waste as a fuel by removing poor combustion materials.

Response: The Agency encourages the removal of noncombustibles incinerator-toxic combustibles from the MWC waste stream.

Comment: Several commenters (IV-F-1.24, IV-F-2.41, IV-D-62, IV-D-141, IV-D-168, IV-D-178, IV-D-191) said the standards should clearly specify that household hazardous wastes cannot be combusted and should mandate the establishment of regional household hazardous waste collection sites or practices.

Response: These standards cannot mandate regional household hazardous waste collection sites, however, the Agency encourages the removal of household hazardous waste from the MWC waste system.

Comment: One commenter (IV-D-02 and IV-D-04) recommended excluding paper and paperboard from the material separation requirements because of its high energy content, which makes it a good replacement for imported oil as a fuel in an MWC. The commenter also noted that paper products are a "renewable" fuel. Other commenters (IV-D-15, IV-D-17, IV-D-74) added that until a dependable market is developed for mixed wastepaper, it should be regulated as a fiber fuel, as is currently done in Washington State, where it is fired in "clean-burn" MWC's.

Response: The final standards do not contain a materials separation requirements. Therefore, a source may combust paper for fuel.

Comment: One commenter (IV-D-02) stated that the EPA's guidelines on procurement of paper and paperboard products from recycled papers would actually act as a disincentive to recycling.

Response: The procurement guidelines issued by the Agency will not act as a disincentive to recycling. In fact, the existence of such guidelines, in and of themselves, promotes recycling. Whether the guidelines can be improved upon to discourage the type of avoidance cited and increase recycling rates still more is not at issue under this regulation.

Comment: One commenter (IV-F-2.43) stated that used oil should be prohibited from combustion due to the high concentration of metals and other toxics. From an energy standpoint, it is preferable to recycle used oil into lubricating oil. He also said Federal procurement policies should do more to encourage use of recycled motor oil.

Response: The Agency has issued a procurement guideline for re-refined engine and gear lubrication oils, which should result in an increase in demand for these products (53 FR 24699, June 30, 1988). Although burning used oils harvests the high heat content, is it a one-time reuse. The Agency prefers re-refining to burning the used oil because of the potential for multiple recycling.

Comment: Many commenters (IV-F-2.11, IV-F.2.12, IV-F-2.30, IV-D-25, IV-D-31, IV-D-33, IV-D-34, IV-D-35, IV-D-36, IV-D-37, IV-D-38, IV-D-39, IV-D-41, IV-D-43, IV-D-44, IV-D-45, IV-D-46, IV-D-48, IV-D-49, IV-D-52, IV-D-53, IV-D-54, IV-D-58, IV-D-60, IV-D-77, IV-D-78, IV-D-99, IV-D-111, IV-D-184, IV-D-260, IV-D-261, IV-D-265, IV-D-267, IV-D-287) who otherwise favor recycling and source separation, opposed tying the fulfillment of the 25-percent preprocessing requirement to MWC operating permits because they had little control over what goes into the waste stream or the market for recyclable. Others (IV-D-25, IV-D-30, IV-D-31, IV-D-32, IV-D-33, IV-D-34, IV-D-35, IV-D-36, IV-D-37, IV-D-38, IV-D-39, IV-D-41, IV-D-43, IV-D-44, IV-D-45, IV-D-46, IV-D-48, IV-D-49, IV-D-52, IV-D-53, IV-D-54, IV-D-58, IV-D-60, IV-D-77, IV-D-78, IV-D-99,

IV-D-111, IV-D-115, IV-D-145, IV-D-223, IV-D-229, IV-D-260, IV-D-261, IV-D-265, IV-D-267, IV-D-287) saw these provisions, and the resultant uncertainty about permit violations as threatening the viability of MWC's as a solid waste treatment strategy.

Response: The final standards do not include a materials separation requirement.

Comment: Several commenters (IV-D-25, IV-D-28, IV-D-30, IV-D-31, IV-D-32, IV-D-34, IV-D-35, IV-D-36, IV-D-37, IV-D-38, IV-D-39, IV-D-41, IV-D-43, IV-D-44, IV-D-46, IV-D-48, IV-D-49, IV-D-52, IV-D-53, IV-D-54, IV-D-58, IV-D-60, IV-D-77, IV-D-78, IV-D-99, IV-D-111, IV-D-123, IV-D-140, IV-D-141, IV-D-145, IV-D-164, IV-D-181, IV-D-193, IV-D-223, IV-D-225, IV-D-229, IV-D-240, IV-D-247, IV-D-249, IV-D-251, IV-D-252, IV-D-255, IV-D-256, IV-D-259, IV-D-260, IV-D-261, IV-D-265, IV-D-267, IV-D-274, IV-D-282, IV-D-285, IV-D-287, IV-D-297, IV-D-300) recommended that the materials separation requirements be deleted from the MWC regulation. Another commenter (IV-D-71) recommended that the materials separation requirements be deferred until alternative means of implementing them were examined. Some commenters (IV-D-32 and IV-D-83, IV-D-116, IV-D-225) suggested that requiring States to develop a plan for reducing waste volume by 25 percent might be a workable alternative to the materials separation requirements.

Response: The materials separation requirements have been deleted from the final standards.

Comment: Some commenters (IV-D-105, IV-D-106, IV-D-117) said that materials separation of metals would reduce wear and tear on MWC's. Commenter IV-D-105 mentioned, for example, that solid metals increase wear on grates, and vaporization of metals (from the noncombustibles) causes fouling and corrosion of boiler tubes. The commenter referred to studies that they said showed that materials separation results in reduced downtime for MWC's due to reduced wear and tear.

Response: The Agency is aware of claims that removal of noncombustibles may improve combustor operation. If this is true, it is an added benefit of materials separation.

Comment: One commenter (IV-D-110) said that no MWC permit should be issued where recycling and incineration are independent of each other. The commenter said that recycling and incineration should be coordinated, especially since removal of a high proportion of combustible materials could decrease the combustibility of the waste stream.

Response: For the reasons outlined in the preamble materials separation is not being required as part of this rule. Nevertheless, the Agency anticipates that communities will take an overall approach to solid waste management. Such an approach would include consideration of the appropriate role for source reduction, source separation, recycling, incineration and landfilling.

Comment: Two commenters (IV-D-138, IV-D-238) said that under the proposed standards, it would not be in the best economic interest of the MWC to reduce waste except for noncombustible, nonrecyclable materials. These commenters said that, therefore, a mandatory recycling requirement may discourage waste reduction.

Response: The final standards do not require materials separation.

Comment: Another commenter (IV-D-117) said that EPA should target separation of materials containing toxic heavy metals and should attempt to reduce the amount of these metals in noncombustibles such as batteries, electronics, and appliances as well as combustibles such as plastics.

Response: This Agency encourages the separation of these materials. The "Agenda for Action" describes activities directed at reducing the amounts of these items in products and reducing the amounts ending up in the waste stream.

Comment: One commenter (IV-D-110) recommended that every incinerator be equipped with a staging area where wastes could be examined prior to combustion and sent through a radioactive detector. The commenter stated there must be provisions for removal of radioactive waste.

Response: The MWC standards apply to incinerators that combust MSW. Municipal-type solid waste is composed of discards from residential, commercial, and institutional facilities and includes medical waste. In general, MSW contains little if any radioactive waste. Radioactive discards could include defective smoke detectors, old clocks, or old watches. If combusted in an MWC, these wastes would produce a low level radioactive discharge and are not of concern. Therefore, there is no need for the final standards to include specific requirements for a staging area for radioactive waste removal.

An exception to the above discussion could be the burning of certain medical wastes or industrial wastes with MSW. These may contain radioactive materials in various amounts. When medical wastes or small amounts of industrial wastes are burned in an MWC, the State may wish to adopt an MWC-specific program to monitor these wastes. The Agency is also in the process of developing separate regulations for medical waste combustors.

The Agency is also aware of recent NRC plans to deregulate the disposal of certain radioactive waste. The Agency will continue to monitor the status of the NRC disposal regulation.

5.0 NEW SOURCE PERFORMANCE STANDARDS - NITROGEN OXIDES

5.1 SELECTION OF NITROGEN OXIDES FOR REGULATION

Comment: Five commenters (IV-D-101, IV-D-164, IV-D-184, IV-D-255, IV-D-257) believed that the NO_x emissions from MWC's have an almost minuscule impact on ambient air quality. One commenter (IV-D-257) pointed out that MWC's operating without add-on controls cause a minimal incremental increase in ground-level NO_x concentrations, which is often below the PSD significant impact level of 1 $\mu g/m^3$ (0.4 gr/million dscf). The commenter added that this level is well below the detectable concentration that can be measured by available monitoring equipment.

Two commenters (IV-D-164, IV-D-184) felt that the NO_x emissions from MWC's are insignificant when compared to overall NO_x emissions. These commenters cited two recent sources (EPA and CARB) and quoted NO_x emissions from MWC's as 0.053 percent and 0.023 percent, respectively, of total NO_x emissions.

Two commenters (IV-D-101, IV-D-257) stated that the proposed NO_x rule would reduce NO_x emissions from new MWC's by 12,000 Mg/yr (13,000 tpy) (in the fifth year), or less than 0.2 percent of national NO_x emissions. These commenters cited an EPA study (National Air Quality and Emission Trends Report, March 1989), which reported national annual NO_x emissions to be 19,000,000 Mg/yr (21,000,000 tpy). One commenter (IV-D-257) reported that 76,000 Mg (83,800 tons) (0.4 percent) of this emitted NO_x is attributed to burning solid waste, where open burning accounts for about 59,100 Mg/yr (65,200 tpy) and controlled combustion accounts for only

16,900 Mg/yr (18,600 tpy) (less than one-tenth of 1 percent of the total NO_x emitted annually in the United States).

One commenter (IV-D-101) felt that the NO_x reductions achieved by the proposed rule would be very small, especially when compared to a single fossil fuel utility boiler that is capable of emitting far greater than 12,000 Mg/yr (13,000 tpy) of NO_x.

Response: As discussed in Section 3.1, MWC's have been considered an important emissions source category for many years. The decision to promulgate an NSPS for NO_x emissions from new sources is based on the availability of technology, the projected rapid growth of new MWC's due to increasing regulatory requirements and decreasing space availability for landfills, and the fact that control costs are not unreasonable. Impacts from NO_x emissions include: acid deposition; increased regional/global ozone background concentrations; untold nutrient effects on some natural waters, including estuaries; visibility/PM_{10} problems in western cities; and potential effects of transformation products of NO_x. In addition, the new section 129 of the Clean Air Act requires EPA to regulate NOx emissions at new and existing combustors.

Since demonstrated technology exists to control NO_x emissions from MWC's, limits for NO_x have been established. This decision is independent of other sources and their emissions.

Comment: One commenter (IV-D-164) did not understand why NO_x was not considered a component of MWC emissions.

Response: As discussed in Section 3.2, NO_x is a criteria pollutant regulated under Sections 108 to 110 of the CAA so it cannot be designated individually; and unlike SO_2, PM, and CO it does not indicate control of a broader class of pollutants included in MWC emissions.

Comment: One commenter (IV-D-218) objected to the EPA's assertion that NO_x emissions from MWC's do not influence production of urban smog or ozone.

Response: The Agency does consider the contribution of NO_x to increased regional/global ozone background concentrations and visibility problems as two of the reasons to set NO_x emission standards under Section 111.

Comment: One commenter (IV-D-277) felt that it was premature to promulgate a specific NO_x limit without data to quantify the correlation between NO_x emissions and recycling.

Response: Sufficient data are available to show that the NO_x limit can be met using demonstrated air pollution control technologies. These data are from MWC's where the waste does not undergo materials separation prior to combustion. The final standards do not include materials separation requirements. However, materials separation in general is not expected to increase NO_x emissions and, in fact, programs that include removal of yard waste and/or other nitrogen-rich organic material may help decrease NO_x emissions. Therefore, the NO_x limits are achievable by MWC's that operate in areas which have materials separation programs as well as those areas which do not have materials separation programs.

5.2 SELECTION OF BEST DEMONSTRATED TECHNOLOGY FOR NITROGEN OXIDES

Comment: Two commenters (IV-F-1.35, IV-D-139) suggested that if a NO_x limit is promulgated, then provisions should be included to allow sufficient flexibility for the development of alternative and innovative NO_x emission control technologies (e.g., the use of alternative reagents such as anhydrous ammonia and urea). These commenters also thought that provisions should be included that allow system vendors to provide long-term NO_x emission guarantees.

Response: The NO_x standard is based on a review of achievable NO_x emissions from various types of MWC's and on the performance of available NO_x control technologies. The promulgated standard reflects emission levels achievable by all affected MWC's. An individual owner or operator of an MWC is free to select any approach or technology that can meet the limit. The owner or operator of the facility may request a long-term performance guarantee from NO_x control technology vendors. However, compliance with the standard is the responsibility of the facility owner and operator.

Comment: Six commenters (IV-D-131, IV-D-138, IV-D-154, IV-D-164, IV-D-184, IV-D-257) stated that ammonium chloride plumes resulting from chemical reactions between ammonia and HCl occur at facilities using SNCR. One commenter (IV-D-131) pointed out that of the three operating MWC's using SNCR constantly, one has an opaque blue-white detached plume which is clearly associated with the use of the SNCR system and at least one of the other MWC's has reported such a plume in the past. Three commenters (IV-D-154, IV-D-164, IV-D-184) stated that all three of the facilities in California have noticeable plumes resulting from ammonium chloride emissions.

One commenter (IV-D-154) attached a report outlining the problems associated with the chemical reactions of ammonia and chloride. One commenter (IV-D-164) noted that ammonium chloride is not only a more hazardous pollutant than NO_x, but it also exudes a pungent odor.

One commenter (IV-D-131) noted that residual ammonia can also react with sulfur trioxide to form ammonium sulfate and ammonium bisulfate. This commenter explained that all of these reactions contribute to the visible plumes as well as corrosion.

One commenter (IV-D-154) stated that before a NO_x limit is established, it should be determined whether the plume causes an opacity violation. This commenter felt that the opacity of the plumes reported in the submitted data was high. This commenter recommended an evaluation and study of ammonia slip versus NO_x control before the NO_x standard is finalized.

Response: Ammonium chloride particles are formed by the reaction of low levels of ammonia and HCl at reduced temperatures downstream of the stack exit. Under certain light conditions, the resulting "detached" plume is visible even when the concentration of ammonium chloride is very low. Careful operation of the ammonia injection system and the acid gas control system can lower the formation of ammonium chloride and reduce plume visibility. The small amount of ammonium chloride is not environmentally significant. To the extent ammonium chloride might create an opacity problem using Method 9, the facility can request a site-specific opacity limit under the provisions of 40 CFR 60.11(e).

Comment: One commenter (IV-D-257) noted that using SNCR can cause fouling of MWC tubes with ammonia salts. This commenter pointed out that corrosion resulting from this fouling can cause operational problems, reductions in efficiency, and reduced MWC life.

Response: It has been hypothesized that ammonia salts, which are formed from unreacted ammonia and SO_2 and HCl, may cause boiler tube corrosion. There have been, however, no boiler corrosion problems attributable to ammonia salts reported by U. S. plants.

Comment: Ten commenters (IV-D-65, IV-D-101, IV-D-124, IV-D-138, IV-D-184, IV-D-189, IV-D-190, IV-D-210, IV-D-235, IV-D-277) supported a NO_x emission limit of 200 ppm. Five commenters (IV-D-65, IV-D-101, IV-D-138, IV-D-184, IV-D-277) stated that SNCR as applied to mass burn waterwall MWC's can meet an emission rate of 200 ppm (dry basis at 7 percent O_2) on a 24-hour block average basis. One commenter (IV-D-210) claimed that large MWC's in California are currently using ammonia injection to reduce NO_x emissions to below 50 and 200 ppm.

One commenter (IV-D-189) recommended a NO_x limit of 200 ppm (at 7 percent O_2 on a 24-hour basis) because it is equivalent to the New Jersey permit limit of 225 ppm for 3 hours. The commenter felt that if the NO_x limits were set too low, EPA may be relying too heavily on the success of a technology that is not appropriate for all MWC's or sites. Commenter IV-D-124 said a level of 200 ppm would promote development of other NO_x control technologies such as fuel reburning and FGR. Another commenter (IV-D-184) suggested that the NO_x standard should be set at 200 ppm and allow the BACT process to drive technology development to achieve lower levels, if possible.

One commenter (IV-D-138) cited NO_x CEM data used in developing the regulation, which indicated uncontrolled NO_x values of 333 ppm (dry basis at 7 percent O_2). Based upon these data, this commenter referenced a report which stated that a 99-percent confidence uncontrolled level emission rate of 319 ppm would give an achievable emission rate for controlled NO_x between 207 and 191 ppm. This commenter cited additional data from the PSD permit application for the Brooklyn Navy Yard Project to support the achievability of 200 ppm (at 7 percent O_2) on a 24-hour block basis.

Another commenter (IV-D-101) felt that large mass burn MWC's could achieve the NO_x limit of 200 ppm at 7 percent O_2 or 40 percent reduction, whichever is less stringent, throughout all seasons of the year if yard waste is removed. This commenter submitted data that support the achievability of this NO_x limit during New England's winter when there is comparatively little yard waste. However, the commenter pointed out that NO_x emissions vary by season in direct correlation with the amount of yard waste burned.

On the other hand, eight commenters (IV-F-1.35, IV-D-139, IV-D-149, IV-D-153, IV-D-164, IV-D-184, IV-D-189, IV-D-277) stated that the data collected to support the NO_x limit of 120 to 200 ppmv were insufficient to ensure that the range could be achieved consistently. Two commenters (IV-D-164, IV-D-277) noted that these data are the results of short-term rather than long-term compliance tests. One commenter (IV-D-149) stated that because an MWC with SNCR could meet the 120 ppmv limit only on an instantaneous basis, the NO_x standard should include time averaging, dual controls, or a standard higher than 120 ppmv. One commenter (IV-D-153) pointed out that there is significant variability in Thermal DeNO_x performance over time and stated that nothing justifies a 120 ppmv NO_x limit. This commenter felt that the NO_x limit could be adjusted when additional data become available to justify the lower limit.

Another commenter (IV-D-184) asserted that the lower end of the range was virtually impossible to meet for some combustion designs, given the small amount of experience with add-on NO_x technology. Two of the commenters (IV-F-1.35, IV-D-164) recommended a NO_x limit of 225 ppm. This was based on the assertion that vendors can guarantee this level and that lower levels may not be continuously achievable. Commenter IV-F-1.35 also said a limit of 225 would allow development and use of controls other than SNCR.

Response: The final standards include a NO_x limit of 180 ppmv for all new MWC's with unit capacities larger than 225 Mg/day (250 tpd) of MSW. To address the issue of long-term continuous compliance, 9 months of NO_x CEM data were collected from a grate-fired mass burn MWC with Thermal DeNO_x control. Statistical analysis of these data demonstrated that a level of 180 ppmv, calculated on a 24-hour arithmetic average basis, is achievable. This limit is consistent with a long-term average NO_x level of about 130 ppmv for the data set. The CEM data included various seasons when different amounts of yard waste was combusted with the municipal waste, and the 180 ppmv limit was achievable throughout the period. Further information on the analysis is contained in an appendix to this BID and in Docket No. A-89-08.

Based on a review of short-term compliance test data from over 35 mass burn waterwall, mass burn refractory, RDF, modular excess air, and modular starved air MWC's, uncontrolled NO_x emissions from this MWC are representative of most other types of MWC's. As a result, these other MWC types would also be able to continuously comply with a NO_x emission limit of 180 ppmv (24-hour arithmetic average) using add-on controls.

Some MWC types may achieve the 180 ppmv level through combustor design rather than add-on controls. Continuous NO_x data from a water cooled rotary mass burn MWC were examined. The combustor was designed and operated to control the temperature and fuel-air ratio in the primary combustion zone to inhibit NO_x formation. The continuous emissions data obtained from this unit indicates that some MWC's can achieve a 180 ppm (24-hour average) NO_x emissions limit without use of the SNCR. The average emission rate from this unit was below 120 ppmv, and the maximum expected 24-hour average was below 180 ppmv.

To assure continuous compliance with the 180 ppmv limit (24-hour arithmetic average), MWC's will need some type of NO_x control. Any control technology (including combustor design or any add-on control technology) can be used as long as continuous compliance is demonstrated by CEM data.

Comment: One commenter (IV-D-168) argued that the proposed NO_x standard of 120 to 200 ppmv for new, large MWC's is not stringent enough for most sources. This commenter claimed that some States in Region V currently impose a NO_x standard more stringent than 120 to 200 ppmv for all new sources except fluidized beds. This commenter urged EPA to tighten the proposed NO_x standard to the level already required in practice.

Response: The goal of the NSPS program is to set national standards based on emission reductions continuously achievable using the best demonstrated technologies considering cost and other factors. As explained in the previous response, the NO_x emission limit of 180 ppmv (24-hour arithmetic average) was selected because data analysis show that level to be continuously achievable for all types of new MWC's using a demonstrated NO_x control technology. Continuous data from one of the few MWC's in the United States with an SNCR NO_x control system indicate that lower levels may not be continuously achievable.

While current data support a limit of 180 ppmv, research and testing of NO_x control technologies is being conducted by various firms and agencies, and this NSPS NO_x limit should encourage further development of NO_x control technologies. If there are local factors that warrant more stringent NO_x control or data indicate a lower limit can be achieved at a particular MWC, more stringent limits can be considered by individual States. Furthermore, the Agency could consider any new data that becomes available over the next few years during the periodic NSPS review.

Comment: Eight commenters (IV-F-1.35, IV-F-2.4, IV-D-101, IV-D-131, IV-D-139, IV-D-149, IV-D-153, IV-D-155) felt that a NO_x standard of 120 ppmv was not based on best demonstrated technology. Two commenters (IV-D-139, IV-D-155) stated that the selection of SNCR for NO_x control was justified based on only two facilities using Thermal $DeNO_x$ in nonattainment areas for NO_x. Five commenters (IV-F-2.4, IV-D-101, IV-D-139, IV-D-149, IV-D-155) felt that these facilities represented LAER rather than best demonstrated technology.

Six commenters (IV-F-1.35, IV-D-101, IV-D-131, IV-D-155, IV-D-164, IV-D-184) viewed SNCR as a "developmental" rather than "demonstrated" technology. Three commenters (IV-D-101, IV-D-155, IV-D-164) pointed out that the only facilities in operation in the United States with add-on NO_x control are located in California in NO_x nonattainment areas. Two commenters (IV-D-101, IV-D-155) further explained that the facilities using Thermal $DeNO_x$ were not permitted using a BACT or LAER analysis, but rather were permitted as an "experimental technology" under California's permitting program.

These commenters stated that besides Thermal $DeNO_x$, no other method of NO_x control had been thoroughly evaluated by EPA because the other types of add-on NO_x control discussed in the NSPS and BID's relied on data from non-MWC technologies or anecdotal data from other countries. These commenters felt that data collected from two facilities burning MSW and one facility burning commercial waste using Thermal $DeNO_x$ do not support best demonstrated technology as set out in Section 111.

Response: Selective noncatalytic reduction is a demonstrated technology. It has been in use on commercial MWC's in the United States since 1987, and roughly 9 months of continuous emission data were reviewed by the Agency. The NO_x emission limit in the standards is 180 ppmv (rather than the 120 ppmv referenced by the commenters). As explained in previous responses, data show that a level of 180 ppmv is continuously achievable using a demonstrated NO_x control technology (SNCR).

Other technologies may also be used to meet the limits. The NO_x limit will achieve significant national NO_x emission reductions. Costs and economic impacts of controlling NO_x have been analyzed and are reasonable for MWC's with unit capacities above 225 Mg/day (250 tpd). Therefore, this NO_x limit represents use of best demonstrated technology.

<u>Comment</u>: Three commenters (IV-D-184, IV-D-190, IV-D-235) cited operational problems with NO_x control. One commenter (IV-D-184) felt that the lack of operating experience was a drawback to using SNCR. Two commenters (IV-D-190, IV-D-235) stated that the operational problems associated with NO_x control would jeopardize the fundamental mission of the MWC. In view of this, both commenters felt NO_x control might be best left as a local option.

<u>Response</u>: Operational problems with various NO_x control technologies were considered by the Agency in developing standards for new MWC's. The objective of the NSPS program is to define national requirements that can be achieved by all affected facilities within a source category. A local agency can require controls that exceed these national requirements.

<u>Comment</u>: One commenter (IV-D-131) pointed out that EPA acknowledges that the desired reactions for SNCR only occur within a relatively narrow temperature window, and that visible chloride emissions result when ammonia is injected outside that window. The commenter felt that, from an operating standpoint, it is difficult to ensure that the controls are performing in an optimum fashion because the precise point of injection varies with operating load. This commenter also mentioned other problems with SNCR, which were noted in the BID (EPA-450/3-89-27d), such as increased CO emissions and reduced mercury removal.

<u>Response</u>: Selective noncatalytic reduction systems are typically designed with multiple rows of injector nozzles with the ability to change the ammonia injection elevation, and thus injection temperature, in response to changes in MSW composition and boiler load. Furthermore, the NO_x standard applies to new MWC's with unit capacities larger than

225 Mg/day (250 tpd). Such MWC's would produce steam and/or electricity and would operate at relatively stable loads. Although potential problems with SNCR technologies can occur, there is no reason to believe the technology cannot be operated in compliance with the promulgated standard. Impacts of SNCR on CO and mercury emissions have been examined and were found not to be significant.

Comment: Three commenters (IV-F-2.15, IV-D-153, IV-D-164) believed that if the NO_x standards were implemented, vendors would be unwilling to guarantee the performance of their equipment. One commenter (IV-F-2.15) questioned the ability of existing control technologies to meet even the upper limit of the proposed NO_x emission range and argued that the limit was clearly beyond the capability of any BACT.

Response: The final standards have been set at levels achievable by all MWC's using best demonstrated technology. The owner or operator of an MWC can solicit a guarantee from a technology supplier. However, compliance with the standards are the responsibility of the plant owner or operator.

Comment: One commenter (IV-D-149) disagreed with the control strategy for NO_x in the proposed NSPS. This commenter recommended setting a NO_x emission limit for large MWC's then allowing the owner or operator to use whatever means necessary to achieve this limit.

Response: The standard includes emission limits for NO_x, but does not specify a particular control technology. Owners or operators can use any technique to reduce NO_x emissions as long as the standards are met.

Comment: Three commenters (IV-F-2.15, IV-D-144, IV-D-294) stated that the EPA's background documents do not support the proposed NO_x standards. One commenter (IV-D-294) believed that the use of FBC technology to control NO_x is BACT and attached a cost analysis to support this position. Two commenters (IV-D-144, IV-D-294) stated that NO_x emissions from FBC's are substantially lower than from conventional MWC's because these FBC's operate at lower temperatures and have lower excess air requirements. These two commenters pointed out that the BID (EPA-450/3-89-27d) does not address this difference. These commenters guaranteed that their FBC's could achieve less than 200 ppmv NO_x at 7 percent O_2 for large MWC's without SNCR and felt that SNCR should not be considered best demonstrated technology for FBC's.

These two commenters also recommended that a NO_x emission limit for large MWC's be set at 200 ppmv at 7 percent O_2. However, the commenters recommended that the standard should differentiate between those technologies, requiring SNCR to meet this limit and those technologies that do not require SNCR to meet a different limit. The commenters suggested that the NO_x standard require an "operational demonstration period" to optimize NO_x control. The commenters envisioned that the final NSPS limit for NO_x (which would likely be less than 200 ppmv) would be set following the demonstration period.

One commenter (IV-D-119) thought that NO_x emissions should be based on an allowable emissions rate, but not on a percent reduction format. This commenter stated that establishing a blanket percent reduction format is likely to discourage the further development of emerging technologies such as circulating bed FBC's, which have uncontrolled NO_x emissions of 200 ppm or less. The commenter pointed out that mass burn and stoker MWC's achieve these NO_x emission levels only when controlled. The commenter felt that because an FBC offers a more complete combustion condition and better quality ash characteristics as well as lower NO_x emissions, further development of this and possible other emerging, alternative technologies, should be encouraged rather than discouraged.

Response: The standards set a NO_x limit of 180 ppmv (24-hour arithmetic average basis) for all MWC's with unit capacities above 225 Mg/day (250 tpd). They do not require use of any particular technology. If FBC's or other types of combustors can meet this limit (as monitored continuously using NO_x CEM's) without the use of SNCR or other add-on controls, they would be in compliance with the standards.

Comment: Two commenters (IV-F-2.8, IV-D-149) recommended that the proposed NSPS limits be reevaluated to consider natural gas reburning as a control alternative. One commenter (IV-F-2.8) was working actively to develop a gas reburn project at his facility. This commenter expected to reduce NO_x emissions by 60 percent, to enhance the controllable temperature profile to achieve more effective destruction of organics, and to reduce the potential for metals emissions.

Response: This technology was considered, and is discussed briefly in the BID (EPA-450/3-89-27d). However, data on the performance of natural gas reburning applied to MWC's are limited so it was not the basis of the performance standards. However, any technology which meets the NO_x emission standards may be used, including natural gas reburn.

Comment: Two commenters (IV-D-101, IV-D-155) pointed out that throughout the development of the NO_x standard, combustion control has been best demonstrated technology for NO_x. These commenters cited support for this Agency position in the BID's and RIA. These commenters felt that if ammonia injection were being considered as best demonstrated technology, then an analysis should have been performed to determine the most cost-effective add-on NO_x control. The commenters acknowledged that some new MWC's in areas of NO_x attainment are being built with ammonia injection as a requirement of the permit. However, the commenters argued and included attachments to support that the requirement for add-on NO_x control is not warranted under Section 111 and should only be used under LAER situations or through voluntary acceptance.

Response: Combustion controls have been applied to a number of MWC's to limit NO_x emissions. For some MWC's, however, post-combustion add-on NO_x controls are technically applicable and were found to be cost effective in achieving NO_x emission reductions. The promulgated standard establishes an emission limit that individual MWC's are required to meet. Use of ammonia injection or any other specific add-on controls is not required.

Comment: Three commenters (IV-D-101, IV-D-153, IV-D-257) favored technology-specific NO_x limits. One commenter (IV-D-101) stated that if EPA adopted add-on NO_x control as best demonstrated technology in the final rule, then limits must be set that are achievable and would require controls to be applied equally to all combustion technologies. The commenter explained that different limits should be set for each technology based on combustion characteristics and that these limits would be inversely proportional to the technology dependent CO limits.

Another commenter (IV-D-257) felt that a technology-based range of NO_x standards is justifiable because unabated NO_x levels vary according to the type of MWC used. This commenter reported that unabated NO_x emissions at his MWC burning RDF are less than 250 ppmv, whereas mass burn MWC's have reported unabated NO_x emission levels greater than 300 ppmv. Two commenters (IV-D-153, IV-D-257) requested that technology-specific NO_x limits be established similar to the proposed limits for CO because, like CO, NO_x emissions are a function of combustor design and operational control. One commenter (IV-D-188) noted that if different CO limits are to be established for different sized MWC's, then different NO_x limits are also appropriate, thereby eliminating an unfair advantage for one type of MWC over another.

Response: A uniform NO_x limit of 180 ppmv has been set for all MWC's with unit capacities above 225 Mg/day (250 tpd). The ranges of NO_x emissions from RDF and mass burn MWC's overlap and are not significantly different. As discussed in previous responses, either technology could meet the limit of 180 ppmv (24-hour arithmetic average) using demonstrated NO_x control technologies. The great majority of MWC's would need to use add-on NO_x controls to meet this limit. However, data indicate that a few designs of mass burn combustors, FBC's, and modular excess air MWC's have lower NO_x emissions and may be able to meet the limit without add-on controls or with a lower percent NO_x reduction by the control device.

Examination of data related to MWC types with baseline NO_x emissions of less than 180 ppmv indicated that the cost effectiveness of NO_x controls from these units would exceed \$4,400/Mg (\$4,000/ton). Review of similar data for MWC types with NO_x emissions above 180 ppmv indicated that the cost effectiveness of NO_x controls on these MWC's was between $2,100 to $3,100/Mg ($1,900 to $2,800/ton). Because plants with baseline NO_x emissions below 180 ppmv (24-hour arithmetic average) start with significantly lower baseline emissions than other plants, the NO_x reduction (in Mg/yr [tpy]) that could be achieved by add-on NO_x control technology is smaller. It was therefore determined that a uniform limit of 180 ppmv for all types of MWC's is reasonable, and technology-specific limits are not warranted.

Comment: Two commenters (IV-D-101, IV-D-164) felt that it could be feasible to require a percent reduction in unabated NO_x emissions and a limit, whichever is less stringent. These commenters pointed out that this is the same approach being proposed for acid gas control. One commenter (IV-D-164) cited data indicating that long-term reductions of 35 to 40 percent over unabated NO_x emissions may be achievable.

Response: Demonstration of continuous compliance with a percent reduction standard would be difficult due to the lack of a continuously monitored uncontrolled NO_x level. In addition, the NO_x emission limit of 180 ppmv is achievable by all types of MWC's. Therefore, there is no clear reason to establish an alternative percent reduction standard, and an emission limit approach is more straightforward. This format is consistent with the standards for MWC metals (measured as PM), and MWC organics (measured as dioxins/furans).

Comment: One commenter (IV-D-164) opposed the proposal of a NO_x standard at this time. This commenter suggested setting a standard for new, large MWC's after conducting thorough research on NO_x production factors and mechanisms, and on whether cost-effective and reliable control technologies can be developed.

Response: Available data on NO_x emissions and emission control technologies for MWC's were reviewed in "Municipal Waste Combustors - Background Information for Proposed Standards: Control of NO_x Emissions," (EPA-450/3-89-27d). Based on this review, it was concluded that SNCR was a demonstrated technology. That conclusion has not changed. Any other NO_x control technology could also be used to meet the standard. The Agency believes that the existing information on NO_x control technologies is sufficient to support the final standard.

Comment: Two commenters (IV-F-1.9, IV-D-188) observed that no NO_x limit had been proposed for MWC's less than 225 Mg/day (250 tpd). One commenter (IV-F-1.9) found the NO_x limit for large MWC's appropriate but opposed the lack of a standard for small (≤225 Mg/day [≤250 tpd]) MWC's. The other commenter (IV-D-188) pointed out that permitting criteria in Pennsylvania establishes a maximum NO_x limit of 300 ppm on a daily average for MWC's greater than 45 Mg/day (50 tpd).

Response: The NSPS currently being promulgated affects only MWC's with unit capacities above 225 Mg/day (250 tpd). However, under Section 129 of the CAA Amendments of 1990, standards for units with capacities of 225 Mg/day (250 tpd) or less must be promulgated within 2 years (see Section 1.0). Control of NO_x emissions from these MWC's will be examined over the next 2 years as a part of that rulemaking.

Comment: One commenter (IV-D-20) argued that 40 percent reduction in NO_x emissions is not consistent with the EPA's pollution prevention policy described in the "Agenda for Action." This commenter also stated that the time frame of 4 years before a NO_x standard went into effect was inconsistent with the EPA's pollution prevention policy.

Response: The commenter is in error in stating that a 4-year time frame is allowed before a NO_x standard goes into effect. New source performance standards are applicable to units built at the time of proposal and effective as of the date of promulgation.

Further, the standard is consistent with the pollution prevention policy.

Comment: Three commenters (IV-D-69, IV-D-210, IV-D-253) stated that the use of SCR in West Germany has resulted in a much lower NO_x emissions than those being proposed for SNCR in the NSPS. One commenter (IV-D-69) projected that if SCR, which is capable of achieving 80 to 90 percent NO_x reduction, were selected as the basis of the NSPS, an additional 12,000 to 15,000 Mg/yr (13,000 to 16,000 tpy) of NO_x reductions could be achieved.

Another commenter (IV-D-210) reported that for an SCR under construction at an MWC in Munich South, pilot-scale tests achieved an average of 38 ppm NO_x. This commenter expected that two proposed facilities in California would meet NO_x concentrations of about 30 to 35 ppm with a control efficiency of about 90 percent. In view of this, the commenter suggested that the proposed NO_x emissions be reevaluated based on SCR, or that provisions be included in the regulation for modifying the NO_x limits as more SCR data become available.

The third commenter (IV-D-253) acknowledged that the proposed NO_x limits are extremely lenient when compared to the NO_x permit limit of 35 ppmv for NO_x (as NO_2) on the Munich South MWC, which uses a dry scrubber/FF followed by SCR. This commenter also enclosed a copy of the State of New Mexico's proposed MWC emission limits (proposed October 13, 1989) as additional support that the proposed NO_x limit is too lenient.

Response: Commercial use of SCR technology has not been demonstrated to date. The Munich South plant has tested a pilot-scale SCR system. However, no data have been recorded for full-scale SCR systems which are designed for 90 percent NO_x reduction. The full-scale plant has an anticipated 1990 start-up date. Use of SCR was considered when two facilities in Southern California were initially proposed, but these facilities were never permitted or constructed. Thus the Agency does not believe that SCR is BDT for NOx at this time, on the current record.

Comment: One commenter (IV-D-116) did not believe that a specific NO_x emission reduction level is necessary for MWC's. This commenter suggested that if NO_x control were required, an achievable emission limit should be set that allows the various MWC technologies to achieve this limit using numerous controls, including staged-combustion, low excess air, FGR, natural gas reburning, urea injection, and ammonia injection.

To support the assertion that a NO_x reduction level is not necessary, the commenter described and submitted data on his Westinghouse O'Connor rotary kiln MWC. The commenter claimed that the O'Connor MWC differs from the traditional MWC. The commenter explained that as the overfire air slowly mixes, the more slowly evolving fuel fragments are being constantly added to the gases, allowing time for the fuel-bound nitrogen to be converted to nitrogen gas. In addition, the commenter claimed that the heat removal mechanism of the O'Connor MWC moderates peak combustion temperatures, alleviating the need for large amounts of excess air. The commenter pointed out that because the O'Connor MWC requires less air than a traditional MWC, less oxygen is available for NO_x production. The commenter reported that higher instantaneous local temperatures may exist within the MWC, but NO_x formation rates are relatively slow, requiring a certain residence time. The commenter included data showing that NO_x emissions from an O'Connor combustor without SNCR can be controlled to 140 ppm or below corrected to 7 percent O_2 on an hourly average basis.

This commenter felt that applying Thermal DeNO_x to his O'Connor MWC would achieve substantially lower percent NO_x control than that achieved when applied to other MWC's. This commenter also claimed that Thermal DeNO_x would increase CO emissions from an O'Connor combustor design because there is much less opportunity for CO to oxidize to CO_2 after escaping from the primary combustion zone before reaching the Thermal DeNO_x region. The commenter concluded that a technology providing only minimal control for NO_x while increasing emissions of another criteria pollutant (CO) cannot be considered best demonstrated technology and, therefore, Thermal DeNO_x is not compatible with the O'Connor MWC to reduce NO_x emissions below the already low levels.

One commenter (IV-D-296) submitted data from tests conducted at his O'Connor MWC to support that staged combustion is BACT for controlling NO_x emissions.

Response: The standards establish a NO_x limit of 180 ppmv (24-hour arithmetic average monitored continuously) for all MWC's with unit capacities above 225 Mg/day (250 tpd). They do not require use of any specific technology. If an MWC can demonstrate that NO_x emissions are continuously below 180 ppmv without the use of SNCR or other add-on controls, the plant would be in compliance with the NSPS. Decisions on BACT are made on a site-specific basis under the PSD permit program, and in some cases may be more stringent that a national NSPS.

Comment: Two commenters (IV-D-117, IV-D-188) stated that NO_x limits below 120 ppm were achievable. One commenter (IV-D-188) noted that NO_x emissions at a rotary waterwall MWC in Pennsylvania are generally under 200 ppm, and that even with a minimum 50-percent reduction with SNCR methods, emission levels below 120 ppm could be achieved.

One commenter (IV-D-117) submitted information on five different combustion design operating strategies:

(1) grate and furnace design for staging of combustion, including starved air modular, excess air modular, split chamber grate furnace, and natural gas reburning;

(2) waterwall cooling of the grate area (O'Connor MWC);

(3) automatic combustion controls;

(4) bubbling and circulating fluidized bed boilers; and

(5) overall boiler design to permit flue gas recirculation.

This commenter also submitted information on add-on control devices in addition to Thermal $DeNO_x$. These devices include:

(1) NO_xOUT,

(2) two-stage $DeNO_x$ Process,

(3) SCR, and

(4) wet scrubbing/condensation.

The commenter stated that considering the recent developments in these NO_x control technologies and their successful demonstration and testing on a variety of new and existing MWC's, it is probable that implementation of a combination of technologies, including yard waste separation and composting along with one or more combustion modifications, improved operating techniques, and/or add-on NO_x removal devices could reduce NO_x emissions well below 100 ppm for new facilities.

Response: Although the Agency recognizes the information the commenters submitted as alternative NO_x control strategies, Section 111 of the CAA requires that NSPS be based on demonstrated technology. On a commercial basis, SNCR is considered to be well demonstrated. Further, all available data indicate that the selected emission level can be continuously achieved by properly designed, operated, and maintained combustors and control systems, without resulting in severe cost, economic, and energy impacts. Owners or operators may use any technology they choose to comply with the standards.

Comment: Two commenters (IV-D-121, IV-D-138) felt that source separation of nitrogen-rich material in the waste should be considered a pollution control option in the control of NO_x emissions from MWC's (see discussion in Section 4.2.1).

Response: The Agency encourages removal of nitrogen-rich yard waste prior to combustion. However, available data do not indicate that yard waste removal alone will achieve the NO_x emission limits for many combustors. Nitrogen sources in the waste are numerous and diverse, and removal of all the sources is not practical. Therefore, the NO_x standards are based on other control techniques.

Comment: One commenter (IV-D-154) initially reported achieving 10 to 15 percent NO_x reduction with FGR. This commenter noted that the FGR resulted in higher CO levels and that the initial findings may have been flawed due to an MWC control system problem that was not apparent at the time of the initial testing.

Response: Actual quantitative results from the commenter's facility were not used in the BID (EPA-450/3-89-27d).

5.3 IMPACTS OF NITROGEN OXIDES CONTROL

5.3.1 Environmental and Health

Comment: Nine commenters (IV-F-1.35, IV-D-101, IV-D-138, IV-D-139, IV-D-164, IV-D-184, IV-D-189, IV-D-255, IV-D-257) were concerned about workplace safety when using ammonia or urea-based SNCR. One commenter explained that control of NO_x with SNCR is based upon a feedback control logic using the outlet NO_x CEM data. Because ammonia feedrate fluctuates with NO_x generation rate, the commenter pointed out that times of overdosing with ammonia will occur to compensate for previously occurring high NO_x levels. The commenter provided data to illustrate that at high stoichiometric ratios, excess ammonia desorbing from the fly ash can create a workplace problem in the ash handling area. The commenter argued that if the NO_x standards are too stringent, the control system's logic would not be able to compensate for the normal fluctuations in uncontrolled NO_x emissions causing ammonia emissions in the ash handling area to become a severe problem.

Five commenters (IV-F-1.35, IV-D-101, IV-D-139, IV-D-164, IV-D-189) stated that the storage of ammonia associated with ammonia injection systems can pose significant safety risks that may be unacceptable at certain sites. One commenter (IV-D-101) mentioned that transportation and accidental release of ammonia posed additional risks. Two commenters (IV-D-101, IV-D-257) also cited problems with ammonia slip and ammonia chloride plume. One commenter (IV-D-164) noted that anhydrous ammonia is a hazardous material that must be handled off-site.

Response: The Agency acknowledges that ammonia injection for NO_x reduction can result in workplace safety problems if the ammonia storage, injection, and control systems are not properly designed, operated, and maintained. To minimize these problems, MWC operating personnel should routinely monitor combustion conditions, ammonia feed rate and injection location, outlet NO_x levels, and other key operating variables. The promulgated standard recognizes the trade-off between NO_x reduction levels and the potential for ammonia slip. At the level of NO_x reduction required, buildup of unreacted ammonia in the ash handling system should not be a problem unless operating problems occur.

With regard to ammonia storage and handling, ammonia is a widely used industrial chemical. Procedures for safely handling ammonia are available. The risks associated with ammonia storage and handling can be minimized by following these procedures.

Finally, and as stated previously, the standards do not require ammonia injection. The owner or operator of an MWC is free to use other techniques if site-specific factors limit the ability to use ammonia, and it is demonstrated that the standard is achievable without the use of ammonia.

5.3.2 Energy

Comment: One commenter (IV-D-101) stated that an MWC that combusts 2,040 Mg/day (2,250 tpd) of MSW could be generating about 50 MW of electricity and offsetting 50 MW of fossil fuel generated electric power. The commenter further explained that if this power were generated in an existing coal plant, over 45,000 Mg (50,000 tons) of NO_x would be produced.

Response: The objective of the NSPS program is to control emissions from individual emission sources to the maximum extent technically and economically justified based on demonstrated technology. This rulemaking concerns MWC's, and a comparison with other combustion sources is not a key factor in the decision under Section 111 of the CAA.

5.3.3 Cost and Economic

Comment: Seven commenters (IV-D-138, IV-D-149, IV-D-154, IV-D-164, IV-D-184 and IV-D-190, IV-D-235, IV-D-257) felt that the costs of the proposed NO_x standard are too high. One commenter (IV-D-138) stated that the costs and uncertainties of controlling NO_x with SNCR outweigh the environmental benefits. This commenter estimated that the incremental cost for NO_x removal would be $5,030/Mg ($4,560/ton) of NO_x, based on data from a Thermal DeNO_x system applied to a 450 Mg/day (500 tpd) MWC. This commenter pointed out that the estimate of $1,630/Mg ($1,480/ton) of NO_x removed used in developing the regulation underestimated the operating costs of the system. This commenter stated that the $1,630/Mg ($1,480/ton) estimate includes power and reagent costs but does not include costs of direct operating labor, direct maintenance labor, direct supervision, and maintenance materials. The other commenter (IV-D-149) noted that the data for NO_x control provided in the BID (EPA-450/3-89-27d) range from $2,130 to $25,600/Mg ($1,930 to $23,300/ton) of NO_x removed, which are outside the generally acceptable range of $2,200 to $2,800/Mg ($2,000 to $2,500/ton) of NO_x removed.

Two commenters (IV-D-154, IV-D-257) argued that the cost justification used in developing the NO_x limit is too low.

One commenter (IV-D-257) felt that the estimate in the proposed NO_x standard of $2,500/Mg ($2,300/ton) of NO_x removed or about $2.00/Mg ($1.80/ton) of MSW burned was too low. This commenter cited data to support NO_x removal costs that range from $2.60 to $3.10/Mg ($2.35 to $2.80/ton) of MSW burned. This commenter also mentioned that a spokesman from EPA had stated that NO_x can be controlled at utility power plants for roughly 20 percent of the cost, on a per Mg (ton) NO_x removed basis, of installing NO_x equipment at an MWC.

One commenter (IV-D-154) reported that the actual costs in $/Mg ($/ton) of MSW burned at his MWC using ammonia injection for NO_x control was $2.60/Mg ($2.35/ton) of MSW. The commenter felt that this number may be low. If additional piping and repairs to observed corrosion problems are included, the commenter projects the cost may be as high as $3.15/Mg ($2.85/ton) of MSW burned.

Response: The proposal BID (EPA-450/3-89-27d) estimated the incremental cost for NO_x removal for a mass burn MWC plant with an aggregate capacity of 450 Mg/day (500 tpd) (i.e., 2 MWC units with capacities of 225 Mg/day [250 tpd]) to be $4,640/Mg ($4,210/ton). This estimate was based on information received from Exxon and Ogden Martin, and included costs of direct operating labor, direct maintenance labor, direct supervision, and maintenance materials. The $1,630/Mg ($1,480/ton) quoted by the commenter (IV-D-138) was based on an estimate from Exxon.

As stated in the proposal preamble, the incremental cost per Mg (ton) of NO_x control for the NO_x standards selected is

$3,700/Mg ($3,400/ton) of NO_x while the average cost per Mg (ton) is $2,500/Mg ($2,300/ton) of NO_x. This cost will vary for individual MWC's. The proposal BID (EPA-450/3-89-27d) showed costs per Mg (ton) of NO_x control based on SNCR to range from $2,000 to $4,600/Mg ($1,800 to $4,200/ton) of NO_x for MWC's larger than 225 Mg/day (250 tpd). A revised analysis conducted after proposal and included in Docket A-89-08 shows a similar range of costs, from $1,800 to $4,500/Mg ($1,600 to $4,100/ton) of NO_x. The much higher numbers cited by commenter IV-D-149 are for MWC's below 225 Mg/day (250 tpd), and these are not covered under this rulemaking.

Cost effectiveness in $/Mg ($/ton) of NO_x control is not the only factor in a decision to regulate NOx emissions. There is demonstrated technology to control NO_x from MWC's. Based on the revised cost analyses, the costs of control are reasonable (an increase in $1.10 to $3.60/Mg ($1.00 to $3.30/ton) of MSW for individual MWC's compared to baseline MSW disposal costs of $40 to $100/Mg ($36 to $90/ton) of MSW without NO_x control. No severe economic impacts are predicted. The goal of Section 111 is to apply best demonstrated technology to all sources except where costs are unreasonable, and not to equalize the $/Mg ($/ton) spent across source categories.

Comment: Two commenters (IV-D-184, IV-D-255) suggested that, instead of imposing SNCR controls that result in only 40 percent reductions, EPA should encourage and participate in research programs to identify whether cost effective and reliable methods can be developed with much higher control efficiency. This commenter felt that if such technology can be developed, then EPA should evaluate the types of emission sources it can be cost effectively applied to for producing real, measurable environmental benefits.

Response: The development of new technologies that can achieve greater emission reductions and lower costs is supported by the Agency. At the same time, however, the need exists to apply existing control technologies to reduce emissions whenever such reductions are cost effective.

Waiting for new technologies to be developed in lieu of current action is not an appropriate response. Any technology can be used to comply with the standards, and therefore, the standards will encourage development and use of new technologies. In addition, the new section 129 of the Clean Air Act requires NOx control at both new and existing combustors.

Comment: One commenter (IV-D-139) found no study to support the cost-effectiveness estimates for the proposed NO_x standards.

Response: Nitrogen oxide is a criteria pollutant, and the control is based on best demonstrated technology. Cost and emission reduction estimates for typical plants are contained in the BID, "Municipal Waste Combustors - Background Information for Proposed Standards: Control of NO_x Emissions," (EPA-450/3-89-27d). National costs and emission reductions were estimated by multiplying costs and emission reductions for each model plant by the number of plants they represent.

Comment: One commenter (IV-D-138) found discrepancies between two methods used to estimate cost of the NO_x standards. This commenter included cost estimates for NO_x control based on a technique outlined in an EPA document, "Control Technologies for Hazardous Air Pollutants," (EPA/625/6-86/014), September 1986 as well as estimates based on a technique outlined in the NO_x BID (EPA-450/3-89-27d). According to the commenter, the results of the calculations showed that the estimates based on the first method were much lower than those based on the second method. The commenter attributed these results to the following:

(1) equipment costs (particularly instrumentation and controls, site preparation, foundation and structural steel) were underestimated;

(2) no building was included in equipment costs;

(3) ammonia safety and monitoring equipment was not included in the equipment costs; and

(4) erection costs (field labor) were included in indirect costs in the first method and in capital costs in the second method.

The commenter pointed out that the indirect costs were also larger when estimated by the second method. The commenter attributed these results to the following:

(1) engineering costs were underestimated and general administrative costs were neglected;

(2) the first method included preproduction costs to indirect costs, whereas the second method considered them separately; and

(3) erection costs were treated separately from indirect costs in the first method but were treated as part of indirect costs in the second method.

The commenter also pointed out that the annual operating costs were greater for the first method because labor cost estimates were greater. The commenter also noted that Table 4-2 of the BID used an incorrect ammonia flowrate.

Response: Both methods the commenter used to estimate costs for applying NO_x controls were study estimates. The first method was published in 1986 in an EPA document, "Control Technologies for Hazardous Air Pollutants," (EPA-625/6-86-014). The second method was presented in the NO_x BID (EPA-450/3-89-27d) and used more recent information obtained specifically for the MWC industry. EPA believes the procedure outlined in the BID to be a more accurate representation of the costs of applying Thermal $DeNO_x$ to new MWC's.

There is a typographical error in the BID, "Municipal Waste Combustors - Background Information for Proposed Standards: Control of NO_x Emissions," (EPA-450/3-89-27d), for the total flue gas flowrate for the 1,360 Mg/day (1,500 tpd) plant. The correct flowrate is listed in Table 4-3 of the document.

Comment: One commenter (IV-D-69) noted that cost comparisons of SCR and SNCR should be based not only on capital and operating costs, but also on the cost per Mg (ton) of NO_x removed.

Response: Selective noncatalytic reduction was costed to estimate impacts of the standards. Selective catalytic reduction has not been adequately demonstrated, therefore, there is less data on this technology applied to MWC's on which to base performance or cost estimates. In general, SCR is likely to be more expensive because of higher capital and operating costs, including flue gas reheat needed to reach the desired catalyst operating temperatures. The cost per Mg (ton) of NO_x removed for SNCR, which varies depending on type and size of plant, is summarized on page 5-21 of the BID, "Municipal Waste Combustors - Background Information for Proposed Standards: Control of NO_x Emissions," (EPA-450/3-89-27d). Although the cost analysis was based on SNCR, any technology which meets the standard may be used.

Comment: One commenter (IV-D-154) suggested that a delayed start up of the NO_x control system after initial plant start up would reduce significantly the installed costs of the system and may result in optimum operation. This commenter recommended a 6-month start up of the NO_x control system, at which time all of the auxiliary equipment could be installed on the MWC. The commenter felt that 6 months is needed to obtain the proper MWC fouling characteristics. The commenter felt that this 6-month delay could reduce the total system cost.

Response: As a result of the new section 129 of the Clean Air Act, the effective date of this NSPS is 6 months from the date of publication in the Federal Register. Moreover, the General Provisions schedule does allow 180 days before compliance testing is required. This time period is sufficient to modify operations if necessary. There are no unique reasons to justify delaying compliance testing beyond the 180-day period already authorized in the General Provisions.

Comment: One commenter (IV-D-154) expressed concern about wall erosion occurring in MWC's using ammonia injection for NO_x control. The commenter felt that additional cost/benefit studies should be conducted if additional refractory or boiler tube material is needed to install the $DeNO_x$ system.

Response: Boiler tube fouling and corrosion caused by ammonia salts may occur, but has not been documented. Increased boiler tube maintenance from ammonia salt deposition was not included as a separate line item maintenance cost in the Agency's cost estimates. There is, however, a contingency based on 20 percent of the direct and indirect capital costs to cover unforeseen expenses. This contingency is believed to adequately cover any problems with corrosion during system start-up.

Comment: One commenter (IV-D-164) stated that if vendors did guarantee the performance of their NO_x control systems to achieve the proposed NO_x standards, it would be at a tremendous cost to municipalities.

Response: The performance levels specified in the standards have been demonstrated. Vendor guarantees are agreements made between the vendor and the MWC owner or operator at the time of purchase negotiations. An owner or operator will generally specify to a potential vendor what guarantees are to be provided or are desired at the time a bid specification is issued. It is the MWC owner or operator's responsibility to decide what guarantees it needs. Responsibility for demonstrating compliance with the permit is the responsibility of the MWC owner or operator.

5.4 PERFORMANCE TESTING AND MONITORING REQUIREMENTS FOR NITROGEN OXIDES

Comment: One commenter (IV-D-257) expressed concern about the requirement to conduct the initial compliance test for NO_x during the first 24 consecutive MWC operating hours at full load. This commenter felt that this requirement would not allow sufficient time to optimize the performance of an SNCR system on a mass burn MWC. This commenter pointed out that because there is limited operating experience with SNCR technology on mass burn MWC's and no experience with such systems at RDF MWC's, compliance testing requirements consistent with those applicable to sources subject to PSD regulations should be implemented for MWC's subject to these NO_x standards.

Response: Owners or operators are encouraged to comply with the NSPS at start-up, however, the General Provisions schedule allows 180 days before compliance testing is required. This 180-day period provides sufficient time to optimize system performance.

6.0 MISCELLANEOUS COMMENTS ON MUNICIPAL WASTE COMBUSTOR NEW SOURCE PERFORMANCE STANDARDS

6.1 PROCEDURAL ISSUES

Comment: Several commenters (IV-F-1.29, IV-F-3.8, IV-D-63, IV-D-132, IV-D-232) said the public comment period should be extended due to the volume of information associated with the rules.

Response: The Agency was not able to grant requests for extension of the public comment period because the Agency is under a Court schedule to issue final rules by December 31, 1990. This schedule does not permit a longer comment period. A 70-day comment period was provided. The proposal was publicized in press releases and in articles in several newspapers and was published in the Federal Register. The first of three public hearings (in Boston, Detroit, and Seattle) was held 30 days after the proposal was published. The record was kept open for 30 days after the hearings as required by Section 307(d)(5) of the CAA. This is adequate opportunity for comment and is consistent with the CAA.

Comment: One commenter (IV-F-1.18) thought public hearings should have been held in other States where there are large numbers of MWC's, and the hearings should have been held at hours convenient for working people to attend.

Response: Public hearings were held in three different areas of the country (Boston, Detroit, Seattle) for 2 days in each place in order to make attendance more convenient than when a single hearing is held. Furthermore, anyone who could not attend a hearing could submit written comments which would have been entered into the docket. Written and oral comments are given equal consideration. Over 300 written public comments were received on the proposal.

Comment: One commenter (IV-D-167) felt enforcement issues are of such fundamental importance to the rulemaking that enforcement guidance documents for the materials separation requirement should be subject to public notice and comment.
Response: For reasons discussed in the Preamble to this rule, the Agency has decided to not to include the materials separation requirements in the final rule.
Comment: One commenter (IV-D-149) requested that the applicability date for NSPS be changed to the date of final promulgation rather than the December 20, 1989, date of the proposal.
Response: Section 111(a)(2) of the CAA sets the applicability date as the date of the proposal of the NSPS in the definition of "new source." Thus, the CAA and not the Agency has directed that the NSPS must apply to any source that commenced construction after proposal of the NSPS in the Federal Register. The standards become effective six months after promulgation.

6.2 COFIRING

Comment: Many commenters (IV-F-1.34, IV-F-2.4, IV-F-2.54, IV-D-72, IV-D-90, IV-D-92, IV-D-101, IV-D-108, IV-D-116, IV-D-147, IV-D-157, IV-D-185, IV-D-232, IV-D-257, IV-D-288) requested that cutoff levels be set for facilities cofiring MSW with fossil fuels. Several commenters (IV-F-1.34, IV-F-2.54, IV-D-92, IV-D-157, IV-D-169, IV-D-174, IV-D-212) were concerned that the rules would discourage cofiring because even units firing a small amount of MSW would be subject to costly add-on control requirements. The commenters felt cofiring was an environmentally sound, cost-effective strategy for energy recovery and material disposal. They also said that if facilities discontinue cofiring as a result of the regulation, RDF production facilities would be forced to shutdown. The MSW would then be diverted back to landfills. Another commenter (IV-D-232) pointed out EPA has proposed a cutoff level for boilers burning hazardous waste.

Some commenters (IV-D-157, IV-D-174, IV-D-236, IV-D-268, IV-D-308, IV-D-309) thought industrial boilers should have the option of burning source-separated, nonrecyclable wastepaper. Commenter IV-D-174 said this material is burned in industrial coal or wood-fuel boilers and generally comprises a very small percent of the unit's fuel. He said data show that firing pelletized paper with coal reduces emissions of almost every pollutant from coal-fired boilers, and that metals and chlorine content of mixed wastepaper are lower than MSW or RDF. One (IV-D-268) described a new fuel, "prepared paper fuel," made from mixed paper and plastic. One commenter (IV-D-308 and IV-D-309) said "fiber based fuel" made from paper that has not been contaminated or mixed with the waste stream can be burned in wood-fired or coal-fired industrial boilers in the paper industry or other industries. This fuel is usually densified (pelletized) and may include plastic as well as paper. The commenter noted that present applications are restricted to 90 Mg/day (100 tpd) or less, but fiber based fuel could be used in larger amounts if fuel supplies increase. Commenters IV-D-268, IV-D-308 and IV-D-309 said studies have shown fiber based fuel has a lower ash content than RDF and is cleaner burning than RDF or coal. Three commenters (IV-D-157, IV-D-232, IV-D-309) submitted papers which discussed the markets, economics, and environmental impacts of using mixed wastepaper as a fuel. One paper included information to show that burning mixed wastepaper is similar to burning coal or wood and in many instances, environmentally better.

In addition, the commenters pointed out due to mandated source separation requirements, the recycling markets for paper will soon be saturated. An alternative market could be as fuel for existing combustors. However, classification of mixed wastepaper as MSW will increase the capital and administrative costs of using it as a fuel. This may force combustors not to use wastepaper as a fuel which will have adverse impacts on the management of MSW. Commenter IV-D-157 suggested an exemption for MWC's firing no more than 20 percent mixed wastepaper.

Two commenters (IV-D-90, IV-D-174) added that the lost unit capacity might be replaced by coal which would likely increase the combustor emissions of NO_x, SO_2, and other pollutants. They said present and projected cofiring capacity is not significant in relation to dedicated MSW capacity and suggested units cofiring less than 20 percent of total heat input with MSW derived fuels be exempt from the rules. Another (IV-D-74) said MWC's firing or cofiring up to 90 Mg/day (100 tpd) of source-separated wastepaper should be exempt from the acid gas control requirements.

Other commenters (IV-F-1.34, IV-D-288) said EPA should encourage such cofiring because it greatly reduces SO_2 and NO_x emissions from the coal-fired units, while only slightly increasing HCl emissions, and has no effect on emissions of organics such as dioxins/furans and PCB. The commenter submitted papers summarizing test results to show that cofiring of up to 30 percent RDF does not increase net emissions from coal-fired units. Another commenter (IV-D-293) felt boilers cofiring RDF should be exempt from the standards. He submitted test data showing SO_2, NO_x, and PM emissions from cofired units are equal or less than the emissions from units firing coal exclusively.

One commenter (IV-D-185) presented emission data on PM, dioxins/furans, and CO from his facility which cofires up to 20 percent RDF based on heat content. The data show the facility already meets the emission guidelines. He felt the rules would create cost and operational burdens without ensuring any environmental improvements. He suggested a cutoff limit be set at 20 percent in the NSPS and emission guidelines to provide communities with the flexibility to design efficient and comprehensive MSW management plans including recycling.

Three commenters (IV-F-2.4, IV-D-122, IV-D-257) claimed that cofiring up to 15 percent RDF does not impact facilities operationally. Furthermore, a 2-year old state-of-the-art unit in the commenters' town would have to discontinue operations unless cofiring is permitted because it does not have a dedicated boiler.

Another commenter (IV-D-92) requested a cutoff level of up to 1 percent by weight of total annual fuel input for electrical boilers. This represents the maximum amount of MSW his facility uses. The commenter stated that if there were no cutoff level his unit would be dually regulated under the NSPS for electrical utility boilers and the NSPS for MWC's.

One commenter (IV-D-101) said the cutoff level should not be defined on heat input. He favored a cutoff of 45 Mg/day (50 tpd). Another commenter (IV-D-215) recommended a cutoff of 23 Mg/day (25 tpd).

One commenter (IV-D-116) requested a cutoff level but felt the broad application of the standard was necessary to prevent facilities from choosing to mix fuels to purposely avoid being subject to the NSPS.

Three commenters (IV-F-1.35, IV-D-90, IV-D-139) said separate standards should be developed for cofired units. One (IV-D-90) suggested regulating RDF through NSR or State regulatory programs.

Response: This is consistent with section 129 of the CAA Amendments of 1990. Under the final guidelines, combustors which combust a fuel feed stream, 30 percent or less of the weight of which is comprised, in aggregate, of MSW or RDF are not subject to the guidelines. To be considered a cofired combustor, a unit must be subject to a Federally enforceable permit limiting the percent of MSW in the fuel feed stream to no more than 30 percent by weight as measured on a 24-hour daily basis.

The standards (Section 60.59a) require certain reports to show that owners or operators of combustors seeking to be exempt from the emission limits and other provisions of the standards meet the definition of cofired combustors. This includes an initial report of the intent to construct a combustor and the estimated start-up date, and capacity. Owners/operators of cofired combustors must include in this report, estimates of the types and amounts of each fuel they plan to combust, the date combustion of MSW or RDF will begin, and copies of Federally enforceable permits limiting the amount of MSW or RDF that can be combusted in any single day. Cofired combustors that do not have a federally enforceable permit limiting combustion of MSW or RDF to 225 Mg/day (250 tpd) or less are also required to keep records of the daily amounts (by weight) of MSW or RDF and each other fuel combusted. These records are to be submitted in quarterly reports. Cofired combustors are exempt from all other provisions of the standards, as specified under Section 60.50a of the final standards.

Combustors that fire mixed fuel streams containing more than 30 percent MSW or RDF (by weight, daily basis) and that fire more than 225 Mg/day (250 tpd) of MSW or RDF are subject to the NSPS.

Source-separated paper or fuels made from paper that is discarded by residential, commercial, or institutional facilities is considered MSW, and MWC's that fire fuel streams containing more than 30 percent paper or other MSW and that combust more than 225 Mg/day (250 tpd) of MSW materials would be subject to the standards. However, industrial process or manufacturing waste is excluded from the definition of MSW. So, for example, if an industrial boiler at a paper manufacturing plant burned only waste paper from their process, this would not be MSW and they would not be subject to the standards.

Comment: Several commenters (IV-D-84, IV-D-147, IV-D-176, IV-D-182) said the emission standards developed for MWC's are not applicable to cement kilns that burn some MSW. These kilns typically burn coal. One commenter (IV-D-84) said that when MSW is cofired, emissions of SO_2, NO_x, and opacity would not increase and would likely decrease. Another commenter (IV-D-147) said cement kilns have excellent capabilities of destruction due to extremely high temperatures and long residence times and thus provide an effective means for waste disposal. They did not think the practice of burning MSW in cement kilns should be discouraged by making them subject to the MWC standards.

The commenters also said that there are differences in the combustion technology, combustion temperatures and residence times, and chemical processes occurring in a cement kiln versus an MWC, so that the GCP and emission limits developed for MWC's would not be applicable for cement kilns.

Three of the commenters (IV-D-147, IV-D-176, IV-D-182) said EPA has addressed cement kilns in the past and determined that they are not the same as incinerators and should not be regulated as such. Two commenters (IV-D-176, IV-D-182) said EPA had previously determined that it is not necessary to limit NO_x, CO, or acid gas emissions from cement kilns. They claimed that it is not technically or economically feasible for cement kilns to meet the limits proposed for MWC's. One commenter (IV-D-147) noted cement kilns are currently regulated by NSPS for new kilns and State air programs for existing programs, as well as by boiler and industrial furnace regulations.

Response: As explained in the previous response, the CAA Amendments of 1990 (Section 129) exclude from the standards and guidelines cofired combustors that fire a fuel stream composed of 30 percent MSW or RDF or less (by weight) or that fire 225 Mg/day (250 tpd) or less of MSW or RDF. These provisions should exempt most cement kilns from the regulation.

If a cement kiln fires a fuel feed stream containing more than 30 percent MSW or RDF and more than 225 Mg/day (250 tpd) of MSW or RDF, it would be subject to the standards or guidelines.

However, as described in Section 7.5.4, cement kilns which are affected facilities under the MWC standards are not subject to CO limits, although they are subject to all other elements of GCP.

The situation of being covered by multiple regulations is not unique to cement kilns. Many combustors may be subject to

Subparts Db, Ea, and various State regulations for example. In this situation, all applicable standards must be met.

Comment: Two commenters (IV-D-104, IV-D-199) said regulating facilities that cofire any amount of MSW with other fuels is appropriate since from a technical perspective it is extremely difficult to specify a cutoff level.

Another commenter (IV-D-210) said he was not aware of information that clearly establishes a cutoff value for cofiring MSW below which there are no adverse air effects. In the absence of such information, the commenter recommended that facilities burning any amount of municipal waste comply with the standard.

Response: The CAA Amendments of 1990 (Section 129) specify that combustors firing fuel feed streams comprised of 30 percent or less MSW or RDF, by weight, are not subject to the MWC standards and guidelines.

6.3 PREVENTION OF SIGNIFICANT DETERIORATION CONSIDERATIONS

Comment: The Agency received several comments on the proposed de minimis level for MWC emissions. Essentially, the comments either support the proposed 9 Mg/yr (10 tpy) significant emissions rate (IV-D-103, IV-D-200), or recommend that the Agency distinguish between the constituents of MWC emissions in setting de minimis levels (IV-D-90, IV-D-108, IV-D-137, IV-D-149, IV-D-150). Two commenters (IV-D-149, IV-D-150) said that if the MWC emissions classification is retained, then the PSD significance level should be increased to 18 Mg/yr (20 tpy). One commenter (IV-D-108) suggested a 9 Mg/yr (10 tpy) level for HCl and smaller levels (e.g., 0.0001 Mg/yr [0.0001 tpy]) for dioxins/furans and chromium because the acid gases are emitted in quantities orders of magnitude greater than metals and dioxins/furans. Another commenter (IV-D-90) thought the Agency should establish new PSD significance thresholds only for those pollutants not currently addressed under 40 CFR 52.21.

Response: After considering all comments on this issue, the Agency has changed its approach to setting PSD de minimis levels for emissions from MWC's. The primary goal of selecting _de minimis_ levels is to focus the PSD review on significant increases in regulated pollutants and not on insignificant increases. A single _de minimis_ level for MWC emissions, however, allows no distinction between either individual pollutant components or pollutant subclasses. The Agency agrees that some distinction among the constituents of MWC emissions is appropriate because of the different levels of concern for emissions of, e.g., dioxins versus acid gases.

Although the overall effect of the NSPS is to regulate MWC emissions, it is the three subclasses for which specific emission rates, test methods, averaging times, and calculations are being promulgated. The Agency has concluded, however, that setting PSD significance levels for each individual pollutant component, as some commenters suggested, is inappropriate and unacceptable because the NSPS does not establish emission limits for each individual pollutant within a subcategory. Even if the individual pollutant components were "regulated" by the Agency, this approach is impractical because test methods are not available for each of the pollutants listed by the commenters. So, rather than the proposed 9 Mg/yr (10 tpy) threshold for total MWC emissions, or thresholds for each individual pollutant, the Agency today is promulgating separate PSD significant emissions thresholds for the three pollutant subclasses of MWC emissions. Therefore, today's notice establishes the following _de minimis_ levels: 36 Mg/yr (40 tpy) for MWC acid gases (measured as SO_2 and HCl); 14 Mg/yr (15 tpy) for MWC metals (measured as PM); and 3.2×10^{-6} Mg/yr (3.5×10^{-6} tpy) for MWC organics (measured as dioxins/furans).

This approach agrees in principle with those commenters who recommended PSD significance thresholds for constituents of MWC emissions, but does not go as far as setting _de minimis_ levels for each individual pollutant as some commenters suggested. In taking this approach, the Agency is setting significance levels for the NSPS regulated pollutants, as it has done in the past. Also, setting PSD significance levels for classes of pollutants is not new; the Agency has on previous occasions regulated under NSPS classes of compounds such as total reduced sulfur compounds and fluorides. To establish de minimis levels for each of the three MWC emissions subclasses, the Agency used previously established approaches. For MWC metals and MWC acid gases, the Agency noted that the PSD concerns are similar to those addresses in the establishment of de minimis levels for PM_{10} and SO_2. For MWC organics, the approach previously established for NESHAP sources was employed.

The Agency noted that emissions of MWC metals are only a part of total PM emissions from MWC's. Particulate matter is measured as an indicator of MWC metals since most of the metals condense on fine PM, and no single test method will yield individual emissions rates of these metals. A 14 Mg/yr (15 tpy) de minimis level already existing for PM_{10}, the portion of PM for which, like MWC metals, the Agency has the greatest public health concern. The Agency believes that PSD review of 14 Mg/yr (15 tpy) increases in emissions of MWC metals (measured as PM) reasonably accomplishes the goals of de minimis.

For purposes of this rule, MWC acid gases are defined as the sum of the emissions of all acid gases for which there are emissions limits established by the NSPS. There are emissions limits for SO_2 and HCl, since SO_2 and HCl constitute the majority of acid gas emissions from MWC's and measurement methods for these gases are readily available. If, for example, a physical change at an MWC increases SO_2 emissions by 27 Mg/yr (30 tpy) and HCl emissions by 14 Mg/yr (15 tpy), MWC acid gas emissions would increase by 41 Mg/yr (45 tpy). Since a significant portion of MWC acid gases consist of SO_2 and the overall PSD concerns in this instance are quite similar to those addressed in the development of the SO_2 de minimis level of 36 Mg/yr (40 tpy), that same level was also chosen for MWC acid gases.

Selection of the significance level for MWC organics was based on procedures the Agency has used in the past to establish de minimis levels for NSPS and NESHAP. When the

Agency promulgated de minimis levels for regulated pollutants on August 7, 1980 (45 FR 52676), the de minimis levels for NSPS and NESHAP were calculated as 20 percent and 10 percent, respectively, of the emissions from a well-controlled, moderately-sized plant. Because of the potential health impact of MWC organics (dioxins and furans), the Agency used the NESHAP precedent and selected an amount that is 10 percent of the well-controlled emissions of a typical RDF plant with a total plant capacity of 1,800 Mg/day 2,000 tpd, i.e., 10 percent of 32 g/yr (3.5×10^{-5} tpy) or 3.2 g/yr (3.5×10^{-6} tpy).

Comment: One commenter (IV-D-27) stated microclimatological studies, including practical testing, should be mandated before PSD permits are issued in populated areas where unique geographical or meteorological characteristics have the potential for trapping or concentrating emissions. Further, the commenter said that the PSD permitting process should require that pre-existing nearby incompatible uses be considered cause for permit rejection. An incompatible use would include anything that would require additional shutdowns of the incinerator, since each shutdown/ start-up cycle would result in 6 hours of exemption from the standards. The commenter gave an example of an MWC being built near an airport runway where FAA operating limitations would have forced at least 12 shutdowns in one 38-day period.

Response: The current PSD permitting review process provides mechanisms to consider the commenter's concerns.

Comment: One commenter (IV-D-134) supported the decision to require materials separation but objected to including it as part of an emission control review, citing the lack of guidance on how this requirement relates to BACT determinations under the PSD program.

Response: The Agency established in the Spokane decision[1] that the separation of MSW must be considered in the BACT

[1]PSD Appeal No. 88-12 to the Administrator in the matter of Spokane Regional Waste-to-Energy Application. June 9, 1989.

analysis for MWC's. Also established was that, at the time of that decision, there was insufficient evidence provided by the applicant to predict the effects of prior processing of MSW on emissions from a well-controlled MWC. Although additional information has become available since the Spokane decision concerning the potential effects of prior processing of MSW on emissions from MWCs, the Agency has decided, for reasons discussed in detail in the Preamble to this rule, not to require materials separation as part of a national Best Demonstrated Technology standard at this time. With regard to BACT, such determinations are to be made on a case-by-case basis using data available at the time of the BACT analyses.

Comment: One commenter (IV-D-1.34) thought emission limits should be accompanied by an analysis of impact to avoid production of unacceptable ground level effects by pollutants.

Response: The decision was made in 1987, and confirmed in 1989 to develop standards for MWC emissions under Section 111 of the CAA. The range of health and welfare effects and the uncertainties of the cancer risk estimates did not warrant listing of MWC emissions as a hazardous air pollutant under Section 112 of the CAA. Section 111 of the CAA requires emission levels to reflect the "application of the best technological system of continuous emission reduction..." (which considering cost and other factors)" ... has been adequately demonstrated." Section 111 standards are not based on achieving any target ambient concentration level of health risk level. Rather, their purpose is to require uniform national application of control technology at all new sources. State and local regulatory agencies are free to require dispersion modeling or analysis of ground level concentrations at MWC's to address site-specific concerns.

Comment: One commenter (IV-D-142) thought, once the regulations are in effect, EPA should produce an educational packet for municipal and tribal governments that would explain the new air emission requirements and the reason why they are so important.

Response: A brief (roughly 10-page) information paper as issued at proposal will be issued at promulgation.

Comment: One commenter (IV-D-78) stated EPA must look at MWC's as a source of multiple emissions (air, wastewater, and solid waste) and implement comprehensive permitting. He said the most cost-effective way to reduce overall emissions of MWC's should be evaluated.

Response: While this standard is limited to regulation of air emissions, impacts of this standard on water and solid waste were considered. Furthermore, as part of the Agency's overall regulatory program, other environmental aspects of MWC's are being addressed. Ash handling and disposal, including control of leachate from disposal sites, will be regulated under RCRA or new Congressional action. Typically there is not a wastewater stream from MWC operations.

Comment: One commenter (IV-F-1.20) asked EPA to consider the 37 permit conditions outlined by the Boston volunteer review committee as part of the MWC permitting process.

Response: These conditions were developed for permitting a specific MWC. They have been included in the docket.

Comment: One commenter (IV-F-2.9) said that adequate buffer zones should be provided between incinerators and residential areas to prevent long-term exposure of local inhabitants.

Response: Buffer zones could be considered by State/local agencies in permitting a specific new MWC, however, this would be a highly site-specific consideration and is not appropriate to include in this national standard. As explained in the first response in this section, Section 111 standards are national standards based on control technology performance.

Comment: Two commenters (IV-F-1.20, IV-D-16) said citizens should have an opportunity to become involved in the planning, implementation, and use of MWC's. They felt this was the best way to develop confidence in the facilities.

Response: Citizen comments were invited on the proposed NSPS for MWC's. Over 300 written comments and 100 oral comments were received and considered in developing the final regulation. Citizen involvement is also provided for at local and State levels when particular waste disposal options or new MWC's are considered. Citizen participation during permitting of individual MWC's is also encouraged.

7.0 EMISSION GUIDELINES - MUNICIPAL WASTE COMBUSTOR EMISSIONS

Chapter 7.0 includes comments which pertain specifically to existing facilities. Where a comment applies to both new and existing facilities, it is presented in Chapter 3.0 and has not been duplicated in this chapter.

7.1 SELECTION OF SOURCE CATEGORY

Comment: One commenter (IV-D-156) supported the definition of MWC which designates that the guidelines apply only to facilities which combust at least 50 percent MSW.

Response: Through public comments on the proposed MWC regulations, the Agency realized the proposed definitions of MWC and MSW were unclear. The definitions of MWC and MSW were revised and the term MSW is more specifically defined in the final standards and guidelines. The 50-percent clause was deleted from the definition. However, under the CAA Amendments of 1990 (Section 129), combustors that fire fuel feed streams consisting of 30 percent MSW or RDF or less (by weight) are not subject to the MWC emission guidelines.

Comment: One commenter (IV-D-156) agreed that medical wastes should not be included in the definition of MSW, as stated in the preamble to the proposed guidelines.

Response: Segregated medical waste is excluded from the definition of MSW in the final guidelines. Moreover, as directed by Section 129 of the CAA Amendments of 1990, guidelines for MWC's with capacities below 225 Mg/day (250 tpd) will be promulgated within 2 years. Medical waste combustors are also being investigated for regulation under a separate standard.

7.2 SELECTION OF DESIGNATED POLLUTANT

Comments on the selection of the designated pollutant apply to both the NSPS and guidelines and are presented in Section 3.2.

7.3 SELECTION OF DESIGNATED FACILITIES

Comment: One commenter (IV-D-10) stated that for some existing incinerators that burn only a specific waste type, such as cardboard or paper, many of the monitoring and testing requirements are unnecessary and burdensome.

Response: If the specific waste type is an industrial process waste, such as paper at a pulp mill, it would not be covered by the final standards and guidelines. Otherwise, if the paper or other wastes are discarded by households, commercial businesses, or institutions and are not specifically excluded from the definition of MSW, then they are considered MSW and are regulated as any other MSW component or mixture of components. Cost analyses, which included testing costs, have been conducted by the Agency. The Agency determined the testing and reporting requirements to be reasonable.

7.4 MODIFICATION AND RECONSTRUCTION

Comment: One commenter (IV-D-124) asked whether an existing large MWC plant that expands its capacity to greater than 2,000 Mg/day (2,200 tpd) by adding a third MWC unit would have to upgrade the existing MWC's to meet regional requirements.

Response: If the third MWC commences construction after proposal of this NSPS (December 20, 1989), it would be considered a new MWC and would be subject to the NSPS requirements. The two existing combustors would be subject to the guidelines for either large or very large existing plants depending on whether the total capacity of the two combustors (added together) exceed 1,000 Mg/day (1,100 tpd). The combined capacity of all the combustors at the site that existed or commenced construction prior to proposal determines the plant capacity for purposes of the guidelines. The combined capacity of those combustors that commenced construction after proposal determines the plant capacity for purposes of the NSPS. In the commenter's case, the guidelines would apply to the two existing MWC's and the NSPS would apply to the new MWC.

7.5 SELECTION OF BEST DEMONSTRATED TECHNOLOGY FOR MUNICIPAL WASTE COMBUSTOR EMISSIONS

7.5.1 Municipal Waste Combustor Organics

Comment: Some commenters (IV-F-1.4, IV-F-2.39, IV-D-62, IV-D-96, IV-D-120, IV-D-134, IV-D-137, IV-D-178, IV-D-209, IV-D-222, IV-D-238) said existing RDF-fired MWC's should be required to meet the same level of organics emissions as other MWC's. One of the commenters (IV-D-209) said emissions testing was recently completed at all the RDF's in Minnesota (the Red Wing, Mankato, Elk River, and Western Lake Superior Sanitary District facilities). The commenter said all these facilities have demonstrated the ability to achieve the dioxin/furan levels specified in the guidelines for mass burn MWC's.

The commenters saw no reason RDF units should be allowed to create greater health risks than other MWC's. One commenter (IV-F-2.39) added that if RDF combustors emit twice the level of dioxins/furans as mass burn MWC's (according to the EPA's proposal), then RDF's should be required to use the most stringent add-on controls. Another commenter (IV-F-2.40) said small and large existing RDF combustors should be required to meet the same emission levels as other MWC's for environmental reasons. Another (IV-F-1.19) said RDF's should be allowed higher limits only if the environmental acceptability of the higher levels could be shown.

However, another commenter (IV-F-2.4) said the proposed levels for RDF units should also be allowed for mass burn units.

Another commenter (IV-D-150) said literature support higher dioxin/furan levels for RDF MWC's and added that regional RDF plants should also be allowed higher dioxin/furan levels than regional mass burn MWC plants.

Response: These standards and guidelines are being set under Section 111 of the CAA as opposed to Section 112.
Section 111(a) and (d) require guidelines for existing sources

to reflect "the degree of emission reduction achievable through the application of the best system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated for that category of sources." Section 111 does not require health risks to be controlled to any level or to an equal extent from all sources.

In this case, it is the Agency's judgment after review of all available data that the best demonstrated technology for regional (very large) existing MWC's can achieve the same dioxin/furan level for mass burn and RDF MWC's. Therefore, a single dioxin/furan emission limits has been established for regional MWC's.

However, after review of data on the best demonstrated technologies for large existing MWC's (retrofit of GCP and DSI/PM control) it was judged that existing mass burn units using these technologies would achieve somewhat lower dioxin/furan (and CO) emission levels than existing RDF stoker units using the same technologies. This is due to differences in combustor design discussed in the BID's, "Municipal Waste Combustors - Background Information for Proposed Guidelines for Existing Facilities" (EPA-450/3-89-27e) and "Municipal Waste Combustion Assessment: Combustion Control at Existing Facilities" (EPA-600/8-89-058). Section 111 emission limits must be achievable using demonstrated technology considering cost and technical feasibility. Therefore, it is appropriate to have higher emission levels for existing large RDF units than for existing large mass burn units.

Comment: One commenter (IV-D-111) said RDF and other MWC plants should have the same dioxin/furan emission guidelines and suggested a level of 500 ng/dscm (200 gr/billion dscf) for small plants and 150 to 200 ng/dscm (60 to 80 gr/million dscf) (rather than 125 ng/dscm (50 gr/billion dscf] or less) for large and regional MWC plants. The commenter said a level of 125 ng/dscm (50 gr/billion dscf) was too strict given the variability at existing MWC plants and the uncertainty of the relationship between dioxin/furan emissions and GCP.

However, another commenter (IV-D-137) said a dioxin/furan level of 125 ng/dscm (50 gr/billion dscf) should be uniformly required for all MWC plants larger than 45 Mg/day (50 tpd). He said small plants could achieve this level cost effectively through combustion improvements, flue gas cooling, and retrofit of an ESP or FF. He said SD/ESP control had also been shown to achieve this level.

Response: In setting the emission guidelines, test data were collected and analyzed for 3 MWC plants with DSI/ESP systems (2 with furnace injection and 1 with duct injection), 7 plants with DSI/FF systems, 4 with SD/ESP systems, and 10 with SD/FF systems. Some of these were retrofit applications. These data indicate that the addition of sorbent (acid gas control) and cooling the flue gas prior to the PM control device result in good control of dioxin/furan emissions. The results are summarized in the BID, "Municipal Waste Combustors - Background Information for Proposed Standards: Post-Combustion Technology Performance" (EPA-450/3-89-27c) and other items in Docket No. A-89-08.

The SD/ESP systems, which are the basis of the final guidelines for very large MWC's (those larger than 1,000 Mg/day [1,100 tpd]) achieved dioxin/furan levels below 60 ng/dscm (24 gr/billion dscf) so this level was selected. The bases of the guidelines for large plants are GCP and DSI/PM control systems. Information included in the BID, "Municipal Waste Combustion Assessments: Combustion Control at Existing Facilities" (EPA-600-8-89-058) indicates that GCP can achieve dioxin/furan levels of 500 ng/dscm (200 gr/billion dscf) or lower at existing mass burn and modular MWC's and 1,000 ng/dscm (400 gr/billion dscf) at existing RDF stokers. The tests of DSI/PM control systems indicate that these add-on control systems further reduce dioxin/furan emissions by 75 percent or greater. Therefore, levels of 125 ng/dscm (50 gr/billion dscf) can be achieved by large existing mass burn MWC plants and 250 ng/dscm (100 gr/billion dscf) can be achieved by RDF plants. The tests demonstrated outlet dioxin/furan emission concentrations below these levels. Therefore, the levels are demonstrated and appropriate for large existing plants.

Under Section 129 of the CAA Amendments of 1990, guidelines for MWC's with capacities of 225 Mg/day (250 tpd) or less will be promulgated within 2 years, and acid gas control for small MWC's will be considered as part of that rulemaking.

Comment: Two commenters (IV-D-105, IV-D-117) suggested that the guidelines require existing MWC's to cool flue gas to 135°C (275°)F at the PM control device inlet. The commenters also suggested dioxin/furan guidelines (measured in TEF) of 0.5 ng/dscm (0.2 gr/billion dscf) for plants over 225 Mg/day (250 tpd) and 0.5 to 1.0 ng/dscm (0.2 to 0.4 gr/billion dscf) for smaller existing plants. Their rationale is the same as described for small new MWC's in their comments in Section 3.5.1.

One commenter (IV-D-116) suggested a dioxin/furan level of 10 ng/dscm (4 gr/billion dscf) TEF for existing MWC's.

Response: The 230°C (450°F) temperature was proposed as a means of preventing secondary formation of dioxins/furans in the PM control device. Data available at proposal suggested secondary formation could occur at temperatures of about 230°C to 320°C (450°F to 600°F). However, as explained in Section 7.5.4, this temperature requirement has been changed in the final guidelines. The revised provisions specify that existing MWC's measure the temperature at the PM control device inlet during their compliance test. Based on this measurement, a site-specific temperature requirement would be established.

This change was made because the relationship between temperature and dioxin/furan emissions may be different for different MWC's, and lower temperatures may help to achieve the dioxin/furan emission levels in many cases. For example, large existing mass burn MWC's are required to meet outlet dioxin/furan concentrations of 125 ng/dscm (50 gr/billion dscf) or less. Data show that in general, as temperature is reduced, dioxin/furan emissions are reduced. In order to meet the acid gas limits and a dioxin/furan level of 125 ng/dscm (50 gr/billion dscf), many MWC's would use sorbent injection/PM control systems. These systems generally operate at temperatures lower than 230°C (450°F) (e.g., about 180°C [350°F]) to enhance acid gas and dioxin/furan control. If compliance is demonstrated (through testing) while the MWC is operated at a temperature below 230°c (450°F), then the plant should monitor temperature and continue to operate at this lower temperature to assure continuous emission reduction.

Rather than specifying a uniform temperature for all existing MWC plants, the site-specific temperature determination approach was selected due to the site-specific nature of MWC organic emission levels and to retrofit considerations. For example, it could be technically difficult and costly to install equipment at some MWC's to allow operation at a temperature of 230°C (450°F) or below; and in some cases it might not be necessary to achieve the specified dioxin/furan emission levels. The site-specific temperature determination approach will ensure that the dioxin/furan emission levels are achieved while allowing existing plants flexibility to design, retrofit, and operate control equipment in the most practical way considering site-specific conditions.

Regarding the commenters' suggested levels for dioxin/furan, the response in Section 3.7 explains why a total dioxin/furan format has been selected rather than a TEF format. The total dioxin/furan approach is appropriate for measuring the performance of control technology, and is a more straightforward approach. The total emission level would not require revision of the guideline each time TEF calculation procedures are changed when no change is intended in the control technology basis of the guidelines, nor does the new section 129 in the CAA of 1990 require use of TEF.

In accordance with the provisions of Section 111 of the CAA, the emission guidelines were set at levels demonstrated to be achievable using the best demonstrated control technologies for existing MWC's. To put the emission guidelines in perspective, the total dioxin/furan level for large mass burn MWC's of 125 ng/dscm (50 gr/billion dscf) is roughly equivalent to a TEF of about 2 ng/dscm (1 gr/billion dscf).

<u>Comment</u>: One commenter (IV-D-124) suggested a level no lower than 30 ng/dscm (12 gr/billion dscf) total dioxins/furans for regional MWC's using the same rationale discussed for new MWC's in his comment in Section 3.5.1.

<u>Response</u>: A level of 60 ng/dscm (24 gr/billion dscf) was selected for very large (regional) MWC's. This is consistent with the selection of SD/ESP systems (in combination with GCP) as the best demonstrated technology for very large existing plants (i.e., those plants with capacities above 1,000 Mg/day [1,100 tpd]). The rationale for selection of SD/ESP as the basis of the final emission guidelines for very large plants is presented Section 7.5.5.

In determining the dioxin/furan level achievable by existing MWC's with SD/ESP systems, emission test data from three plants were received. Tests at all three plants showed average outlet dioxin/furan levels below 60 ng/dscm (24 gr/billion dscf). Two of these units (Millbury, Massachusetts; SEMASS in Rochester, Massachusetts) were operated at temperatures consistent with most SD/FF systems (<150°C [<300°F]). Outlet total dioxin/furan emissions from Millbury (equipped with a SD and 3-field ESP) were 40 to 58 ng/dscm (16 to 23 gr/billion dscf) during five of six runs. Outlet emissions at SEMASS (equipped with a SD and 5-field ESP) were 5 to 18 ng/dscm (2 to 7 gr/billion dscf) during five of six runs. The SEMASS emission levels are more variable than the data from SD/FF systems, but are generally within the same range. Testing in December 1989 at the third MWC (Portland) with the SD/ESP operated at about 150°C (300°F) showed average dioxin/furan levels of 36 and 44 ng/dscm (14 and 17 gr/billion dscf) for the two units. Because of the increased variability of SD/ESP relative to SD/FF data and in line with the data from Millbury, the 60 ng/dscm (24 gr/billion dscf) was determined to be achievable by SD/ESP systems operated in conjunction with GCP.

Comment: One commenter (IV-F-2.32) suggested a higher dioxin/furan limit for very large MWC plants than was proposed. The commenter said that exposure and risk modeling indicates that a dioxin/furan level of 425 ng/dscm (170 gr/billion dscf) for regional MWC plants would result in an MIR of 10 chances per million. He believed this level of risk was acceptable and more stringent emission levels were not justified.

Another commenter (IV-D-184) said that the guidelines should allow MWC's to exceed the dioxin/furan limits if risk analyses demonstrate that actual emissions result in maximum health risks of less than 1 in 100,000. Another (IV-D-255) said dioxin/furan control should only be required for plants where risks are above 1 in 100,000.

However, another commenter (IV-D-9) disputed this suggestion saying that: (1) risk assessment is imprecise and should not be used to exempt facilities from control and (2) Michigan air toxics standards are based on a 1 in a million rather than 10 in a million risk level.

Response: The guidelines are based on the performance of best demonstrated technology and are not based on a target health risk level. As stated in the ANPRM (52 FR 25339) and the preamble to the proposed standards (54 FR 52251), it was decided to regulate MWC's under Section 111 rather than Section 112 of the CAA. While MWC emissions may reasonably be anticipated to contribute to endangerment of public health and welfare, the range of health and welfare effects and the uncertainties in the cancer risk estimates did not warrant listing MWC emissions as a hazardous air pollutant under Section 112. And, Section 111(d) would permit more thorough evaluation of existing MWC's at the State level.

Under Sections 111(a) and (d) of the CAA, guidelines for existing sources are to reflect "the degree of emission reduction achievable through the application of the best system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated for that category of sources."

In developing the guidelines, emission test data were examined to determine the performance levels achievable by control technologies. The retrofit costs and other impacts of the controls were examined. The best demonstrated technology, considering cost, was selected for the various types and size classes of existing MWC's. Guideline emission levels were then set to reflect performance of these technologies. For large and regional plants these guidelines are below the 425 ng/dscm (170 gr/billion dscf) recommended by the commenter because the lower levels are achievable and costs and other impacts are not unreasonable.

Comment: One commenter (IV-D-164) said the organic emission limits for existing MWC's are not justified. He referred to a study that concluded that maximum ground level exposure to dioxins (on a TEF basis) near typical modern MWC's is below typical urban background concentrations.

Response: As described in the previous response, MWC's were selected for regulation under Section 111 of the CAA. Guidelines for MWC emissions were then developed based on the performance of demonstrated control technologies, as specified by Section 111. Ambient concentrations and estimated health risks levels are not the basis of Section 111 standards.

Comment: One commenter (IV-F-1.11 and IV-D-158) said the proposed dioxin/furan emission limits for existing plants may not be achievable and supporting emission data are limited. He also said that since the same add-on control devices control acid gases and PM as well as dioxins/furans, and it is not known how to optimize these systems for dioxin/furan control, emission limits for dioxins/furans are unnecessary. He believed the acid gas and PM limits would ensure organics control. However, he suggested that monitoring of dioxins/furans could still be required in order to collect data.

Response: In developing the emission guidelines, test data were gathered and analyzed for a total of 24 MWC's with acid gas/PM control systems (including 3 with tests of DSI/ESP, 7 of DSI/FF, 4 of SD/ESP, and 10 of SD/FF systems). Based on these test data and other available information, the dioxin/furan emission levels achievable by acid gas/PM control technologies were determined. The guidelines are based on these demonstrated levels of performance and will be achievable by the combination of GCP and add-on controls. Establishing guideline levels for dioxins/furans and requiring periodic testing will better assure that control technologies are properly designed, operated, and maintained, and that MWC organic emissions are reduced.

7.5.2 Municipal Waste Combustor Metals and Particulate Matter

Comment: One commenter (IV-F-1.4) said that small existing MWC's should be required by the guidelines to meet a PM level of 34 or 46 mg/dscm (0.015 or 0.02 gr/dscf). The commenter said this level is technically feasible.

Four commenters (IV-D-105, IV-D-117, IV-D-168, IV-D-186) said all existing MWC's should be required to achieve PM levels in the range of 23 to 34 mg/dscm (0.010 to 0.015 gr/dscf) rather than 69 mg/dscm (0.03 gr/dscf). Two of the commenters (IV-D-105, IV-D-117) said several plants in Europe smaller than 2,000 Mg/day (2,200 tpd) have been retrofitted with SD/FF or SD/ESP control and vendors have guaranteed levels of 23 to 46 mg/dscm (0.010 to 0.020 gr/dscf). They also said tests at seven of the plants have shown PM levels of 2 to 23 mg/dscm (0.001 to 0.010 gr/dscf). Another commenter (IV-D-106) stated agreement with Commenter IV-D-117 and suggested a level of 34 mg/dscm (0.015 gr/dscf) based on the European retrofit data. Other commenters (IV-F-1.4, IV-D-190, IV-D-238) also said a level of 34 mg/dscm (0.015 gr/dscf) should apply to plants above 225 Mg/day (250 tpd).

One commenter (IV-D-101) said the proposed level of 69 mg/dscm (0.03 gr/dscf) is reflective of best demonstrated technology for existing MWC's. Another (IV-D-116) agreed, and said many existing facilities have installed 3- or 4-field ESP's, most of which are capable of achieving 69 mg/dscm (0.03 gr/dscf), but it would be unnecessarily costly to require more stringent PM levels for existing MWC's. Another (IV-D-137) suggested this level for all existing MWC plants larger than 45 Mg/day (50 tpd).

Other commenters (IV-D-164, IV-D-277) favored a level of 69 mg/dscm (0.03 gr/dscf) for large and regional MWC's. Commenter IV-D-164 said more stringent levels (e.g., 34 mg/dscm [0.015 gr/dscf]) are not justifiable on a health risk basis because national background PM concentrations are 48 $\mu g/m^3$ (21 gr/million ft^3) and levels in urban areas are higher. Commenter IV-D-277 favored use of SD/ESP for regional MWC's and said the addition of sorbent could cause an increase in PM emissions from ESP's so a level of 69 mg/dscm (0.03 gr/dscf) is more reasonable than 34 mg/dscm (0.015 gr/dscf).

One commenter (IV-D-111) said the 69 mg/dscm (0.03 gr/dscf) PM level for small and large MWC plants is reasonable, but regional MWC plants should be required to meet 58 mg/dscm (0.025 gr/dscf) based on use of an ESP.

Response: A level of 69 mg/dscm (0.03 gr/dscf) is included in the guidelines for MWC units with capacities above 225 Mg/day (250 tpd) that are located at existing plants smaller than 1,000 Mg/day (1,100 tpd). The guidelines were set at a level that would allow upgrades (if necessary) and continued use of existing ESP's already in place at most plants, rather than requiring demolition and complete replacement of the many existing ESP's. The costs of retrofit control are more reasonable if use of an (upgraded) existing ESP is allowed. Data for 18 existing MWC plants with ESP's and for 3 applications of DSI/ESP systems and 4 SD/ESP systems are summarized in the BID, "Municipal Waste Combustors - Background Information for the Proposed Standards:

Post-Combustion Technology Performance" (EPA-450/3-89-27c), and other reports in Docket No. A-89-08.

The data on performance of existing ESP's demonstrate that PM emissions of 69 mg/dscm (0.03 gr/dscf) can be achieved over a range of ESP designs and operating characteristics. Many existing ESP's designed for lower performance levels could be upgraded to achieve a level of 69 mg/dscm (0.03 gr/dscf). This level can be achieved by ESP's with 3 or more fields. Achieving lower emissions, however, is very dependent on state-of-the-art designs, control system configurations, and ESP sizes that are not present at most existing MWC's. As a result, establishment of a PM limit of 23 to 46 mg/dscm (0.01 to 0.02 gr/dscf) would have required either addition of a new field or replacement of existing ESP's with brand new ESP's in some situations where a level of 69 mg/dscm (0.03 gr/dscf) could be achieved at a much lower cost using (or upgrading) an existing ESP.

For very large MWC plants (with capacities above 1,000 Mg/day (1,100 tpd), it was determined that best demonstrated technology, considering costs, is SD/ESP control or the equivalent. The rationale for this decision is described in Section 7.5.5. For these very large plants, the guidelines establish a PM level of 34 mg/dscm (0.015 gr/dscf).

This PM emission level was selected following review of ESP design and performance data for existing MWC's in this size category. Most of the ESP's on these units are relatively new (less than 6 years old), have 3 to 5 fields, have SCA's in excess of 300, and have demonstrated existing PM emissions of less than 34 mg/dscm (0.015 gr/dscf). Based on the gas cooling as part of acid gas control requirements, it is anticipated that these units will be able to continue operation with PM emission rates of 34 mg/dscm (0.015 gr/dscf) after installation of a SD system. Upgrading of the ESP's internal configuration and instrumentation and increasing the solids handling capacity of the unit may be required. These costs were considered reasonable relative to the overall emission reductions. This is especially true for very large

MWC's where ESP costs show significant economies of scale, and thus have better cost effectiveness.

Comment: Some commenters (IV-F-2.8, IV-D-266) suggested maintaining the current PM standard of 180 mg/dscm (0.08 gr/dscf) for small existing MWC's. Commenters IV-F-2.4 and IV-D-266 said ESP's on some plants were designed to meet 180 mg/dscm (0.08 gr/dscf) rather than 69 mg/dscm (0.03 gr/dscf), and that it would be costly to replace these. They did not believe the additional PM control achieved would justify the cost. Another (IV-D-222) said more flexibility in the PM guideline for small plants is needed to address such cases.

Response: As explained in Chapter 1, the guidelines currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). As specified in the CAA Amendments of 1990, PM guidelines for small MWC's will be developed under a separate rulemaking scheduled for promulgation within 2 years.

Comment: Some commenters (IV-F-2.40, IV-D-168) said a PM level of 34 mg/dscm (0.015 gr/dscf) is not stringent enough for existing regional MWC plants and that a level of 0.010 is demonstrated. Commenter IV-F-2.40 supported this by saying the permit PM limit for at least one MWC in the BACT/LAER Clearinghouse is 23 mg/dscm (0.010 gr/dscf) and emission tests at other MWC's with SD/FF also show levels below 23 mg/dscm (0.010 gr/dscf).

The commenter (IV-F-2.40) also said that regional MWC plants should be required to install a FF rather than an ESP in combination with a SD. He commented that ESP's are subject to long-term corrosion and performance deterioration, and that using a SD in combination with an ESP will cause increased corrosion and slagging. He also commented that ESP efficiency is subject to upsets in inlet gas characteristics, and he said ESP's are much less efficient at collection of fine particulates than are FF's.

Response: As described in more detail in Section 7.5.5, the final guidelines are based on SD/ESP control for very large

MWC plants (those with capacities above 1,000 Mg/day (1,100 tpd). This decision was based on analysis of performance and costs of DSI/ESP, SD/ESP, and SD/FF control systems. The SD/ESP control level provides a high level of MWC emissions control (for MWC acid gases, MWC organics, and MWC metals). It also costs considerably less than the SD/FF option because many plants with existing state-of-the-art ESP's can add a SD and still use their existing ESP, whereas to use SD/FF control the ESP's would need to be completely removed and replaced with a FF. As described in previous responses, a PM emission rate of 34 mg/dscm (0.015 gr/dscf) is achievable by well designed and operated SD/ESP systems. Furthermore, ESP systems that can achieve a level of 34 mg/dscm (0.015 gr/dscf) for total PM are also very efficient at collection of fine particulates.

Both SD/FF and SD/ESP systems have been installed and operated on MWC's for the past several years and have been demonstrated to be reliable when properly designed, operated, and maintained. Problems such as those cited by the commenter can occur if proper care is not taken. To avoid these problems, regular inspection and maintenance of these systems will be required. These requirements, however, are no different than those generally exercised for other types of industrial process equipment. The cost of maintenance for SD/FF and SD/ESP systems was included in the Agency's analysis of the acid gas control requirements and is considered reasonable.

Comment: As with the NSPS, some (IV-F-2.6, IV-F-2.41, IV-F-2.47, IV-F-2.50, IV-D-26, IV-D-150, IV-D-168, IV-D-178) thought the guidelines should establish specific levels for mercury and/or other metals and should include provisions to perform periodic testing of metals emissions. (See the comments in Section 3.5.2 for more details.) One of these commenters (IV-D-26) said that based on the EPA compliance test results, they calculate that 2,700 kg/yr (6,000 lb/yr) of mercury are emitted by an MWC in Massachusetts. The commenter said that according to SINTEF of the Norwegian Technological

University, PM controls only remove about 9 percent of mercury emissions; and about 12 percent of lead and 28 percent of total cadmium remain in the emissions after PM controls. The commenter suggested flue gas cooling, stringent health-based metals emission limits, and health monitoring be included in the guidelines.

However, other commenters thought mercury guidelines and standards were premature (see comments in Section 3.5.2).

Response: Based on test data from a large number of MWC plants, ESP's and FF's designed to meet the PM limits specified in the guidelines consistently remove over 97 percent of lead, cadmium, and other MWC metals emissions except mercury. Therefore, the PM guideline will adequately assure metals control without setting levels and monitoring for each individual metal.

The emission guidelines have been promulgated without a mercury emission level at this time. However, the CAA Amendments of 1990 (Section 129) require that mercury (and also lead and cadmium) emission levels be promulgated within 12 months of enactment of the CAA Amendments. Mercury, lead, and cadmium standards and guidelines will therefore be proposed in the Federal Register and promulgated in the near future. In developing the mercury emission guidelines, information on mercury emissions and controls gathered during the rulemaking for the current standards and guidelines will be considered. This information is included in Docket A-89-08, Category IV-M. Public comments on mercury received as part of this rulemaking will also be considered.

Comment: Some commenters (IV-F-1.4, IV-F-1.19, IV-D-106, IV-D-134, IV-D-238) said the proposed temperature of 230°C (450°F) at the PM control device is not adequate to ensure condensation and removal of metals. They said a temperature of 150°C (300°F) or 180°C (350°F) for existing MWC's should be required to improve metals control. Similar comments were made for new MWC's (see Section 3.5.2).

Response: The 230°C (450°F) temperature was proposed for the purpose of preventing secondary formation of dioxins/furans in the PM control device and not to achieve metals control. Except for mercury, metals emissions would not be significantly reduced by lowering the flue gas temperature to less than 230°C (450°F). However, many large existing MWC's would cool gas to temperatures below 230°C (450°F) in order to meet the dioxin/furan and acid gas emission levels. As described in Section 7.5.4, the temperature provision has been changed in the final guidelines. Existing MWC's will now establish site-specific temperature levels during their compliance tests, and thereafter operate at no more than 17°C (30°F) above this temperature level (4-hour average basis).

Comment: Two commenters (IV-D-105, IV-D-117) cited a table from the EPA's August 1989 Guidance on HCl and Heavy Metals Control from Hazardous Waste Incinerators, which indicates that SD/FF may achieve 90 percent mercury control, but ESP's (allowed at existing plants) do not achieve control. The commenters were in favor of basing guidelines for all existing MWC's on SD/FF control and requiring a PM control device inlet temperature of no more than 135°C (275°F) to increase mercury capture. The commenters' rationale for this temperature is described in Section 3.5.2.

Response: While lower temperatures may aid in mercury capture, it is not a simple condensation phenomenon, and other factors (such as level of carbon in the fly ash) also influence mercury control. As mentioned in previous responses, the CAA Amendments of 1990 require that mercury emissions be addressed through promulgation of mercury emission guidelines within 12 months of enactment of the CAA Amendments.

Comment: One commenter (IV-F-2.54) said that the proposed opacity limit is unachievable by the FBC unit he operates. The unit can meet the PM limit. He requested that EPA allow a facility to determine an acceptable opacity level during PM compliance testing and that this level become their operating limit.

Response: Available information indicates that the 10-percent opacity limit is achievable for MWC's with best demonstrated technology. However, there is flexibility for special cases as identified by the commenter. The General Provisions (40 CFR 60.11(e)(6), (7), and (8)) contain procedures whereby site-specific opacity limits can be established for sources that demonstrate during testing that they can meet all other applicable emission standards while the opacity level is higher than specified.

Comment: One commenter (IV-D-111) said a 15-percent opacity level more closely reflects a particulate level of 69 mg/dscm (0.03 gr/dscf).

Response: Existing MWC's with PM controls that meet emission levels of 69 mg/dscm (0.03 gr/dscf) or less generally operate below 10 percent opacity. However, as explained in the previous response, there are provisions that allow establishment of site-specific opacity levels.

Comment: One commenter (IV-D-143) asked for clarification of whether the visible emissions (opacity) level is defined to exclude water vapor.

Response: Method 9 (40 CFR 60, Appendix A, Method 9, Procedure 2.3) specifies that "opacity observations shall be made at the point of greatest opacity in that portion of the plume where condensed water vapor is not present." Furthermore, the General Provisions [40 CFR 60.11(e)] specify that "Opacity readings of portions of plumes which contain condensed, uncombined water vapor shall not be used for purposes of determining compliance with opacity standards."

7.5.3 Municipal Waste Combustor Acid Gases

Comment: One commenter (IV-F-1.7) supported Alternative IIA for existing MWC's (based on DSI/ESP to achieve 50 percent SO_2 and HCl control for large and regional MWC's, and an ESP but not acid gas control for small MWC's). He thought the cost impacts of this alternative were more reasonable. Other commenters (IV-F-1.6, IV-F-1.35, IV-F-2.15, IV-F-2.32, IV-F-3.5, IV-D-116, IV-D-137, IV-D-139, IV-D-155, IV-D-164, IV-D-184, IV-D-190) said that 50 percent SO_2 and HCl control should be specified for all existing MWC's (or all existing MWC's above 45 or 225 Mg/day [50 or 250 tpd]). They and Commenter IV-D-111 said that regional MWC plants should not have to meet more stringent acid gas emission levels.

Some commenters (IV-F-1.35, IV-D-139, IV-D-164) said the 50-percent level allows MWC's flexibility in developing innovative retrofit control techniques (no specific examples were given) rather than total replacement of their entire existing air pollution control system. Others (IV-D-116, IV-D-137, IV-D-155, IV-D-158) said it allows facilities various options for use of DSI or SD systems with either ESP's or FF's which will make retrofits economically achievable. Another (IV-F-2.15) said EPA has presented no evidence that the stringent SO_2 and HCl levels proposed for regional MWC plants can be met on a continuous basis, but said 50 percent control is demonstrated.

Another commenter (IV-F-3.5) favoring 50 percent control for existing MWC's rather than higher levels, said emissions of HCl and SO_2 from MWC's are negligible compared to overall emissions of these substances and, therefore, do not contribute significantly to acid deposition or materials damage. The commenter also said the materials separation provisions will lower HCl and SO_2 emissions without scrubbing. (Also see comments under "size categories for existing MWC's" in Section 7.5.5).

Two other commenters (IV-D-115, IV-D-231) favored requiring 50 percent acid gas control for regional as well as large plants. However, Commenter IV-D-231 said if a regional plant distinction is retained, emission levels should be 70 percent SO_2 removal or 60 ppmv SO_2 and 90 percent HCl removal or 45 ppmv HCl (8-hour block average). He said these levels are consistent with today's most advanced SD-equipped MWC's. The other commenter (IV-D-115) said that 85 percent SO_2 and 95 percent HCl reduction had not been demonstrated continuously by SD/FF. Further, he suggested that SD/ESP systems or ESP/wet scrubber systems may achieve comparable (or only slightly lower) SO_2 and HCl reductions to SD/FF systems as well as similar PM and dioxin/furan emissions. These systems would be less costly to retrofit for some plants. He suggested the emissions guidelines should allow these options by requiring 80 to 85 percent HCl control and 75 to 80 percent SO_2 control if the regional plant distinction is maintained. Another (IV-F-2.40) said 95 percent HCl control is appropriate for existing regional MWC plants.

Response: The final guidelines define very large MWC plants as those with capacities above 1,000 Mg/day (1,100 tpd), and include emission levels based on SD/ESP control. After proposal, the performance and cost of SD/ESP control systems were assessed and compared to those of DSI/ESP (the level proposed for large plants) and SD/FF (the level proposed for regional plants).

Analysis of long-term CEM data from a SD/ESP-equipped MWC showed a long-term average SO_2 reduction of 80 percent. However, over a shorter averaging period (e.g., 24 hours) the control level will vary above and below this long-term average performance. Statistical analyses of the data demonstrated that 70 percent SO_2 reduction, calculated as a daily (block) 24-hour geometric mean, is continuously achievable and is consistent with a long-term average SO_2 reduction of 80 percent.

An HCl reduction of 90 percent is achievable by SD/ESP systems. The HCl reduction would be measured using Method 26, and since the compliance method is a stack test rather than a CEM, an averaging period does not need to be specified. This control level is based on emission tests from three MWC's with SD/ESP control.

For comparison, as stated at proposal, DSI/ESP control systems achieve 50 percent control of SO_2 and HCl. Spray dryer/fabric filter systems can achieve 80 percent SO_2 reduction calculated as a 24-hour geometric mean (or about 90 percent long-term average) and 95 percent HCl control.

The SD/ESP systems achieve reductions in MWC metals and PM emissions comparable to SD/FF systems. Dioxin/furan levels of less than 60 ng/dscm (24 gr/billion dscf) are also achieved by SD/ESP systems. (See Sections 7.5.1 and 7.5.2 for further discussion of these pollutants.)

Because the SD/ESP alternative would allow reuse of existing ESP's at many plants, costs are significantly lower than SD/FF retrofits. For typical plants above 1,000 Mg/day (1,100 tpd) the annualized cost of SD/ESP retrofit (not including GCP costs) would be $9 to $12/Mg ($8 to $11/ton) of MSW whereas the costs of SD/FF retrofit would be $13 to $18/Mg ($12 to $16/ton) of MSW. The incremental cost effectiveness of SD/ESP control compared to DSI/ESP control for plants larger than 1,000 Mg/day (1,100 tpd) is about $3,300 to $4,400/Mg ($3,000 to $4,000/ton) of acid gas control. In contrast, the incremental cost effectiveness of SD/FF control compared to SD/ESP control would be about $13,000 to $17,000/Mg ($12,000 to $16,000/ton) of acid gas removed. The increased cost of SD/FF control was judged to be unwarranted relative to the small additional emission reduction achieved.

A model plant cost analysis showed that SD/ESP control costs per Mg (ton) of MSW combusted and cost per Mg (ton) of acid gas removed were similar for plants larger than about 1,000 Mg/day (1,100 tpd). Costs per Mg (ton) of MSW combusted increase more rapidly for plants below this size. For plants smaller than 1,000 Mg/day (1,100 tpd) the cost for SD/ESP control would typically be about $19 to $30/Mg ($17 to $27/ton) of MSW combusted, as compared to less than $11/Mg ($10/ton) of MSW for typical plants larger than 1,000 Mg/day (1,100 tpd).

It is therefore reasonable to define very large MWC plants as those with plant capacities above 1,000 Mg/day (1,100 tpd) and to promulgate emission guidelines for these plants based on emission levels achievable with SD/ESP control. The final guidelines include an SO_2 emission level of 70 percent or 30 ppmv (daily block 24-hour geometric mean), whichever results in a higher emission level. The final HCl emission level is 90 percent or 25 ppmv, whichever results in a higher emission level. This change results in SO_2 and HCl emission levels that are slightly less stringent than proposed for plants larger than 2,000 Mg/day (2,200 tpd) but in more stringent SO_2 and HCl levels for plants between 1,000 Mg/day (1,100 tpd) and 2,000 Mg/day (2,200 tpd). The guidelines for plants smaller than 1,000 Mg/day (1,100 tpd) have not changed since proposal.

There are about 45 very large existing MWC plants with capacities above 1,000 Mg/day (1,100 tpd). About 27 are already controlled with SD/ESP or equivalent controls, while the other 18 are controlled with ESP's and would be expected to retrofit acid gas controls under the guidelines. Economic analyses concluded that no severe economic impacts are expected to result from these guidelines.

Comment: One commenter (IV-F-2.39) said the requirement for regional MWC plants such as Detroit to retrofit SD's is warranted. She said the relative efficiencies and costs of SD/ESP versus SD/FF should be documented to decide if replacement of an existing ESP with a FF is warranted.

Response: As described in the previous response, a relative analysis of SD/ESP and SD/FF performance and cost was conducted. The final guidelines would require very large plants such as Detroit to achieve an SO_2 reduction of 70 percent (24-hour geometric mean) and an HCl reduction of 90 percent, based on levels achievable with SD/ESP control systems.

Comment: One commenter (IV-D-277) said the SO_2 and HCl levels proposed for regional MWC's were more reflective of LAER than best demonstrated technology. He said they had not been demonstrated on a long-term basis. Further, he said recycling could change emissions and control effectiveness since these depend on waste characteristics. He suggested the guidelines specify design and operating requirements rather than percent reductions for acid gases, since retrofit performance levels may vary. He also requested special consideration for existing plants with space constraints.

Response: The SO_2 and HCl levels were changed between proposal and promulgation of the guidelines. The final levels have been demonstrated to be achievable based on the data analysis described in the previous response.

Section 111 of the CAA and 40 CFR 60.24(b) specify the use of emission levels (or percent reductions) unless it is clearly impractical to establish or measure emission levels. In the case of SD/ESP systems, percent reductions are demonstrated and can be measured, so this format is used. This format allows owners or operators of existing plants flexibility to design and operate their systems in the most practical way given site-specific considerations as long as they meet all applicable standards.

In general, as specified in Section 60.24(c), State standards developed pursuant of the emission guidelines must be at least as stringent as the guidelines. However, the provisions of Section 60.24(f) do allow case-by-case consideration of less stringent limits based on unique site-specific circumstances. Few such situations are expected.

Comment: One commenter (IV-D-111) said DSI systems have not been demonstrated to achieve 50 percent SO_2 removal on a continuous basis in all cases. The commenter says that the Montgomery County plant, which was used as the basis for one of the EPA's model plants, is achieving less than 30 percent SO_2 control with a DSI system.

Other commenters (IV-D-101), IV-D-139, IV-D-155) said 50 percent SO_2 and HCl control was not unreasonable, but questioned whether DSI was "demonstrated." Commenters IV-D-101 and IV-D-155 said retrofits of the three types of DSI techniques (direct sorbent injection into the furnace, sorbent injection into the duct, and sorbent introduction into the fuel) had each been tried at only one United States facility. These two commenters suggested that given the lack of data on the achievable percent removal for this technology, a requirement for a fixed stoichiometric ratio of 1:1 would be preferable to the 50-percent reduction limits for SO_2 and HCl. The other commenter (IV-D-139) said DSI could be required without specifying an exact emission reduction until more data are available.

Another commenter (IV-D-169) said that DSI technology is not commercially accepted or adequately demonstrated, and he did not know of any current commercial installation of DSI technology on an MWC.

Response: The BID, "Municipal Waste Combustors - Background Information for Proposed Standards: Post-Combustion Technology Performance" (EPA-450/3-89-27c) describes tests of furnace sorbent injection/ESP control at two MWC plants and duct sorbent injection/ESP control at one plant. These data include parametric testing of the Dayton MWC mentioned by the commenter.

For the Dayton facility, SO_2 and HCl emission levels were measured with furnace injection of limestone at various feed rates with the ESP operated at various temperatures. When furnace injection is used, simultaneous inlet and outlet acid gas concentrations cannot be measured. Comparison of measured outlet emission levels to typical uncontrolled SO_2 and HCl concentrations indicated that between 55 and 90 percent control of both SO_2 and HCl were achieved. The higher levels were obtained at higher limestone feed rates and lower ESP operating temperatures. The data from the other plant with furnace injection/ESP control indicate about 60 to 70 percent HCl removal and a slightly higher percent SO_2 removal at a stoichiometric ratio of about 1:1, and an ESP inlet temperature of about 190°C (370°F).

Parametric tests of duct sorbent injection were also conducted at Dayton. Hydrated lime was injected into the duct prior to the ESP at a temperature of about 180 to 200°C (300 to 400°F). Emissions were measured at the ESP inlet and outlet. The results show that 50 percent SO_2 removal and 80 percent HCl removal are achievable by DSI systems at temperatures of 200°C (400°F) or lower.

Taken together, these tests demonstrate that both SO_2 and HCl removals of at least 50 percent can be achieved by DSI/ESP systems (either furnace or duct sorbent injection).

Data from several tests of MWC's with DSI/FF or SD/ESP systems are also reported in the BID, and these also achieve over 50 percent control of both SO_2 and HCl.

In response to the suggestion of specifying a stoichiometric ratio rather than an emission level or percent reduction, Section 111 of the CAA and 40 CFR 60.24(b) specify the use of emission levels (or percent reductions) unless it is clearly impractical to establish or measure emission levels. In the case of MWC's with acid gas/PM control systems, percent reductions are demonstrated and can be measured, so this format is used. (Section 7.8 describes how percent reduction may be determined to demonstrate compliance where furnace injection is used.) This format allows owners or operators of existing plants flexibility to design and operate their systems in the most practical way given site-specific considerations as long as they meet all applicable standards.

Comment: Three commenters (IV-D-101, IV-D-155, IV-D-257) said the 30 ppm and 25 ppm SO_2 and HCl levels proposed in conjunction with the 50-percent control are unreasonably low. The commenters said that if emission levels are needed the following would be more reasonable:

- for SO_2, a 100 ppm level (24 hour average), based on a 50-percent reduction from a typical uncontrolled SO_2 level of 200 ppm, and
- for HCl, a 250 ppm level, based on a 50-percent reduction from an uncontrolled HCl level of 500 ppm.

Another commenter (IV-D-124) said the outlet SO_2 and HCl emission levels should be raised to be commensurate with a 50-percent reduction, but did not suggest specific numerical values.

Response: The guidelines require 50 percent control of SO_2 and HCl for some existing MWC plants. However, in cases where inlet acid gas levels are low and the specified percent reductions would require outlet concentrations below 30 ppm for SO_2 and 25 ppm for HCl, these percent reductions may not be achievable because of limitations in SO_2 and HCl measurement and control loop feedback systems. Therefore, the format is a combination of either a percent reduction or these ppm levels. The SO_2 and HCl ppm levels are not meant to be commensurate with 50 percent reductions. It is expected that most existing plants will demonstrate compliance with the percent reductions rather than the ppm levels.

Comment: One commenter (IV-D-127) said the preamble states that DSI/FF is best demonstrated technology for plants in the 225 to 2,000 Mg/day (250 to 1,800 tpd) category, but he contended that based on his company's work in Europe, DSI/ESP can also achieve 50 percent SO_2 control.

Response: The Agency concurs that either DSI/ESP or DSI/FF control can achieve the levels of performance specified in the proposed guidelines for largest existing MWC's. This was stated in both the proposal preamble (54 FR 52209) and the BID's. Furthermore, the guidelines specify levels for emissions (and certain GCP operating parameters) rather than any particular technology. As long as compliance with all applicable guidelines (and associated State standards) can be demonstrated, MWC owners or operators can use any technology they wish.

Comment: One commenter (IV-D-134) said the requirements for 50 percent SO_2 and 50 percent HCl control are inconsistent. He said that if 50 percent SO_2 control is achieved, a higher level of HCl control (about 70 percent) would be achieved. Therefore, the commenter suggested changing either the SO_2 or HCl level.

Response: There are two main types of DSI systems - duct sorbent injection and furnace sorbent injection. Duct sorbent injection systems preferentially control HCl and would achieve higher HCl levels when 50 percent SO_2 control is achieved. However, data on furnace sorbent injection indicate that these systems do not preferentially control HCl. Either system can achieve both 50 percent SO_2 and 50 percent HCl control. The site-specific configuration of existing MWC's will determine whether furnace or duct injection technology is more feasible to retrofit. Furnace injection generally takes less space, which is a consideration in retrofit applications.

Comment: One commenter (IV-F-1.9) said the acid gas levels in the proposed guidelines were not stringent enough. He suggested applying the level of control proposed for regional MWC plants (based on SD/FF) to all existing MWC's. The commenter said 50 percent control of HCl and SO_2 was not adequate for environmental protection, especially in areas that have several large (nonregional) MWC's located near one another so region wide acid gas emissions are high. Others (IV-F-1.2, IV-D-253) said that some States are already requiring "acid gas scrubber technology" for all existing MWC's, and that the proposed limits are not stringent enough.

Response: Section 111(a) and (d) specify that emission guidelines are to be based on the best demonstrated system of emission reduction "taking into consideration the cost of achieving such emission reduction and any nonair quality health and environmental impact and energy requirements...." A range of regulatory alternatives were considered as described in the preamble to the proposed guidelines (54 FR 52209). The selected alternative for large plants will significantly reduce emissions. National emissions of MWC organics from large MWC plants would be reduced by about 90 percent, MWC acid gas emissions by about 50 percent, and PM emissions by about 70 percent compared to baseline levels (i.e., levels in the absence of standards). The costs of this emission reduction (based on retrofit of GCP and DSI and use of an existing (upgraded) ESP for most plants) would average about \$10/Mg (\$9/ton) for large plants, but could typically range from about \$4 to \$16/Mg (\$4 to \$15/ton) for individual large plants. No severe economic impacts are predicted.

While additional reductions of about 5 percent for MWC organic emissions and 30 percent MWC acid gases could be achieved by application of SD/FF control systems at all large plants, the cost impacts would be unreasonable. The average cost would be about \$23/Mg (\$21/ton) of MSW, which is more than double the cost of DSI retrofit. For individual large plants, costs could typically range from \$13 to \$32/Mg (\$12 to \$29/ton) of MSW. About 90 percent of the large existing plants have ESP's and would need to completely remove these systems and retrofit both the SD and FF. This would cause longer downtime as well as higher capital costs. It is therefore concluded that the increase in costs would be disproportionate to the additional emission reduction achieved.

States can take specific situations (such as co-location of several plants) into account in setting State standards, which under 40 CFR 60.24(c) must be at least as stringent as these guidelines, but may be more stringent. Such site-specific issues are better considered at the State level than at the national level.

Comment: Two commenters (IV-D-105, IV-D-117) said a review of data from retrofits of MWC's in Europe showed that vendors have guaranteed levels of 6 to 60 ppm HCl and 10 to 60 ppm SO_2 (at 7 percent O_2). The MWC plants ranged in size from 180 to 1,800 Mg/day (200 to 2,000 tpd). The commenters also said data from five retrofit MWC's in Europe shows HCl levels below 50 ppm. The commenters said the percent reduction provision for SO_2 and HCl should be eliminated because: (1) where uncontrolled levels are high, a percent reduction could allow higher outlet emissions than are achievable by demonstrated technology; and (2) it would be difficult for some MWC's, such as FBC's, to calculate percent reduction. These commenters and others (IV-D-106, IV-D-186) recommended emission guidelines of 50 ppm HCl and 60 ppm SO_2 for all sizes of existing MWC plants.

Response: Data from MWC's with state-of-the-art control systems show that the percent reductions specified in the final guidelines are achievable using demonstrated control technology. A percent reduction format was chosen because it is the most accurate and representative measure of the performance of acid gas control systems. The ppm levels were set because in cases where inlet acid gas levels are low and the specified percent reductions would result in outlet concentrations below 30 ppm for SO_2 or 25 ppm for HCl, these percent reductions may not be achievable.

Furthermore, inlet acid gas levels can be highly variable over relatively short periods of time. In cases where inlet acid gas levels are intermittently high, compliance with a ppm level would require use of significantly more sorbent than is generally needed, would make design and operation of the control instrumentation for SD and DSI systems more complex, and would require the overall emissions control system to be larger than is otherwise required. Finally, the emissions data gathered for the best demonstrated technologies for existing MWC's (e.g., DSI/PM controls for large MWC's) indicates that higher percent reductions (or outlet levels of 50 to 60 ppm) are not demonstrated to be achievable on a continuous basis by all MWC's with best demonstrated technology.

In response to the commenters' point that it would be difficult for some MWC's to calculate percent reduction (because inlet and outlet levels cannot be measured simultaneously), the response in Section 7.8 describes how these MWC's could demonstrate compliance.

Comment: One commenter (IV-D-111) said that HCl emission limits are unnecessary since any system achieving good SO_2 control will automatically achieve good HCl control.

However, another commenter (IV-D-134) claimed that continuous SO_2 monitoring will not ensure HCl control. He said, for example, when little or no SO_2 removal is required due to low sulfur in the waste, a facility could feed little reagent to the system and still meet SO_2 levels. However, during this time HCl levels could be high.

Response: While SO_2 is a good indicator for acid gas control technology performance, the results of the periodic HCl test will provide additional assurance that all of the acid gases are being controlled to the prescribed level. Furthermore, because the MWC operator will have to perform periodic stack tests for PM and dioxins/furans, testing set-ups will be required, and the additional cost of conducting a performance test for HCl at the same time is small.

In response to the second comment, the guidelines require 50 percent SO_2 removal or 30 ppm for large MWC's. Any MWC complying with either of these limits would be expected to be achieving both SO_2 and HCl control. If enough sorbent is added to achieve 50 percent SO_2 control, then good HCl control would also be achieved. Since uncontrolled SO_2 levels are typically about 200 ppm, an MWC complying with the 30 ppm level rather than the percent reduction would generally be achieving about 85 percent control and would require adequate addition of sorbent to control both SO_2 and HCl.

7.5.4 Good Combustion Practices

7.5.4.1 Operator Training and Certification. Several commenters made exactly the same comments about certification and training for existing MWC's as they did for new MWC's. The standards and guidelines include the same certification and training provisions. These comments and responses are all included in Section 3.5.4.1 and have not been repeated here. Comments specific to the guidelines for existing MWC's are listed below.

Comment: One commenter (IV-D-169) recommended the certification requirement in the guidelines be removed due to the inherent potential liability. The commenter continued to state that the liability properly rests solely with the owner or operator.

Response: As explained in Section 3.5.4, the Agency believes training and certification are necessary inclusions into the regulations. The certification and training requirements would not affect liability associated with violations of the standards and guidelines.

Comment: Two commenters (IV-D-137, IV-D-138) stated that the comprehensive facility operating manual will not be available for appropriate Agency review until after completion of final design and selection of equipment vendors, for any retrofits required for compliance with proposed regulations.

Response: The operating manual must be complete and available for Agency inspection at the same time a facility is required to comply with the other operating provisions. As stated in Section 60.38(a)(b), the compliance time for existing facilities is 36 months after the effective date of the State standards developed pursuant to the Section 111(d) emission guidelines.

Comment: Commenter IV-D-153 requested that the regulation be clarified to state that the existing manuals may be approved if the State determines that the substance of the EPA's requirements have been met.

Response: If an existing manual addresses all the required topics, then the operating manual is satisfactory.

7.5.4.2 Carbon Monoxide Limits.

Comment: One commenter (IV-D-159) stated that in many modular system applications the CO is consistently low and fairly insensitive to the operation due to high combustion efficiencies and as a result, its measurement is of little value. Two commenters (IV-D-116, IV-D-241) state that it has not been proven that continuous monitoring of CO predicts the dioxin/furan emission limits. Commenter IV-D-116 cites examples of data which indicate no correlation between CO and dioxin/furan at low levels of CO.

Response: Carbon monoxide is used as an indicator of the amount of organics leaving the furnace. High emission levels of CO are associated with high organic emissions at the exit of the furnace. The regulations, by eliminating periods of high CO emissions, reduce periods of high organic emissions. This then reduces the amount of organic precursors entering the APCD and minimizes the amount of organic formation downstream of the combustor. The CO emission requirement is to ensure continuous organic destruction. See Section 3.5.4.2.

Comment: Several commenters (IV-F-1.35, IV-F-2.4, IV-D-61, IV-D-62, IV-D-80, IV-D-137, IV-D-190) recommended that a single CO limit be set for all MWC technologies and capacities such as was included in the EPA's draft guidelines dated

June 1987. Commenter IV-F-2.4 recommended that the limit be set at the level proposed for RDF combustors.
Commenter IV-D-80 believed that modular units were being unduly penalized as a result of their more efficient combustion process and that requiring a 100 ppm limit (1 hour average) will actually result in less CO emissions.
Commenter IV-D-78 stated that grouping mass burn rotary waterwall, RDF, coal/RDF cofired, and other technologies under one CO limit creates inequity. Commenter IV-D-137 was concerned that the proposed guidelines give an unfair retrofit advantage to some MWC technologies. Commenter IV-D-209 stated that RDF facilities should be held to a more restrictive CO limit due to RDF's capability to control its fuel input to a much better degree than mass burn facilities. Commenter IV-D-235 stated that a 100 ppm limit should be established for all technologies except RDF which should be set at 250 ppm due to difficulty in continuous compliance with 100 ppm limit.

Several commenters (IV-D-105, IV-D-106, IV-D-117) stated that the CO limits were not chosen in accordance with data truly representative of the better operated facilities and therefore this standard will not ensure the best combustion practices. Three commenters (IV-D-105, IV-D-106, IV-D-117) stated that the CO emission limit should be changed to 50 ppm over a 4-hour averaging time for all technologies, a value recommended in a 1987 EPA report. One commenter (IV-D-131) stated that the CO limit set for RDF combustors is insupportable and therefore the proposed emission limit can only be regarded as an arbitrary value. Commenter IV-D-159 stated that not enough data are available for the different size classes of modular units and that the CO limit should be raised to 100 ppm until more data are obtained. One commenter (IV-F-1.11) indicated that some existing RDF facilities may not be able to meet the CO limit, which was established based on the performance of new RDF combustors.

<u>Response</u>: Different types of combustors may have inherently different average CO emission levels when applying GCP. The

CO limits are based on technology specific available data. See Section 3.5.4.2.

The limits for RDF and rotary waterwall facilities have been readdressed based on new data available to the Agency. Analysis of the data support establishing different limits for existing RDF and rotary waterwall facilities. The Agency outlined retrofit items for model plants which would incorporate GCP (EPA-450/3-89-27e). For RDF facilities these included modifications to the overfire air arrangement, installation of a metered RDF feeding system, and other items. Data were obtained from an existing RDF combustor which incorporates all of these items into the design. Analysis of the data show that a CO level of 200 ppm, corrected to 7 percent O_2 is achievable on a 24-hour averaging period. Analysis of rotary waterwall combustors show that a level of 250 ppm, corrected to 7 percent O_2 is achievable on a 24-hour averaging period. See Section 3.5.4.2. Note that the averaging time for RDF and rotary waterwall facilities has been changed from 4 hours to 24 hours. This is because RDF facilities experience combustion conditions which are more highly variable than most other MWC's due to the semi-suspension burning process. Existing rotary waterwall facilities also have unique combustion conditions which are much more variable than the majority of mass burn and modular facilities. For more information refer to the memorandum entitled, "Good Combustion Practice: CO Emission Limits" in the docket.

Comment: Two commenters (IV-F-2.54, IV-D-162) questioned the need to reduce CO emissions to satisfy the proposed levels when compliance with the dioxin/furan limits has been demonstrated. The commenters recommended that the guidance allow each State to evaluate facilities within their borders on a case-by-case basis and, where appropriate, develop alternate CO limits. Some commenters (IV-D-78, IV-D-119, IV-D-122) recommend that the guidelines allow for site-specific technology CO limits based on achievability.

Response: The CO limits have been developed for different combustor types which may have inherently different steady-state CO emission levels. The CO limits are based on achievable emission levels from units which have incorporated GCP. Dioxins/furans are not the only organic species of concern, and by reducing CO, emission of all organics will be minimized.

Comment: One commenter (IV-D-119) stated that the CO emission limits should not preclude the use of dry bottom ash systems.

Response: There is no technical reason why the method of bottom ash storage should have an impact on CO emissions from MWC's unless the lack of a water seal (as provided by a wet bottom ash system), prevents complete air control to the facility. In that situation, it is possible for higher CO emissions. Such a system would not represent GCP. If complete air control is maintained, the CO emissions should not be higher from a dry bottom system than from a wet bottom system.

Comment: One commenter (IV-D-84) stated that the CO limits cannot be applied to cement kilns because they would not serve the purpose of controlling combustion since cement kilns emit CO based on process chemistry and raw material reactions occurring in noncombustion zones of the kiln.

Response: A review of data from tests on cement kilns indicates that high concentrations of CO in stack gas may result from cement feed material properties and process conditions. The CO emission levels are not always a good indication of process fuel combustion conditions in cement kilns. The GCP provisions of the final standards and guidelines do not include CO emission limits for cement kilns. (See the memorandum entitled "Good Combustion Practice: CO Emission Limits" in Docket A-89-08.)

Comment: One commenter (IV-D-80) stated that no provisions are made in the CO standards for the type of waste burned (i.e., wastes with higher moisture may result in higher CO emissions). The commenter recommended that modular units which burn RDF should have a higher CO limit, such as in the case of stokers.

Response: Average achievable CO emissions are dependent on the type of combustor, the varying waste properties and the manner in which the combustor is operated. Many of the data sets examined included naturally occurring changes in short term and seasonal waste conditions including moisture content. The technology-specific CO limits have been based on those levels that have been demonstrated to be achievable.

Comment: One commenter (IV-D-60) stated that continuous monitoring of CO at very small facilities would be of little value due to daily start-ups and a continuous burn time on the order of 6 hours. Two commenters (IV-D-149, IV-D-150) stated that the 50 ppm emission limit for modular units is unattainable for very small units and recommended an emission limit also based on size if a lower size cut-off is not adopted. Commenter IV-D-159 stated that smaller modular units may have trouble meeting a 50 ppm 4-hour block average and recommended a 100 ppm 1-hour block average.

Response: The guidelines currently being promulgated apply only to MWC's with capacities greater than 225 Mg/day (250 tpd). It is assumed that the very small facilities referenced by Commenter IV-D-60 would be below the size and will not be covered by the monitoring requirements.

Comment: One commenter (IV-D-137) recommended that the CO CEM location not be fixed at the combustor exit because it is the most difficult CEM operational environment due to high particulate loading and uncontrolled acid gases. The commenter recommends allowing the facility the option to install the CO CEM at the APCD outlet with the other CEM's since the small delay in correlating real time CO data with combustion conditions is meaningless.

Response: The CO CEM location will be left to the discretion of the facility operator, as long as the CO monitor and the O_2 (or CO_2) monitor are in the same location. See Section 3.5.4.2.

7.5.4.3 Time at Temperature/Temperature.

Comment: Several commenters (IV-D-03, IV-F-1.4, IV-F-1.19, IV-D-106, IV-D-168, IV-D-186, IV-D-189) recommended that the regulation include a time at temperature requirement such as 980°C (1,800°F) for 1 second. Several commenters (IV-D-81, IV-D-86, IV-D-105, IV-D-117) stated that the regulation should include a combustion temperature requirement (both a minimum to ensure PIC destruction and a maximum to reduce NO_x formation) since it is documented that temperature is critical and that technology to measure the temperature is commercially available. Commenter IV-D-107 also recommended that auxiliary burners be required to maintain a required minimum temperature. Commenter IV-D-186 recommended continuously monitoring furnace temperature.

Response: The Agency chose to regulate on a performance basis whenever possible. While the Agency believes that it is necessary to measure temperature to properly control combustion conditions, the best method to monitor combustion performance is to monitor CO. Carbon monoxide concentrations rather than a predetermined range of combustion temperature are the best measure of performance. See Section 3.5.4.3.

7.5.4.4 Capacity.

Comment: Several commenters (IV-F-2.4, IV-F-3.5, IV-D-137, IV-D-138, IV-D-222) believed that the proposed demonstrated capacity measurement is overly restrictive and that operation within a range of 80 (or 90) to 110 percent of demonstrated capacity is more appropriate due to the variability of MSW heat content. Two commenters (IV-D-101 and IV-D-155) stated that the limit should be 100 percent plus or minus 2 percent to account for the error band of the instrument.

Several commenters (IV-F-2.15, IV-F-2.30, IV-D-78, IV-D-101, IV-D-107, IV-D-111, IV-D-115, IV-D-137, IV-D-153, IV-D-154, IV-D-155, IV-D-159, IV-D-164, IV-D-222) stated that the load level averaging time should be increased or eliminated due to the variability of MSW. Commenters IV-F-2.15, IV-F-2.30, IV-D-115 and IV-D-164 recommended the load level averaging time be changed to 24 hours, similar to other EPA standards. Commenters IV-D-101, IV-D-137, IV-D-154 and IV-D-155 recommended that the load averaging time match their recommended CO averaging time of 8 hours. Commenter IV-F-2.4 stated that the capacity should be established over a 4-hour average test.

Response: The proposed 1-hour averaging time for steam load has been changed to a 4-hour averaging time to account for variability in steam flow rates related to changes in waste properties. The maximum operating load has been set to 110 percent of the average load demonstrated during the dioxin/furan performance test. See Section 3.5.4.4.

Comment: Two commenters (IV-F-2.15, IV-D-164) requested that EPA clarify whether emission tests are to occur at design capacity or available load level.

Response: The regulations require dioxin/furan performance tests to be conducted at the highest average continuous load at which the facility will be operated. It is the responsibility of the facility owner or operator to define this load and then demonstrate through a dioxin/furan performance test that all emission and operating requirements can be met at that load. See Section 3.5.4.4.

Comment: One commenter (IV-D-78) stated that it is unequal to regulate the maximum demonstrated capacity for only steam producing units. The commenter recommended dropping the guideline.

Response: Excessive flue gas flowrates entrain additional PM and carry it to locations in the MWC system where low temperature formation of organics occurs. Those MWC's which produce steam can use steam flowrate measurements to limit operation at excessive loads. The object of the maximum load requirement as measured by steam flowrate is to limit the volumetric flowrate of flue gases. Several alternate techniques for measurement of flue gas flowrate were initially considered for units which do not generate steam, but none were considered sufficiently accurate or easily applied for inclusion in the original standard proposal. Further investigation has shown that vendors are now offering a number of different techniques for continuous measurement of flue gas flowrate. Although none of these techniques has been validated by the Agency for use on combustion sources, one or more of them may be applicable to all classes of MWC's including refractory units without heat recovery. If one of these techniques is validated for MWC facilities, the Agency will require their use at units without heat recovery for the purpose of avoiding operation at excessive loads. For more details of this alternative method of measuring combustor flue gas flowrates, see the memorandum entitled, "Good Combustion Practices: MWC Steam Load Requirement" in Docket A-89-08.

Comment: One commenter (IV-D-134) recommended that the requirements establish a method to define exactly how load capacity should be measured and what calibration or other quality assurance measures are required. Two commenters (IV-D-149, IV-D-150) recommended that the proposed standards for load capacity include consideration of the enthalpy recovered in the steam.

Response: The Agency will utilize ASME's Power Test Codes PTC4.1, Section 4 and PTC19.5, Chapter 4 to specify measurement and calibration methods for steam load. See Section 3.5.4.4.

Comment: One commenter (IV-D-219) recommended the rules be amended to allow exemption of the steam load requirement to facilities which generate a minimal amount of steam for a limited use and that operate for the primary purpose of burning MSW.

Response: For facilities where the total volume of flue gas is not consistently passed through the boiler or waste heat exchanger, the steam load is not representative of total flue gas flowrate. Therefore, it does not accomplish the purpose of the requirement which is to limit flue gas flowrate. When a methodology is validated, these facilities will be required to measure load by the method described for nonsteam producing facilities. See Section 3.5.4.4.

7.5.4.5 Particulate Matter Control Device Inlet Flue Gas Temperature.

Comment: Several commenters discussed the 230°C (450°F) PM control device inlet temperature requirement. Commenter IV-D-03 believed that the requirement was to improve condensation and capture of metals and organics and pointed out that the best ESP operation is achieved at temperatures greater than 230°C (450°F). Commenters IV-F-1.4, IV-F-1.19, IV-D-106, IV-D-108, IV-D-134, IV-D-149, IV-D-150, IV-D-186 and IV-D-238 thought that the temperature was too high and recommended a 150°C (300°F) temperature to ensure metals condensation and collection. Commenters IV-D-62, IV-D-105, IV-D-117, IV-D-186 and IV-D-238 also recommended a 150°C (300°F) or 135°C (275°F) PM control device inlet temperature in order to minimize dioxin/furan formation and to maximize their condensation. Commenter IV-D-168 recommended a 180°C (350°F) inlet temperature. Commenters IV-D-190 and IV-D-235 recommended an outlet maximum temperature of 180°C (350°F) to capture metals and dioxins/furans. Commenter IV-D-186 further stated that acid gas corrosion can be minimized or prevented with the use of acid gas adsorbents or by using acid resistant surfaces. Two commenters (IV-F-3.5, IV-D-266,) felt that there should be flexibility in the PM control device inlet temperature requirement if compliance with the dioxin/furan limit can be demonstrated.

Response: The PM control device inlet temperature requirement is for continuous dioxin/furan compliance, not for the control of metals. The requirement has been changed to a temperature limit of 17°C (30°F) above the temperature demonstrated during a successfully completed dioxin/furan performance test. See Section 3.5.4.5 and the memorandum entitled, "Good Combustion Practice: PM Control Device Inlet Temperature Requirement" in Docket A-89-08.

Comment: Several commenters (IV-F-2.4, IV-D-122, IV-D-266) indicated that no temperature limit should be required since dioxin/furan emission limits are established. One commenter

(IV-D-159) recommended that modern modular systems be exempt from the PM control device inlet temperature requirement due to the high combustion efficiencies and destruction of dioxins/furans and their precursors.

Response: The temperature requirement is necessary to ensure continuous dioxin/furan compliance. See Section 3.5.4.5.

Comment: One commenter (IV-D-111) recommended that the averaging time be lengthened to avoid constantly attempting to correct for waste variability. Commenter IV-D-137 recommended that the inlet temperature averaging time be changed to an 8-hour block average.

Response: Data indicate that facilities with good operating practices can meet a 4-hour block averaging time. See Section 3.5.4.5.

Comment: One commenter (IV-D-60) questioned the benefit of lowering the flue gas temperature at a facility with afterburners in the stack and no heat recovery system. The commenter pointed out that dioxin/furan formation is retarded at temperatures greater than 400°C (750°F) and that many such facilities operate with flue gas temperatures considerably higher than this value.

Response: The GCP requirement does not limit flue gas temperature, only temperature at the inlet to the PM control device. To meet the guidelines, all MWC facilities larger than 225 Mg/day (250 tpd) are expected to employ PM control and must limit temperatures at the inlet to the final PM control device.

Comment: One commenter (IV-D-158) was considering retrofitting a SD/FF downstream of an existing ESP and air preheater. The preheater is at the exit of the ESP for cleaner operation. The cost of this retrofit would increase significantly if the ESP had to be removed and new air preheaters installed. The commenter recommended the wording be changed to specify the temperature limit at the entrance to the final PM control device.

Response: The proposed regulation has been changed to regulate the final PM control device inlet temperature.

7.5.4.6 Overall Good Combustion Practices Comments.

Comment: Two commenters (IV-F-2.15, IV-D-219) believed that compliance with GCP is sufficient to minimize production of organics and that dioxin/furan testing should not be required. Another commenter (IV-F-2.4) indicated that operational parameters should not be dictated since specific emission limits have been proposed.

Response: Due to the complexity of MWC design/operating conditions and emissions, a prior specification of GCP requirements alone are not sufficient to ensure compliance with the dioxin/furan emission levels. Thus, periodic dioxin/furan performance testing is necessary to determine dioxin/furan emission levels. Continuous monitoring of operational parameters such as PM control device inlet temperature and load levels are also necessary in order to ensure continuous compliance with the dioxin/furan emission levels. See section 3.5.4.6.

Comment: Several commenters (IV-F-2.39, IV-D-65, IV-D-101) were concerned about the pollutant tradeoffs between CO and NO_x. Commenter IV-F-2.39 stated that GCP for control of organics and CO emissions includes operation at O_2-rich conditions which will lead to the formation of excess NO_x. Commenter IV-D-65 stated that the CO limits should be achievable if the NO_x emission limit for new incinerators is set at 190 to 200 ppm in the final standards.

Response: While there is a potential for a tradeoff between NO_x and CO, there is no evidence that the proposed CO emission limits will invalidate combustion techniques intended to control NO_x emissions. See Section 3.5.4.6.

Comment: One commenter (IV-D-84) stated that GCP for cement kilns is better accomplished by regulating direct combustion controls such as excess O_2 minimums, kiln rotation speed and raw material feed minimums, proper draft fan operation, and fuel feed minimums, instead of monitoring emissions.

Response: The Agency has examined cement kiln operations and in the final standards and guidelines has exempted cement kilns from the CO emission level provisions of GCP. (See the memorandum entitled "Good Combustion Practice: CO Emission Limit", in Docket A-89-08.) Furthermore, since cement kilns usually do not generate steam, they would not be required to measure load level (see Section 7.5.4.4).

Comment: One commenter (IV-D-105) stated that automatic combustion control systems should be required on all MWC's.

Response: It is believed that automatic combustion control systems will generally be used to ensure compliance with GCP requirements. See Section 3.5.4.6.

Comment: Two commenters (IV-D-108, IV-D-159) stated that hydrocarbon monitors should be used to ensure continuous dioxin/furan compliance rather than CO monitors.

Response: Carbon monoxide is a more sensitive predictor of poor combustion conditions. See Section 3.5.4.6.

Comment: One commenter (IV-D-117) argued that as part of GCP to reduce secondary dioxin/furan formation a provision should be required which prevents metals which have been shown to catalyze dioxin/furan secondary formation from entering incinerators. Commenter IV-D-241 recommended the removal of noncombustibles and toxins prior to combustion.

Response: Sufficient data are not available to demonstrate the effectiveness of these approaches in minimizing dioxin/furan emissions.

Comment: Two commenters (IV-D-106 and IV-D-117) recommended reestablishing the 6 to 12 percent range of O_2 content in the flue gas. Commenter IV-D-186 recommended continuously monitoring for a minimum O_2 level in the furnace.

Response: Oxygen content in the flue gas is not a direct emission concern and is not a direct indicator of performance. Therefore the standards do not specify O_2 level. See Section 3.5.4.6.

Comment: One commenter (IV-D-158) stated that the field test data do not exist (and the preliminary data do not confirm) the ability of GCP to demonstrate a reduction in dioxin/furan emissions to the level predicted. The commenter recommended that numerical emission levels not be mandated at this time.

Commenter IV-D-241 stated that GCP will not be effective in controlling dioxins/furans.

Response: The regulations are based on available data. See Section 3.5.4.6.

Comment: One commenter (IV-D-159) stated that insufficient data on modern modular units exist and that extrapolation from waterwall and older modular systems is inappropriate for developing best demonstrated technology for modern units.

Response: The regulations are based on available data. See Section 3.5.4.6.

7.5.5 Size Categories for Existing Municipal Waste Combustors

7.5.5.1 Size Category Distinction Between Regional and Large Municipal Waste Combustors.

Comment: Several commenters (IV-F-1.6, IV-F-1.7, IV-F-2.5, IV-F-2.32, IV-F-3.2, IV-D-78, IV-D-101, IV-D-111, IV-D-115, IV-D-137, IV-D-139, IV-D-145, IV-D-152, IV-D-155, IV-D-164, IV-D-231, IV-D-255, IV-D-257) said the 2,000 Mg/day (2,200 tpd) capacity distinction between large and regional MWC plants was not justified. Some (IV-F-2.5, IV-D-115, IV-D-145, IV-D-231) said the decision was arbitrary and capricious, while another (IV-D-152) said it was arbitrary and unlawful.

Some (IV-F-1.7, IV-F-2.32, IV-D-78, IV-D-101, IV-D-152, IV-D-155, IV-D-164, IV-D-184, IV-D-231, IV-D-255, IV-D-257) favored the same guidelines for regional MWC plants as was proposed for large MWC plants and claimed that facilities over 2,000 Mg/day (2,200 tpd) do not produce greater emissions and health risks than many facilities smaller than 2,000 Mg/day (2,200 tpd). One commenter (IV-F-2.32) submitted a table of modeled ambient HCl levels around regional and large MWC plants to show that HCl concentrations can be higher for some MWC plants below 2,000 Mg/day (2,200 tpd) than they are for MWC plants above this size. He presented another table showing that the proposed dioxin/furan levels result in much lower MIR's for regional MWC plants than for large MWC plants. He, therefore, viewed the more stringent requirements for regional MWC plants as inequitable. Some commenters

(IV-D-115, IV-D-155, IV-D-257) said the preamble refers to regional plants exceeding the HCl welfare effects level of 3 $\mu g/m^3$ (1 gr/million ft^3) and short-term health effects level; however, no background documentation was provided to support this statement, and the referenced effects levels have not undergone public comment and peer review. Another commenter (IV-D-101) said dioxin/furan emissions from many large and regional plants are already well below the proposed level for large plants, so more stringent controls on regional plants will result in relatively little emission and risk reduction. Test results and information from a permit analysis were presented for two MWC plants. One commenter (IV-F-1.7), while not presenting data, said that MWC plants below 2,000 Mg/day (2,200 tpd) may have shorter stacks, resulting in greater health risks. Commenter IV-D-78 said the regional MWC in their city causes health risks of only 1 in a billion, while another (IV-D-152) said a multipathway analysis concluded risk from their plant was less than 1 in a million. A State agency (IV-D-277) said risks from a regional MWC in their State with ESP control and dioxin/furan emissions of 120 ng/dscm (50 gr/billion dscf) are lower than 1 in a million; the plant complies with State air toxics rules, has one of the lowest PM levels in the country, and should not be required to replace their ESP with a FF to meet a regional plant dioxin/furan limit.

Some commenters (IV-F-1.6, IV-F-2.5, IV-F-2.32, IV-F-3.2, IV-D-101, IV-D-111, IV-D-115, IV-D-137, IV-D-139, IV-D-152, IV-D-155, IV-D-184, IV-D-257) said the 2,000 Mg/day (2,200 tpd) size category distinction was not environmentally or economically justified. Some of these commenters said the BID's and the regulatory alternatives did not present an analysis of regional MWC's as a distinct category. One commenter (IV-D-101) said the cost to replace control equipment at a regional plant would be no less expensive, on a cost per Mg (ton) of MSW basis, than for a large plant; while another said there is no economy of scale basis for requiring more stringent control of regional plants. Another (IV-D-184) said retrofit cost per Mg (ton) of MSW more than doubles from "good" to "best" control for both large and regional MWC plants. Commenter IV-D-115 cited the BID's analysis of a regional mass burn MWC model plant where capital and annualized costs for SD/FF retrofit are more than double the costs of DSI/ESP retrofit. Others (IV-F-1.35, IV-F-2.5, IV-F-2.32, IV-D-78, IV-D-115, IV-D-152, IV-D-164, IV-D-255) said the cost and economic impacts and disruption of service that would result from the requirements to retrofit SD/FF on regional MWC plants are disproportionate to the small environmental benefits of the more stringent control. One (IV-D-152) calculated that for their plant, the incremental cost of SO_2 control for SD/FF versus DSI/ESP would be \$29,000/Mg (\$26,000/ton) of SO_2. One of these commenters (IV-D-78) suggested EPA perform a cost-benefit analysis for their area before requiring more stringent controls for regional MWC plants. Others (IV-D-115, IV-D-130, IV-D-152) said the cost per Mg (ton) of adding DSI and upgrading an existing ESP is far more reasonable than retrofitting a SD/FF. Others (IV-D-115, IV-D-137, IV-D-155, IV-D-257) said a SD/ESP control alternative should have been analyzed. Commenter IV-D-115 said an ESP/wet scrubber may also be a viable retrofit option.

Two commenters (IV-D-155, IV-D-257) said SD/FF technology is equally applicable, and has been applied, to both large and regional MWC plants, so there is no technological basis for the size distinction.

One commenter (IV-F-2.5 and IV-D-78) referred to the statement in the preamble that many existing regional facilities have provided space to retrofit the proposed SD technology, and said that there is little space at the existing regional MWC plant the commenter operates. Another (IV-D-137) said space constraint and technical feasibility issues would be the same for plants larger and smaller than 2,000 Mg/day (2,200 tpd). Commenter IV-D-152 said space constraints are not related to the age or size of the plant as the preamble implies, and another (IV-D-115) said the remaining useful life is the same for some large and regional plants.

Commenter IV-D-137 further stated that costs for actual regional MWC plants may be very different from costs calculated for the EPA's model plant. He said that Section 111(d) allows States discretionary authority to consider site-specific factors, but by setting the guidelines for regional MWC plants at the most stringent possible level of control, EPA had preempted State and local agencies from exercising this allowed authority. Another (IV-D-152) said EPA did not follow the requirements of Section 111(d) because it failed to do a full analysis of control technology costs and environmental impacts in determining best demonstrated technology for regional MWC plants, and the model plant approach did not take site-specific factors into account.

Response: The final guidelines for very large (regional) MWC's reflect changes since proposal. First, the final guidelines define very large plants as those larger than 1,000 Mg/day (1,100 tpd) rather than the 2,000 Mg/day (2,200 tpd) proposed. Second, emission levels for these plants are based on SD/ESP rather than SD/FF as the best demonstrated control technology considering costs and other relevant factors. The MWC acid gas guidelines for very large plants are: (1) an SO_2 reduction of 70 percent or an emission level of 30 ppmv (24-hour geometric mean), whichever results in greater emissions and (2) an HCl reduction of 90 percent or an emission level of 25 ppmv. The final guidelines for very large plants include a dioxin/furan level of 60 ng/dscm (24 gr/billion dscf), and a PM level of 34 mg/dscm (0.015 gr/dscf). The basis for selection of SD/ESP control as the best demonstrated technology for very large existing plants and responses to the commenters' points are described below.

In response to commenters who cited health risk information, Section 111 of the CAA and 40 CFR 60.22(b) specifies that emission guidelines are to reflect the application of the best system of emission reduction (considering the cost of such reduction) that has been adequately demonstrated for designated facilities. These sections also provide the authority to distinguish among sizes, types, and classes of designated facilities in establishing guidelines. Emission guidelines established under Section 111 for regional MWC plants are, therefore, based on demonstrated control technology performance, and are not based on the level of health risk posed by particular sources.

In response to the comments, the performance and retrofit costs of SD/ESP systems were analyzed and compared to those of DSI/ESP systems (the proposed control level for large plants) and SD/FF systems (the proposed control level for regional plants). The analysis results, including emission reductions and costs for model plants, are contained in Docket No. A-89-08. Capital and operating cost estimation procedures were consistent with those for SD and ESP retrofits and modifications contained in the BID volume on cost procedures (EPA-450/3-89-27a). Retrofit factors and scope adder costs were used to reflect retrofit constraints, and downtime costs were included.

The analysis results show that the costs to retrofit SD/ESP systems (in terms of $/Mg [$/ton] of MSW) are similar for plants larger than about 1,000 Mg/day (1,100 tpd), but increase more rapidly for plants below that size. Costs for add-on SD/ESP control at plants above 1,000 Mg/day (1,100 tpd) are about $10 to $12/Mg ($9 to $11/ton) of MSW, whereas costs for plants below this size typically range from about $19 to $30/Mg ($17 to $27/ton) of MSW. The same pattern in observed for DSI/ESP and SD/FF costs. It is therefore reasonable to establish a size category distinction at 1,000 Mg/day (1,100 tpd) rather than the proposed 2,000 Mg/day (2,200 tpd).

In terms of both performance and costs, SD/ESP control systems are intermediate between DSI/ESP and SD/FF control. Table 7-1 shows the performance levels achievable by the three control systems. The table shows that SD/ESP systems achieve

TABLE 7-1. PERFORMANCE OF ACID GAS CONTROL TECHNOLOGIES

Pollutant	Technology		
	DSI/ESP	SD/ESP	SD/FF
MWC Acid Gases			
SO_2 (percent reduction, 24 hour geometric mean)	50	70	80
HCl (percent reduction)	50	90	95
MWC Metals			
PM, mg/dscm (gr/dscf)	69 (0.03)	34 (0.015)	34 (0.015)
MWC Organics			
Dioxin/furan, ng/dscm (gr/billion dscf)	125[a] (50)	60 (20)	30 (12)

[a] For most MWC types. Level for RDF is 250 ng/dscm (100 gr/billion dscf).

high levels of control for MWC acid gases, MWC metals and PM, and MWC organics. Further information on the data supporting performance levels of SD/ESP systems are contained in responses in Sections 7.5.1, 7.5.2, and 7.5.3 and in Docket No. A-89-08.

The costs of SD/ESP retrofit control are considerably less than the costs of SD/FF retrofit, because at many plants the SD/ESP option will allow use of existing ESP's, whereas the SD/FF option would require removal of ESP's and complete replacement with a FF system.

For plants larger than 1,000 Mg/day (1,100 tpd), the costs of SD/ESP systems are reasonable. The cost is about $10 to $12/Mg ($9 to $11/ton) of MSW. The incremental cost effectiveness compared to DSI/ESP control is about $3,300 to $4,400/Mg ($3,000 to $4,000/ton) of acid gas emissions reduction. No severe economic impacts are expected from application of these controls. The costs of SD/FF controls are higher (from $13 to $17/Mg [$12 to $16/ton]) of MSW. The incremental cost effectiveness of SD/FF compared to SD/ESP controls for regional plants is about $13,000 to $17,000/Mg ($12,000 to $16,000/ton) of acid gas emissions reduction. It was determined that the costs of SD/FF control are not warranted given the relatively small additional emissions reductions that would be achieved. Therefore, SD/ESP control was selected as the best demonstrated technology for very large existing MWC plants.

For MWC units larger than 225 Mg/day (250 tpd) located at MWC plants with plant capacities between 225 and 1,000 Mg/day (250 and 1,100 tpd), the guidelines are based on DSI/ESP. This is the same level of control that was proposed. For an example mass burn refractory MWC model plant with a capacity of 800 Mg/day (900 tpd), the cost of DSI/ESP control is $9/Mg ($8/ton) of MSW, whereas the cost for SD/ESP is over $19/Mg ($17/ton) of MSW. The incremental cost effectiveness of SD/ESP control compared to DSI/ESP control is about $5,700/Mg ($5,200/ton) of acid gas emission reduction for this model plant. The decision made at proposal that DSI/ESP control is the best demonstrated technology, considering costs, for plants in the 225 to 1,000 Mg/day (250 to 1,100 tpd) size range is reaffirmed considering this analysis.

There are about 45 very large existing MWC plants with capacities above 1,000 Mg/day (1,100 tpd). About 27 are already controlled with SD/ESP or equivalent controls, while the other 18 are controlled with ESP's and would be expected to retrofit acid gas controls under the guidelines. Economic analyses concluded that no severe economic impacts are expected to result from these guidelines.

Some of the commenters suggested that site-specific situations be considered. The provisions of 40 CFR 60.24(c) specify that State standards must generally be at least as stringent as the guidelines. However, Section 60.24(f) allows States to consider site-specific factors that may justify a less stringent standard on a case-by-case basis. Such specific analyses are better left to State and local agencies. Since the characteristics of the model plants were selected to represent the existing population of MWC's and retrofit factors were included in the analysis, the guidelines will be appropriate for the vast majority of plants and few site-specific exceptions will be needed.

<u>Comment</u>: Other commenters (IV-F-1.4, IV-F-1.9, IV-F-2.31, IV-F-2.40, IV-D-186, IV-D-189, IV-D-238) also said the 2,000 Mg/day (2,200 tpd) cutoff was not justified, but believed all existing MWC plants, or all existing MWC plants above 225 Mg/day (250 tpd) should be controlled to the level proposed for regional MWC plants (based on SD/FF). Two commenters (IV-F-2.31, IV-D-178) claimed that some small existing MWC plants (e.g., the 180 Mg/day [200 tpd] Jackson County, Michigan, MWC) already employ the best demonstrated technology proposed for regional MWC plants. One commenter (IV-F-2.40) said it is inequitable to allow a large 1,800 Mg/day (2,000 tpd) MWC plant to emit twice as much PM as a regional 2,000 Mg/day (2,200 tpd) MWC plant. Another commenter (IV-D-238) said extending the more stringent rules (proposed for regional plants) to large facilities would

result in covering 90 percent of the MWC capacity in New York as opposed to 33 percent, and would reduce emissions and health risks. The commenter had estimated SD/FF retrofit control costs for eleven facilities. He claimed that while costs per Mg (ton) of MSW are higher for smaller plants they are reasonable in light of the additional emission reductions achieved.

Response: For the reasons described in the previous response, the very large plant size category has been extended to cover plants larger than 1,000 Mg/day (1,100 tpd). The control levels for very large plants are based on SD/ESP control, which achieves a high level of emission reduction at a lower cost than SD/FF control. As at proposal, the guidelines for MWC units larger than 225 Mg/day (250 tpd) located at MWC plants between 225 and 1,000 Mg/day (250 and 1,100 tpd) are based on GCP and good acid gas and PM control (i.e., DSI/ESP systems). For existing plants smaller than 1,000 Mg/day (1,100 tpd) the higher costs of applying SD/ESP or SD/FF control were determined to be unreasonably high relative to the emission reduction achieved. Individual States are free to develop more stringent standards for various size plants to address State or local concerns.

In accordance with the CAA Amendments of 1990, guidelines for MWC's smaller than 225 Mg/day (250 tpd) are being developed as part of a separate rulemaking and will be promulgated within 2 years.

Comment: Two commenters (IV-D-104, IV-D-199) suggested regional MWC plants be defined as those with capacities at or above 900 Mg/day (1,000 tpd) rather than 2,000 Mg/day (2,200 tpd). He said there was little difference between the two sizes in the economics of control technology, and the 900 Mg/day (1,000 tpd) size definition would result in greater air quality and environmental benefits.

Another commenter (IV-D-186) said there are only 15 plants larger than 2,000 Mg/day (2,200 tpd), but there are an additional 45 plants with capacities between 900 and 2,000 Mg/day (1,000 and 2,200 tpd), burning more than

54,000 Mg/day (60,000 tpd) of MSW. The commenter said requiring levels based on SD/FF control for these plants would achieve significant emission reductions.

Response: As described in the previous responses, the definition of the very large (regional) plant size category has been changed to include MWC plants larger than 1,000 Mg/day (1,100 tpd). There are about 45 plants in this size category. After analysis of comparative performance and costs of SD/ESP versus SD/FF control systems, it was decided to base the emission guidelines for very large plants on levels achievable with SD/ESP control systems. The analysis results and rationale for the change are described in the previous responses in this section.

Comment: Some commenters raised the question of how the regional size category capacity would be determined. Two (IV-F-2.32, IV-D-115) said that the MWC they represent consists of three facilities, only two of which are permitted by the State to operate at a time. The third unit is a spare used to maintain plant capacity during unit outages for maintenance. The commenters claimed that based on the existing permit that allows them to operate only two of the three units and burn 1,990 Mg/day (2,194 tpd), the plant is a "large" MWC plant; however, based on the total installed capacity, it is a "regional" MWC plant.

Another commenter (IV-F-2.41) said the same MWC plant falls 5.8 Mg (6.4 tons) below the regional size category definition with two units operating. This commenter and another (IV-D-178) suggested the cutoff be changed or clarified to ensure the facility is controlled with the most stringent technology. Commenter IV-D-238 said it should be clarified that the regional plant status is based on total combustion design capacity (of all three combustors) rather than on the amount the facility is currently burning and favored SD/FF control for this plant.

One commenter (IV-D-239) said the rules should clearly state that "aggregate capacity to combust" refers to the maximum capacity the facility was built to combust and not the level at which the facility may chose or be forced to combust at a reduced rate.

Another commenter (IV-D-78) said while EPA listed their plant capacity as 2,751 Mg/day (3,032 tpd), the facility usually operates at 1,800 to 2,000 Mg/day (2,000 to 2,200 tpd). The commenter said the maximum amount combusted was 2,100 to 2,300 Mg/day (2,300 to 2,500 tpd). Furthermore, he said that since their RDF has a high moisture content, the heat content (kJ or Btu) was only equivalent to about 1,540 Mg/day (1,700 tpd). He urged EPA to include a definition of capacity.

Another (IV-D-132) said that while the preamble lists their MWC as a regional facility, operational tests and experience dictate that the city's demonstrated maximum charging capacity necessary to maintain plant operation is 1,800 to 2,000 Mg/day (2,000 to 2,200 tpd), so it should not be considered a regional MWC plant. The commenter said classifying their facility as a regional MWC plant would be "arbitrary and capricious."

One commenter (IV-D-134) said the Federal Register notice (54 FR 52219) indicates capacity is "the maximum demonstrated charging rate for each MWC measured in Mg/day (tpd) of MSW combusted," and asked if that meant a facility is classified as small, large, or regional based on the highest such number ever recorded at a facility. He also said permit conditions might limit charging capacity to less than the threshold capacity and asked how this situation would be handled.

Response: The aggregate design capacity of all existing combustors at an MWC site will be used for purposes of determining size categories. Megagrams per day (tpd) would be calculated based on continuous operation at the maximum design rate. Even if a permit specified a lower operating rate than the design capacity, or if one unit was not in use, the total installed design capacity would still determine the size category. This is a more straightforward approach for enforcement purposes, and would not result in changes in the required level of control at an existing plant over time due to permit modifications or decisions to stop using or restart existing units at the site.

Because of thermal considerations, MWC's are generally limited by heat input capability rather than tonnage. Because of differences in the heat content of MSW from site-to-site, two MWC's of the same size (i.e., same heat input capacity) could have different tonnage feed rates. To avoid this possibility, a standard design heat rate of 10,500 kJ/kg (4,500 Btu/lb) for MSW and 19,800 kJ/kg (8,500 Btu/lb) for medical waste is to be used in calculating capacity. This will provide a more consistent basis for calculating tonnages of individual MWC's.

7.5.5.2 Size Category Distinction Between Small and Large Municipal Waste Combustors.

Comment: Some commenters (IV-F-1.4, IV-F-2.4, IV-F-2.8, IV-D-159, IV-D-222) supported the distinction between small and large existing MWC plants and agreed that acid gas controls were warranted for large but not small MWC plants as defined by a 225 Mg/day (250 tpd) capacity breakpoint.

However, as with the NSPS, others (including IV-F-1.9, IV-D-134, IV-D-155, IV-D-168, IV-D-178, IV-D-186, IV-D-275) did not believe the 225 Mg/day (250 tpd) size category distinction was justified and thought equivalent control should be required for all sizes of MWC plants or for MWC's above 45 Mg/day (50 tpd). (See comments in Section 3.5.5.1).

Two of these commenters (IV-D-155, IV-D-186) said that the BID's showed that about half of the plants subject to the guidelines are below 225 Mg/day (250 tpd). They, therefore, concluded that acid gas, organic, and mercury emissions from small plants are significant and acid gas control should be required.

One commenter (IV-D-188) recommended keeping the 225 Mg/day (250 tpd) size category distinction, but said plants smaller than 225 Mg/day (250 tpd) should be required to meet emission levels based on DSI/ESP systems while emission levels for those larger than 225 Mg/day (250 tpd) should be based on SD/FF.

One commenter (IV-D-03) questioned the rationale for not requiring acid gas control at small MWC plants. He said costs per Mg (ton) were in the $22 to $58/Mg ($20 to $53/ton) range only for the smallest model plants, but for those near the 225 Mg/day (250 tpd) breakpoint, Figure 1 of the preamble shows lower costs of $6 to $39/Mg ($5 to $35/ton). Furthermore, the EPA analysis predicted no severe impacts on households or government units. The commenter also said a State agency's analysis of a small MWC showed a possibility of short- and long-term adverse health effects from HCl emissions, and that this suggests there should be acid gas guidelines for small MWC plants. Another commenter (IV-D-168) suggested 50 percent HCl and SO_2 for small as well as large existing MWC's.

Some commenters suggested small size category distinctions other than 225 Mg/day (250 tpd). Some commenters (IV-F-1.7, IV-D-137, IV-D-155) suggested that a capacity of 45 Mg/day (50 tpd) be used to define small plants and suggested that plants larger than this be subject to control levels based on DSI/ESP. They said there could be health and welfare risks from a large number of plants below 225 Mg/day (250 tpd) capacity.

One commenter (IV-F-3.2) suggested EPA consider requiring acid gas control for units above about 54 or 90 Mg/day (60 or 100 tpd) capacity. Another (IV-D-104) said that while there are some economies of scale, the cost per Mg (ton) of applying controls to a 90 Mg/day (100 tpd) MWC may not be much different than a 225 Mg/day (250 tpd) MWC. He suggested an economic analysis of control costs for these two sizes to determine if the small versus large plant definition should be changed to 90 Mg/day (100 tpd).

Another (IV-F-1.34) suggested that small plants be defined as those less than 400 Mg/day (450 tpd), based on cost-effectiveness considerations described in detail in Section 3.5.5.1.

Response: As explained in Chapter 1, the guidelines currently being promulgated affect only MWC's with MWC unit capacities greater than 225 Mg/day (250 tpd). This is consistent with the CAA Amendments of 1990 (Section 129). Under Section 129, guidelines for MWC units smaller than 225 Mg/day (250 tpd) will be promulgated within 2 years. The emission guidelines for small plants may be different than those for large plants. The provisions of 40 CFR 60.22(b)(5) state that "the Administrator will specify different emission guidelines . . . for different sizes, types, and classes of designated facilities when costs of control . . . or similar factors make subcategorization appropriate." Section 129, which addresses solid waste combustion, also allows the Administrator to distinguish among sizes and classes of MWC's. The guidelines proposed in the Federal Register on December 20, 1989 (54FR 52209) made a distinction between small and large plants because: (1) control cost increases associated with the various control technologies, on the bases of percent of capital cost and dollars per Mg (ton) of MSW combusted are greater for small plants, and (2) large plants generally have larger emissions potential and in total account for over 90 percent of existing capacity. During the next two years, the level of control for small MWC's will be reconsidered in light of the CAA Amendments of 1990, and comments on the size category distinction between small and large MWC plants will be addressed as part of that rulemaking.

7.5.5.3 Lower Size Cutoff.

Comment: One commenter (IV-D-60) argued that the guidelines (and NSPS) should not cover MWC plants with total capacities below 23 Mg/day (25 tpd) that operate intermittently, have no heat recovery, or serve populations of less than 10,000. Another (IV-D-276) whose town operates a 4 Mg/day (4 tpd) MWC suggested a cutoff of 9 or 23 Mg/day (10 or 25 tpd). Another commenter (IV-F-3.2) suggested a cutoff at a charging rate of 360 to 450 kg/hr (800 to 1,000 lb/hr).

Two commenters (IV-D-93, IV-D-196) specifically addressing only existing MWC's, said the guidelines should not apply to MWC's below 45 Mg/day (50 tpd) which is consistent with the cutoff in Subpart E. The first commenter's town operates a 11 Mg/day (12 tpd) stoker-type, refractory wall MWC with a wet ESP. It operates intermittently (3 to 5 days per week, 6 hours per day in the summer and once a week in the winter). The second commenter's town operated a 5 Mg/day (5 tpd) facility which is hand-fed and is open 32 hours per week. This commenter (IV-D-196) and commenter IV-D-276 said there are 15 other small towns in New Hampshire operating very small MWC's. The commenters said the guidelines would have severe impacts or cause closure of such existing facilities.

Others suggested different lower size cutoff levels for new and existing MWC's. More detailed comments and responses are contained in Section 3.5.5.2 since the same comments were made for new MWC's.

Response: As explained in Chapter 1, the guidelines currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Therefore, MWC's of the size discussed by the commenters will not be subject to these guidelines. However, under Section 129 of the CAA Amendments of 1990, guidelines applicable to MWC units smaller than 225 Mg/day (250 tpd) will be promulgated within 2 years. The inclusion of a lower size cutoff will be considered as part of that rulemaking.

Comment: One commenter (IV-D-130) representing a State agency said existing MWC plants smaller than 225 Mg/day (250 tpd) should be exempted from the PM and organic emissions provisions of the guidelines and should continue to be regulated under existing State rules. They said that such facilities are too small to require PSD permitting and that States should be allowed to decide what, if any, increase in control is reasonable based on cost/benefit analyses and estimates of the impacts on these facilities. In the commenter's State, small MWC's account for only 2.6 percent of total existing MWC capacity.

Response: The CAA Amendments of 1990 require that guidelines for MWC units with capacities of 225 Mg/day (250 tpd) or less be promulgated within 2 years and specifies that these guidelines should include PM and dioxin/furan emission levels.

7.5.6 General Comments on Emission Levels

Comment: One commenter (IV-F-1.28) said the guidelines should be as stringent as the NSPS, because equal health protection should be provided regardless of whether the MWC is old or new.

Response: For reasons described in other responses, new and existing MWC's are being regulated under Section 111 of the CAA rather than Section 112. As stated in the CAA, Section 111 standards and guidelines are to reflect emission levels achievable by demonstrated control technologies considering costs of control and other factors. The Act specifies that the standards can distinguish between sizes, types, and classes of facilities within a source category. Section 111 of the CAA does not indicate that any particular health risk level should be achieved or that the same health level be achieved by all sources, rather it requires technology-based standards and guidelines.

As explained in the proposal preamble (54 FR 52209) and other comment responses, there are differences in control technology feasibility and cost for existing versus new sources. Costs are higher for existing MWC plants because of retrofit considerations. The emission reductions, costs, and other impacts of a range of control alternatives for new and existing MWC's were examined, and best demonstrated technology (considering costs and other factors) were selected for each category of MWC plants in accordance with Section 111 of the CAA. The standards and guidelines are based on performance of these technologies.

Comment: One commenter (IV-D-135) said a sliding scale for emissions as a function of MWC capacity, rather than step-function regulations should be considered. This way, emission rates could be roughly held constant regardless of capacity.

Response: The suggested approach would be unreasonably complicated. As described in the previous response, Section 111(d) emission guidelines are based on performance of control technologies. The objective of Section 111 is not to equalize emissions from all sources, but to achieve maximum control based on the best demonstrated technology considering cost and other factors.

Comment: Some commenters (IV-F-1.19, IV-D-134) stated that all units at any given facility should have to meet the same emission levels regardless of when they were constructed and whether they are new or existing. He said circumvention might be possible if different levels are allowed.

Response: Best demonstrated technology for existing units is generally not the same as for new units. Having different standards for new and existing units at the same location is not likely to lead to circumvention since emission levels must be measured at the stack for each combustor. New combustors would not be routed to the same controls as existing combustors. Measurement of emissions and operating parameters for each new and existing combustor is feasible. Furthermore, although control requirements are different for existing versus new plants, because of retrofit costs for existing plants, the total costs of combustion and control are similar across new and existing facilities.

New capacity (i.e., capacity that commenced construction after proposal) is not considered in determining the size category of that part of the MWC plant that was previously existing and subject to the guidelines. Such a procedure could result in multiple retrofits of existing units each time new capacity is added, which could be costly.

Comment: One commenter (IV-D-57) said that all MWC's should be required to installed MACT, because all sources result in toxic deposition regardless of size and age. She said existing MWC's that do not have MACT and are not able to meet stringent emission standards should be closed within a "reasonable" time, for example, 5 years.

Response: Section 111 of the CAA specifies that standards and guidelines be reflective of the best demonstrated technology considering cost and other factors. Section 111(d) further states that remaining useful life and other factors be taken into consideration for existing sources. This section of the CAA does not require MACT.

Comment: Two commenters (IV-F-1.9, IV-D-275) supported more stringent guidelines for small MWC plants. One (IV-F-1.9) said the proposed guidelines for small MWC plants would result in little or no emission reduction. The other (IV-D-275) said their 180 Mg/day (200 tpd) MWC is located in a populated community and may cause health risks. They also said the guidelines will undermine more stringent regulations proposed for small MWC plants by States such as New York.

Response: The guidelines currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Under Section 129 of the CAA Amendments of 1990, guidelines for smaller MWC's will be promulgated within 2 years. These national guidelines will not "undermine" State programs because States are free to develop standards that are more stringent than the guidelines.

Comment: One commenter (IV-F-1.7) said that the proposed guideline levels for regional MWC plants would be very hard to meet even for new MWC plants. He said the guidelines for regional MWC plants put local communities in the difficult position of having to spend $30 or $40 million to retrofit control equipment without a reasonable assurance that the emission levels could be met.

Response: The emission levels and percent reductions for very large (regional) plants are demonstrated as detailed in Section 7.5.3. The costs were considered and determined to be reasonable (see Section 7.6.4). Therefore, it is appropriate to require these levels of control in the guidelines for very large plants.

Comment: One commenter (IV-D-78) said the guidelines should include a procedure for determining whether severe economic impacts occur in a municipality and provide specific provisions for municipalities that would experience severe impacts.

Response: Some of the factors considered in determining whether economic impacts of the guidelines would be "severe" are described in Chapter 11.0 of the BID, "Regulatory Impact Analysis of Air Pollutant Emission Standards and Guidelines for Municipal Waste Combustors."

> The provisions of 40 CFR 60.24(f) allow that "on a case-by-case basis for particular designated facilities, or classes of facilities, States may provide for the application of less stringent emission standards or longer compliance schedules . . . provided that the State demonstrates with respect to each such facility (or class of facilities):
>
> (1) Unreasonable cost of control resulting from plant age, location, or basic process design;
>
> (2) Physical impossibility of installing necessary control equipment; or
>
> (3) Other factors specific to the facility (or class of facilities) that make application of a less stringent standard or final compliance time significantly more reasonable."

No rigid procedure has been provided for making these determinations, because the important factors to consider are likely to be different in each specific situation. The determinations are to be made on a case-by-case basis.

Comment: Two commenters (IV-D-164, IV-D-184) said the guidelines should be flexible and allow for site-specific exemptions or variances when the total cost of retrofit would be prohibitive and facility shutdown would result in a disposal method lower in the "Agenda for Action" hierarchy of waste management alternatives (i.e., landfilling). They said this type of approach is supported by the language of Section 111(d) of the CAA, which says State plans can take into account factors including remaining useful life of a source. These commenters and Commenter IV-D-152 suggested that a "top down" best available retrofit technology evaluation approach could be applied to each site based on the EPA-developed evaluation criteria. States would then establish emission levels and compliance times as part of the implementation plan required under Section 111(d). Similarly, Commenters IV-D-115 and IV-D-287 said site-specific cost effectiveness analyses should be the basis of retrofits, and that control levels that would result in shutdowns and increased landfilling should not be required. Another (IV-D-255) also argued for greater flexibility to consider local factors.

Another commenter (IV-D-231) suggested the guidelines establish acceptable emission ranges rather than exact levels and allow States to consider site-specific environmental and cost benefit analyses in selecting limits within these ranges.

Response: The provisions of 40 CFR 60.20 through 60.29 describe the procedures for adoption and submittal of State plans for designated facilities. These provisions were proposed in 1974 and promulgated in 1975 and established procedures for implementing Section 111(d) of the CAA. Under 40 CFR 60.22(b), the Agency is directed to publish "an emission guideline that reflects the application of the best system of emission reduction (considering the cost of such reduction) that has been adequately demonstrated for designated facilities." The published guidelines for MWC emissions fulfill this requirement.

Sections 60.23 and 60.24 describe the State plan and standards-setting procedures that follows publication of emission guidelines. Section 60.24(c) states that "emission standards shall be no less stringent than the corresponding emission guideline(s)."

However, as described in the previous response, Section 60.24(f) does provide for case-by-case determinations that State emission standards for particular sources should be less stringent than the guidelines provided that the State demonstrates that this is warranted due to unreasonable costs or other factors. EPA is still assessing what effect the new section 129(b)(2) of the CAA of 1990 may have on State discretion.

Comment: One commenter (IV-F-1.24) said cost was considered too heavily in the selection of best demonstrated technology. The commenter said if plants or industries that pollute wish to continue operating, they should pay the cost of controls needed to protect public health.

Response: As noted in other responses, the provisions of Section 111 of the CAA explicitly state that costs should be considered in setting emission standards and guidelines. States can require more stringent controls if they believe it to be necessary.

Comment: Two commenters (IV-F-2.12, IV-F-2.3) expressed support for the combustion control standards and felt the emission guidelines are attainable on a sustainable basis from a technical, engineering, and operating aspect.

Response: The Agency acknowledges these commenters' support.

Comment: One commenter (IV-F-2.51 and IV-D-227) favored the guidelines provision requiring a SD/FF for the Detroit MWC because it contributes to health and environmental impacts not only in the United States, but also in Canada. The commenter said that EPA should ensure that emission standards adopted meet the terms of Annex 15 on Air Toxic Emissions to the 1987 Amendment to the Great Lakes Water Quality Agreement.

Response: Under the guidelines, very large MWC's are required to meet stringent levels of control for MWC acid gases, MWC metals, and MWC organics. These are based on use of SD/ESP control, and could also be met using SD/FF systems. A mercury guideline is also specified. These controls will substantially reduce emissions, and lead to environmental improvement in the Great Lakes and other areas. However, additional actions to address problems specific to the Great Lakes or other local areas can be taken under regulatory authorities other than Section 111 of the CAA. Section 111 is designed to address nationwide problems.

7.6 IMPACTS OF MUNICIPAL WASTE COMBUSTOR EMISSIONS GUIDELINES

7.6.1 Environmental

Comment: One commenter (IV-D-111) said emission reduction impacts of the guidelines were overestimated. He presented a table showing that baseline emissions from the model plant used in the BID were higher than emissions measured at his plant.

Response: A model plant approach was used to estimate emission impacts. Baseline emission levels vary among plants. The model plants were developed to be representative of existing plants after review of data on characteristics of MWC's and available emission data. The national emission estimates are believed to be reasonable, however, any particular plant may differ from the model.

Comment: One commenter (IV-D-111) said EPA had not considered the impact of increased ground level pollutant concentrations caused by requiring decreased stack temperatures.

Response: The control required by the standards and guidelines may in some cases reduce the outlet flue gas temperature and, thus, the buoyancy of the outlet gases. If emissions (kg/sec [lb/sec]) remained constant between the two scenarios, the MWC with a higher gas outlet temperature would produce a lower maximum concentration. However, the standards are reducing the overall emissions by about 90 percent. It is expected that any potential increase in maximum concentration caused by decreasing the outlet temperature will be offset by lowering the emissions level. In any event, the controls will reduce the total aggregate exposure to MWC emissions. The aggregate exposure, rather than the maximum concentration, was the primary consideration in this rulemaking. If in some circumstance the specific terrain and configuration of a MWC is such that the application of a specific control technology increases the maximum concentration, the State may require the facility to reheat the flue gas or add additional control.

Comment: Some commenters (IV-D-111, IV-D-115, IV-D-152) said there would be significant impacts on the amount of solid waste as a result of the proposed guidelines.

Commenters IV-D-111 and IV-D-115 said more waste would be landfilled during retrofit downtime and because of closures and decisions not to build new MWC's. Commenter IV-D-111 also said that add-on controls would increase the amount of fly ash production. One commenter (IV-F-1.24) said that retrofitting air pollution controls on existing MWC's would cause a greater density of heavy metals in the fly ash.

Furthermore, Commenters IV-D-111, IV-D-115, and IV-D-152 said that because of increased volumes of MSW landfilled, increased air emissions from landfills would result. Commenter IV-D-152 said that over a 3-year period while their regional MWC is retrofitted with a SD/FF, an additional 820,000 Mg (900,000 tons) of waste would be landfilled. He said this would result in 880 Mg (970 tons) of reactive hydrocarbon emissions (which are an ozone precursor) and 24,440 Mg (26,940 tons) of methane emissions (which cause global warming) over the period of 1992 to 2005. Another commenter (IV-D-154) submitted a paper discussing emissions of greenhouse gases from MWC's versus landfills, and concluding that MWC's contribute much less to the greenhouse effect than landfills on a per Mg (ton) of MSW basis.

Response: The impacts on the amount of solid waste were considered in establishing the guidelines. The BID for the guidelines (EPA-450/3-89-27e) includes information on changes in ash quantity due to air pollution controls. Acid gas/PM control systems increase the amount of fly ash, but for some model plants, GCP will decrease the amount of ash. The costs reported in the BID include costs for disposal of any increased amount of ash. The increase in the amount of solid waste landfilled during retrofit downtime was also considered. The downtime costs include costs for landfill disposal of the solid waste that would have been combusted had the combustor been operating (minus the amount of ash that would have been generated if the combustor were operating).

The economic analyses did not predict substantial closure of MWC's or substantial substitution of landfills for MWC's. The costs of control for MWC's are reasonable, and because of scarcity of land and increased landfill control requirements, landfill costs are also increasing.

Control of air emissions and leachate from landfills are being investigated under separate regulatory actions. The "Agenda for Action," which described the comprehensive Agency strategy for dealing with solid waste management described a number of initiatives. Control of air emissions from new and existing MWC's was one initiative that is being implemented by the MWC NSPS and guidelines. The guidelines will result in significant reductions in MWC emissions which include many constituents that may impact public health and welfare, including MWC organics, MWC acid gases, and MWC metals. Separate initiatives to investigate further control of solid waste landfills, ash disposal, and other parts of the "Agenda for Action" strategy are underway.

Comment: Some commenters (IV-D-111, IV-D-115, IV-D-152, IV-D-184, IV-D-266) said the guidelines will cause increased water pollution due to increased use of landfills. Commenter IV-D-152 said this is particularly a concern in Florida where water tables are high. Commenter IV-D-266 said rural counties would not be willing to pay an increase of $13/Mg ($12/ton) for MSW disposal, and waste would be put in landfills, ditches, and sloughs. Commenter IV-D-111 added that mining and processing of limestone for acid gas control will also cause water pollution.

Response: As stated above, the regulations are not expected to result in substantial substitution of landfills for MWC's. Ash disposal is being investigated for regulation in order to protect water quality. Therefore, water quality impacts are not expected to result from effects of this guideline on MSW or ash disposal.

Comment: Two commenters (IV-F-2.47, IV-F-2.50) said that the Detroit MWC accounts for between 10 and 20 percent of the mercury entering the atmosphere in Michigan from the four top sources of mercury in the State.

Others (IV-F-2.58, IV-D-234), while not citing emission estimates, commented that fish in the Great Lakes are contaminated from mercury and MWC's contribute to this problem.

Other commenters (IV-D-11, IV-D-105, IV-D-183) presented information to show that MWC's are a major source of mercury emissions. One (IV-D-183) referred to a 1975 nationwide mass balance done for EPA which showed that in 1973 MWC's emitted 40 Mg (44 tons) of mercury, compared to 45 Mg (50 tons) for coal-fired power plants, and exceeded emissions from sludge incinerators, chloralkali plants, and oil- and gas-fired power plants. He said 1983 studies showing MWC's created lower mercury emissions 21 Mg/yr (23 tpy) were based on faulty assumptions. Two commenters (IV-D-11, IV-D-105) noted that the Swedish government has stated that MWC's contribute 55 percent of total mercury emissions to the environment. All three said an EPA report states that in 1985 mercury emissions from MWC's in New York City were 10,000 to 19,000 kg/yr (22,000 to 42,000 lb/yr) while mercury from all other sources were 17,000 kg/yr (37,000 lb/yr). Commenters IV-D-105, IV-D-111, IV-D-136, and IV-D-244 also cited reports indicating that mercury contamination of Minnesota lakes and Florida wetlands may be due in large part to airborne emissions from MWC's. The commenters said stringent mercury control is needed to reduce environmental risks from MWC's.

Response: The Agency agrees that MWC's are a major source of mercury emissions. The Agency further agrees that mercury control is needed at MWC facilities. As required by Section 129 of the CAA Amendments of 1990, mercury standards and emission guidelines are to be promulgated within 12 months of enactment of the CAA Amendments. Reducing mercury emissions would result in a reduction in direct and indirect risks.

Comment: One commenter (IV-D-57) said the governors of eight States in the Great Lakes region cite persistent toxic substances as the greatest environmental threat to the Great Lakes Ecosystem and studies suggest atmospheric deposition is to blame. She also referred to a 1986 brief by the Pollution Probe Foundation of Toronto, Canada, saying that combustion sources produce toxic fallout onto Ontario's orchards, pastures, and food crops. The commenter was concerned that dioxins/furans, PCB's, mercury, and lead from MWC's also cause contamination of Michigan's crops and fish. She, therefore, argued for application of MACT to all MWC's. One commenter (IV-F-2.26) said Ontario and Canadian environmental groups are concerned that emissions of mercury and other toxics and acid gases from the Detroit MWC are contaminating the Great Lakes and crops grown in Ontario, and therefore, they oppose the MWC. The commenter said that even if a SD/FF were installed, mercury would still be an environmental problem.

Response: The MWC emissions encompass a wide range of diverse pollutants including those mentioned by one of the commenters. The standards and guidelines being promulgated today address MWC metals, MWC organics, and MWC acid gases. The control technologies required by the standards and guidelines have broad benefits that address most of the concerns raised by the commenters. For example, an overall reduction in emissions will reduce pollutant deposition on surrounding areas, including bodies of water. The second commenter is correct that SD/FF in some cases will not adequately reduce mercury emissions. However, under Section 129 of the CAA Amendments of 1990, mercury emission standards and guidelines for MWC's will be promulgated within 12 months.

7.6.2 Health and Risk Assessment

Comment: Two commenters (IV-F-2.32, IV-D-257) stated that they failed to find any basis in the EPA's docket for establishing HCl as the basis for health or welfare based emission guidelines. The 3 $\mu g/m^3$ (1 gr/million ft^3) used as a welfare effects level was a preliminary finding from a study that has never been completed or documented.

Response: The HCl was not the primary basis for establishing health or welfare-based emission guidelines for MWC's. The MWC's emit large quantities of organics and metals that are carcinogenic as well as other acid gases (e.g., SO_2). Emissions of these other substances, in addition to HCl, warrant control of MWC's under Section 111 of the CAA. The commenter is correct that the 3 $\mu g/m^3$ (1 gr/million ft^3) level was a preliminary finding, but it remains the best data available.

Comment: One commenter (IV-F-2.32) said that the guidelines for HCl are inequitable because regional MWC's are required to have more stringent acid gas controls that large MWC's. The commenter cited modeling data from the Report to Congress which showed modeled levels of HCl and dioxins/furans to be higher at large MWC's than regional MWC's.

Response: The modeling data for HCl and dioxins/furans as reported in the Report to Congress was not a key factor in determining the level of the Section 111 standards and guidelines. These data did serve as part of the basis for the Administrator's decision to regulate MWC's as sources of air pollution which may contribute to the endangerment of public health or welfare. The emission guidelines selected for each of the three size categories of MWC's are not inequitable because the guidelines represent best demonstrated technology considering cost and other factors. In addition, the control technologies identified as best demonstrated technology have been demonstrated at MWC's in the United States. Although cost and economic impacts will vary between facilities, no severe cost and economic impacts are expected to result from the guidelines.

Comment: Some commenters (IV-D-112, IV-D-113, IV-D-195) said baseline health risks from dioxins from MWC's are very low relative to other sources. They also said that the standards and guidelines should not be set at levels so stringent as to cause decreased use of MWC's and an increase in trucking of MSW long distances to remote landfills. These commenters and others (IV-D-64, IV-D-184) argued that the increased health risks from truck transport of MSW (from both exhaust and traffic accidents) would be greater than the risks of combusting the MSW.

Response: The selection of best demonstrated control technology for emissions from MWC's covered by the guidelines considered cost and economic impacts as well as other factors as specified in Section 111 of the CAA. As described in the preamble of the proposed standards and the BID (EPA-450/3-89-005), no severe adverse cost or economic impacts were identified for the control technologies selected. In addition, the regulations are not expected to significantly affect the proportion of MSW that is combusted versus landfilled.

Comment: Some commenters (IV-F-2.6, IV-F-2.40, IV-D-2.47, IV-D-19) were concerned with the health and environmental risks of mercury emissions that may be deposited in surface waters and bioaccumulate in fish. The commenters urged EPA to adopt stringent mercury controls especially given that a particular MWC was exceeding the permit limit set by the State which is based on TLV's.

Response: In the absence of Federal standards, many States have developed their own emission limits for many toxic air pollutants. One of the effects of the Agency's control technology-based standards is to standardize control requirements such that MWC's nationwide are required to use best demonstrated technology as defined by the standards and guidelines. The Federal standards supersede State emission limits that are based on TLV's. In cases where there are air quality problems of a localized nature, the States are free, under Section 116 of the CAA, to require more extensive controls. However, a State standard may not be less stringent than the Federal standard. As described in other responses, a mercury guideline is to be promulgated within 12 months of enactment of the CAA Amendments of 1990.

Comment: Two commenters (IV-D-07, IV-D-24) said MWC's in their communities had been closed because of health hazards. They wanted the MWC's to remain closed.

Response: The Agency agrees with the commenters that uncontrolled or poorly controlled combustion of MSW releases potentially harmful pollutants into the air. Due to their nature and magnitude, emissions from MWC's can pose health risks to the public if not well controlled. The intent of the standards and guidelines is to limit air emissions from all MWC's by requiring application of best demonstrated technology or the equivalent. If the MWC's referred to by the commenters were to reopen, they would be subject to the guidelines proposed by the Agency under Section 111(d) for existing MWC facilities. Furthermore, under Section 116 of the CAA, States are free to require more extensive controls in order to address concerns which are specific to a localized air quality situation.

Comment: One commenter (IV-F-2.10 and IV-D-13) said that because Detroit has a high cancer rate an MWC should not be allowed in such an area and the existing MWC should be shutdown.

Response: Background risk levels are not considered in developing NSPS in accordance with Section 111 of the CAA. In 1987, the Administrator determined that MWC's would be regulated under Sections 111(b) and 111(d) rather than Section 112 partly because the development of emissions guidelines under Section 111(d) would permit a more thorough evaluation of existing MWC's at the State level than would be feasible under a Federal rulemaking. The Section 111 standards are technology-based, however, States may adopt more stringent standards considering local existing pollution levels or other site-specific factors.

7.6.3 Energy

No comments on energy impacts of the proposed guidelines were received. Section 3.6.3 presents energy comments related to the NSPS.

7.6.4 Cost and Economic

Comment: Some commenters believed the cost of control was underestimated. One commenter (IV-F-1.11 and IV-D-158) who owns and operates a 540,000 Mg/yr (600,000 tpy) (roughly 1,800 Mg/day [2,000 tpd] capacity) MWC, said that EPA estimated retrofit costs for an MWC of their size to be $4 to $15/Mg ($4 to $14/ton) of MSW. However, a detailed engineering study for their MWC estimated $35.80/Mg ($32.50/ton) for retrofit of a SD/FF. He said costs could be $35 to $45 million. This cost included pilot plant trials of the system prior to full scale design and installation. He thought individual pilot trials at each plant would be necessary because standard "packaged" control processes may not be applicable to existing facilities. The commenter said space constraints will cause high retrofit costs for his plant and many other existing MWC's. The commenter also said downtime costs and lost revenues were a large portion of the total cost. He estimated these at $65,000 per day per unit. He also mentioned that prolonged downtime may cause contractual problems.

One commenter (IV-F-1.7) said retrofitting their 2,800 Mg/day (3,100 tpd) MWC to attempt compliance with the proposed guidelines for regional MWC's would cost $30 to $40 million.

Others (IV-D-78, IV-D-132) said retrofit of their regional plant with a SD/FF would cost $30 to $40 million, and Commenter IV-D-78 added that the costs to operate the SD/FF system will be about $1 million per year. The commenter (IV-D-78) said the 1-month retrofit downtime in the BID's is too short, leading to underestimation of costs and economic impacts. This commenter also said EPA did not include additional costs of purchased power during retrofit downtime. He also said costs for loss of landfill life for MWC retrofit downtime should be included. The other commenter (IV-D-132) said the remaining landfill life would be decreased from 9 years to about 2 years. The first commenter (IV-D-78) said the plant already has upgraded ESP efficiency, and the requirements for SD/FF would place a burden on the city. Another commenter (IV-D-184) also raised loss of landfill life as a cost issue.

Another commenter (IV-D-111) said a 1-month downtime was unrealistically short for his plant, so costs for diversion of waste to landfills and lost electrical revenues were underestimated.

Another commenter (IV-F-2.5) said that a retrofit of their existing regional MWC including replacement of the ESP's with SD/FF systems would entail a capital cost of $100 million and a 20-year operational cost of an additional $100 million. The commenter said this cost burden would force the community to abandon the MWC. She and another commenter (IV-D-115) said EPA has not shown that large communities could bear the cost and economic impacts of SD/FF control any better than smaller communities.

One commenter (IV-D-115) said physical space limitations and the absence of authority to condemn adjacent land may preclude application of SD/FF or make it prohibitively expensive.

Some commenters (IV-F-2.15, IV-D-164) said the EPA's average cost estimate of \$11/Mg (\$10/ton) of MSW was extremely low, and that true costs will be several times that figure. Another commenter (IV-D-152) said retrofitting their 2,860 Mg/day (3,150 tpd) regional MWC with a SD/FF would cost \$214 million and raise the tipping fee by about \$29.60/Mg (\$26.85/ton) of MSW, a level which the preamble indicated was unreasonable. These three commenters and Commenters IV-D-115 and IV-D-184 said retrofit of acid gas control will be costly in order to solve technical problems including increased particulate loading and space limitations that could lead to inefficient configuration of control technologies. Second, facilities undergoing retrofit will not be able to meet previous power commitments, and energy revenues will be lost. Commenters IV-D-115, IV-D-152, IV-D-164, and IV-D-184 also said municipalities with put-or-pay contracts could end up owing large amounts of money and that operating contracts may need to be renegotiated resulting in costs. Third, Commenters IV-D-115 and IV-D-152 said there would be costs associated with obtaining or modifying vendor guarantees. Fourth, Commenters IV-F-2.15, IV-D-164, and IV-D-184 said retrofit downtime could be 5 to 8 years, so downtime costs have been underestimated. During this time, landfill fees and long-distance hauling costs would have to be paid. Commenter IV-D-152 said retrofit of their MWC would require a 1-year downtime for each of three combustors at the plant, or a total of 3 years. During this time, 810,000 additional Mg (900,000 tons) of MSW would have to be landfilled, shortening landfill life by 5 years. Another said the 2-month downtime EPA cited for the regional mass burn model MWC is too short, and downtime could be 6 months to 1 year. Finally, Commenters IV-D-115, IV-D-164 and IV-D-184 said that depending on the remaining useful life of an MWC, retrofit costs may be amortized over short time periods causing sharp increases in disposal costs.

Response: The cost estimates developed prior to proposal are representative for existing plants. The cost estimates for 17 model plants chosen to represent different sizes, types, and ages of existing facilities are contained in the BID, "Municipal Waste Combustors - Background Information for Proposed Guidelines for Existing Facilities" (EPA-450/3-89-27e), and the cost procedures are described in the BID, "Municipal Waste Combustors - Background Information for Proposed Standards: Cost Procedures" (EPA-450/3-89-27a).

The capital costs of $30 to $40 million cited by some of the commenters for GCP and SD/FF retrofit of a regional MWC plant are consistent with the capital costs estimated by the Agency for model plants with capacities in the range of 1,800 Mg/day (2,000 tpd) or more. As shown in the BID, total annualized capital, operating, and maintenance costs for GCP and SD/FF control of such plants would typically be about $13/Mg ($12/ton) of MSW, but were $20/Mg ($18/ton) for one of the 1,800 Mg/day (2,000 tpd) model plants.

Costs for SD/ESP retrofit was estimated after proposal and found to be about $9/Mg ($8/ton) of MSW for a model plant larger than 2,000 Mg/day (2,200 tpd) and about $12/Mg ($11/ton) for a 1,000 Mg/day (1,100 tpd) model plant. Costs for DSI/ESP retrofit are lower.

The cost estimates considered most of the factors mentioned by these commenters. Capital costs of controls were developed from information provided by vendors for control equipment designed to be applicable to MWC's. Installation costs were included. Retrofit factors were used to account for increased costs due to site access constraints and congestion. For most models a factor of 1.25 was used, representing a "medium" difficulty case. For some (e.g., retrofit of SD/FF on the existing large RDF model plant) a factor of 1.42 was used to represent very limited space and access. "Scope adder" costs for modifying ducts and stacks, demolition, and replacement were also included where appropriate.

Downtime was estimated based on characteristics of each model plant and the difficulty of retrofitting each control option. Downtime costs included costs for lost energy revenues as well as costs for landfill disposal of MSW that would have been combusted had the combustor been operating. The performance of control technologies that formed the basis of the guidelines are demonstrated, as explained in the responses in Section 7.5. Therefore, increased costs for obtaining vendor guarantees are not likely to be a major concern. Most contracts have clauses which would release parties from "put or pay" and other clauses in the case of an outside factor such as a new Federal regulation.

As described in Section 7.5.5, the guidelines have been changed since proposal and are based on SD/ESP rather than SD/FF control for very large MWC plants (i.e., those larger than 1,000 Mg/day [1,100 tpd] capacity).

The cost and economic impacts of the guidelines were considered and determined to be reasonable. Emission guidelines have been established based on the performance of the best demonstrated technologies considering costs. The provisions of 40 CFR 60.24(c) specify that State "emission standards shall be no less stringent than the corresponding emission guideline(s)," except as provided in Section 60.24(f).

Paragraph (f) of 40 CFR 60.24 establishes a procedure for States to address plants with exceptional site-specific concerns such as a very short remaining life. It is not expected that this provision will be used much because representative retrofit costs of control were considered in establishing the guidelines. However, the procedure is available for unusual cases. EPA is still assess what affect the new section 129(b)(2) of the CAA of 1990 may have on this rule. The wording of 40 CFR 60.24(f) is as follows:

> "on a case-by-case basis for particular designated facilities, or classes of facilities, States may

provide for the application of less stringent emission standards or longer compliance schedules than those otherwise required by paragraph (c) of this section, provided that the State demonstrates with respect to each such facility (or class of facilities):

(1) Unreasonable cost of control resulting from plant age, location, or basic process design;

(2) Physical impossibility of installing necessary control equipment; or

(3) Other factors specific to the facility (or class of facilities) that make application of a less stringent standard or final compliance time significantly more reasonable."

Comment: One commenter (IV-D-184) said a model plant analysis cannot adequately predict costs for specific existing MWC's and should not be used to set emission level guidelines, but only to establish procedures and acceptable retrofit cost ranges.

Response: As described in the previous response, the model plants were developed to be representative of the different sizes and types of combustors within the existing MWC population, and costs of control are therefore representative of costs for existing MWC's. While the models do not correspond exactly to particular MWC's, the analyses of model plant costs can be used to determine that costs of the guidelines are not unreasonable. Since control technology performance is demonstrated, and cost and other impacts are not unreasonable, emission guidelines have been established in accordance with Section 111(d) and the provisions of 40 CFR 60.22.

Comment: One commenter (IV-D-164) said even regional facilities with SD/FF control may have to modify their systems to achieve the stringent acid gas levels proposed. For example, they may need to change reagents, modify the reagent delivery system, increase the stoichiometric ratio, add bulking agents, modify existing baghouses, and oversize fans.

The commenter said these modifications could be costly and are not well demonstrated. Also, increasing stoichiometric ratios would increase ash disposal costs.

Response: The final guidelines for regional plants are based on SD/ESP or equivalent control. They specify 70 percent reduction of SO_2 (24-hour geometric mean) and 90 percent reduction of HCl. These emission levels would be achievable by most existing SD/FF systems without any modifications, and can also be met by SD/ESP systems.

Comment: One commenter (IV-F-137) submitted a table showing his estimate of costs for retrofitting a SD/FF on a mass burn MWC with three 680 Mg/day (750 tpd) units. His annualized cost estimate was $17 million or $26.80/Mg ($24.30/ton) compared to the EPA's estimate of about $8 million or $16.60/Mg ($15.10/ton) for this model. Major differences that the commenter included were: (1) a new stack; (2) higher allowances for site-specific contingencies, and a 10-month downtime for each boiler instead of a 2-month downtime due to site constraints that preclude retrofit construction alongside the existing equipment while the boiler remains in operation; (3) a reverse air type baghouse with an air-to-cloth ratio of 2.5:1 rather than a pulse jet with a ratio of 4:1; and (4) different lime consumption rates and operating and maintenance labor costs. Also, the commenter used 1990 rather than 1987 dollars. The commenter stated that his costs did not include lost electrical revenues and lost tipping fees during downtime, which would add to the costs but are highly site-specific.

The commenter also provided annualized costs for a SD/ESP designed to achieve 50 percent SO_2 control and said annualized costs are $15 million, or $23.60/Mg ($21.40/ton) of MSW, which is $2 million less than their estimated annual SD/FF costs.

Response: As discussed above, the Agency reevaluated the cost of installing SD/ESP and SD/FF systems on existing MWC's and concluded that requiring emission reductions consistent with those achievable by SD/ESP systems was reasonable. The cost estimates developed by the Agency were based on data supplied by equipment vendors and accepted costing procedures. The Agency acknowledges that costs for compliance at a specific MWC may be different due to local site conditions and economic assumptions.

Comment: One commenter (IV-D-115) submitted a preliminary cost estimate for four retrofit options for their ESP-controlled regional RDF-fired plant. The capital costs for SD/FF were estimated to range from $69 to 98 million with annual operating costs of $2.2 to 3 million per year. Capital costs of SD/ESP were $61 to 79 million with annual costs of $2.1 million per year. An ESP/wet scrubber alternative was estimated to have lower capital costs ($46 million) but higher annual operating costs ($2.2 to 4.2 million per year). The commenter said costs for the SD/FF retrofit would include demolishing the current ESP, removing the existing air preheater, which is downstream of the ESP and replacing it with a new tubular air preheater, structural changes (foundations, buildings, etc.), costs for SD/FF purchase, installation, operation and maintenance, additional duct work, and fan motors.

The commenter provided a second estimate of costs for their facility (a regional RDF) by scaling up the EPA's costs for control of the model large (1,800 Mg/day [2,000 tpd]) RDF. The commenter said their own estimates of capital costs were higher than the EPA's, but their estimates of downtime, operating, and maintenance costs were somewhat lower than the EPA's. On a cost per Mg (ton) of MSW basis, this facility's costs would be higher than estimated in the BID for the large RDF model plants because they would need to retrofit controls on three combustors (each about 1,000 Mg/day [1,100 tpd]), but their permit only allows operation of two combustors at one time, so the volume of MSW burned is below 2,000 Mg/day (2,200 tpd).

The commenter claimed that their preliminary costs estimates, and the EPA's estimates (in the BID [EPA-450/3-89-27e]) did not include estimates for additional landfill volume, additional water and electrical demand, or lost revenue due to inhibited or curtailed operation of the facility during retrofit activities.

The commenter concluded that EPA has underestimated the cost of SD/FF retrofit for regional MWC's and suggested they analyze and consider other options including SD/ESP and ESP/wet scrubber systems.

Response: The costs of waste disposal, electricity, water, and lost revenues were included in the Agency's analysis. As discussed above, additional analysis of acid gas control options (including DSI/ESP, SD/ESP, and SD/FF) was conducted after proposal. The use of wet scrubbing was considered, but not costed. However, MWC owners or operators may use any technology, including ESP/wet scrubber systems, if they can meet all applicable emission levels and operating parameter guidelines.

Comment: One commenter (IV-D-115) said the BID for the guidelines (EPA-450/3-89-27e) did not list the Detroit or Honolulu facilities in the list of existing RDF-fired facilities and thus did not examine retrofit of these two regional facilities.

Response: Chapter 10.0 of the BID (EPA-450/3-89-27e) notes that in addition to the 160 plants currently in operation (as of the end of calendar year 1988 when information gathering was completed), there are many plants that will start-up or commence construction in 1989, and will therefore be subject to the guidelines. The BID says that a list of these plants and the model plants (in the BID) to which they are assigned is provided in a separate memo. This memorandum, titled "Municipal Waste Combustion Industry Profile - Facilities Subject to Section 111(d) Guidelines" is in Docket No. A-89-08 (Item No. II-A-065). Both the Detroit and Honolulu plants are included in this memorandum, and were considered in estimating impacts of the guidelines.

Comment: One commenter (IV-D-137) said that DSI systems require more lime than SD/ESP or SD/FF systems to achieve 50 percent SO_2 control. He said the relative ratios of lime consumption for the three technologies are 7:2:1. He commented that the use of DSI will strain existing ESP's designed for a 180 mg/dscm (0.08 gr/dscf) PM level, and that an ESP upgrade without flue gas cooling may not be sufficient to achieve a level of 69 mg/dscm (0.03 gr/dscf). He contended additional ESP fields or retrofit of a new ESP may be required.

Response: The sorbent injection rate for any acid gas control technology is dependent on several operating variables, primary among which are the desired SO_2 removal efficiency and the flue gas temperature. In selecting the required removal efficiency for SD/FF, SD/ESP, and DSI technologies, the achievable SO_2 reduction level and the sorbent consumption rate were both considered. To achieve 80 percent control of SO_2 emissions with a SD/FF system, the required stoichiometric sorbent feed rate (moles of calcium per mole of acid gas) is roughly 2.5. To achieve 50 percent control of SO_2 emissions with a DSI system will require a stoichiometric sorbent feed rate of roughly 2.0. These two stoichiometric ratios are essentially equal.

To achieve these SO_2 removal efficiencies at these sorbent feed rates, flue gas cooling to roughly 150°C to 180°C (300°F to 350°F) will be needed. Typical operating temperatures for ESP's located at most existing MWC's are 200 to 320°C (400 to 600°F). Addition of sorbent to the flue gas to reduce acid gas emissions will increase the particulate load to the ESP. However, by cooling the flue gas the volume of flue gas will decrease. Data reviewed by the Agency indicate that under these conditions (i.e., sorbent addition and flue gas cooling), many existing ESP's can be maintained at PM emission rates similar to those they originally had. For ESP's installed on modular starved-air MWC's with a design PM emission rate of 180 mg/dscm (0.08 gr/dscf), the Agency recognizes that achievement of a 69 mg/dscm (0.03 gr/dscf) PM emission rate may require installation of additional ESP plate area or a new ESP.

Comment: One commenter (IV-D-184) said there are apparent errors or inconsistencies in the BID on costs. Specifically, he said the lime feed rate equation on page 2.3-2 of the "Cost Procedures" BID would yield a lime feed rate of 77,600 kg/hr (171,000 lb/hr) per unit for a large mass burn plant, whereas the BID (page 5-22) used 400 kg/hr (880 lb/hr), a more reasonable rate. He also said some equations in the cost procedure BID do not have dimensions allowing a dimensional analysis to verify equations.

The commenter asked why the cost procedures BID said that the duct sorbent injection system costed is expected to achieve 40 percent SO_2 and 80 percent HCl control, whereas the guidelines specify 50 percent control of SO_2 and HCl.

Another commenter (IV-D-137) said the BID's do not present an analysis of the impacts of requiring a 69 mg/dscm (0.03 gr/dscf) PM level for small MWC's, which is the level proposed.

Response: The equation on page 2.3-2 of the cost procedures BID (EPA-450/3-89-27a) was checked using 0.12 percent sulfur and 0.32 chlorine in the waste (corresponding to 200 ppm SO_2 and 500 ppm HCl at 100 percent conversion of sulfur and chlorine in the waste) and found to be accurate.

Compliance test data from both DSI/FF and DSI/ESP systems were reviewed. The cost procedures BID (EPA-450/3-89-27a) assumed 40 percent SO_2 control as the "reference" case. However, emissions data from actual facilities reported in the post-combustion technology performance BID (EPA-450/3-89-27c) demonstrates that over 50 percent SO_2 and HCl control is consistently achievable with commercial DSI systems (using either furnace or duct sorbent injection systems).

In response to commenter IV-D-137, the guidelines currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Under Section 129 of the CAA, guidelines for small MWC's, including PM emission levels, are to be developed and promulgated within 2 years.

Comment: One commenter (IV-D-130) said one regional plant in their State has already upgraded their ESP at a cost of $2 million and to have to replace it with a SD/FF would be very burdensome. They also said it would require longer downtime (compared to DSI retrofit) causing more waste to be landfilled and increasing costs.

Response: The guidelines have been changed since proposal, and the final emission guidelines are achievable with SD/ESP control systems. This allows facilities with efficient ESP's to retrofit a SD and make use of the existing ESP rather than replacing it.

Comment: One commenter (IV-D-184) said the cost and economic analysis does not justify the regional size category distinction because only one model plant above that size was included in the model plant study and because costs depend more on the size and number of individual combustors at a plant than on total plant size. He said a more detailed analysis is needed.

Response: As described in Section 7.5.5, an analysis of control performance and cost of SD/ESP systems was done after proposal to determine what level of control was appropriate for very large (regional) MWC's, and what the size category breakpoint should be. It included model plants from 45 Mg/day (50 tpd) to 2,050 Mg/day (2,250 tpd). Costs and emission reductions for SD/FF and DSI/ESP were examined over the same range. The models had two or three combustors per plant, which is typical.

The analysis showed that control cost per Mg (ton) of MSW combusted and incremental cost effectiveness per Mg (ton) of acid gas control are similar for plants with capacities above about 1,000 Mg/day (1,100 tpd), but costs increased more rapidly for plants below that size. For example, cost of SD/ESP control for model plants of 1,000 Mg/day (1,100 tpd) to 2,000 Mg/day (2,200 tpd) were in the range of $9 to $12/Mg ($8 to $11/ton) of MSW, but for model plants from 180 to 800 Mg/day (200 to 900 tpd), costs were $19 to $30/Mg ($17 to $27/ton) of MSW. The same trend occurs for the other acid gas control technologies. The final guidelines define very large MWC plants as those with capacities above 1,000 Mg/day (1,100 tpd), and the emission levels for very large plants are achievable with SD/ESP control systems. The emission levels included in the final guidelines are summarized in responses in Section 7.5.5.

Comment: One commenter (IV-D-143) who operates a large existing MWC said they had recently spent over $5 million in pollution control equipment, but the guidelines may require them to replace this equipment. They said the cost of scrapping nearly new control equipment should be considered as part of the cost of the guidelines and flexibility should be allowed in such cases.

Response: The guidelines for large plants are achievable using DSI/ESP or DSI/FF (or any other technology that can meet the emission guidelines). It is expected that most large plants can make use of some of their existing equipment (e.g., the ESP) although in some cases it would need to be upgraded. The cost of adding acid gas control and also of modifying existing control equipment were estimated in the BID for the guidelines (EPA-450/3-89-27e), and costs of the guidelines are reasonable. However, as mentioned in the first response in the section, the provisions of 40 CFR 60.24(f) establish procedures for States to consider unique factors on a case-by-case basis in developing State standards based on these guidelines.

Comment: One commenter (IV-D-193) said the proposed guidelines will increase tipping fees in their communities by $20 to $22/Mg ($18 to $20/ton). He argued against more stringent standards (based on SD/FF) because this would cause much greater fee increases of about $44/Mg ($40/ton) of MSW.

Response: The final guidelines increase costs for disposal of wastes by an average of $12/Mg ($11/ton) of MSW, although this will vary for individual communities depending on site-specific circumstances. The final emission guidelines are based on levels of control achievable DSI/ESP systems for large plants and SD/ESP systems for very large plants. They would not require installation of more expensive SD/FF systems.

Comment: One commenter (IV-D-132) said his city would not be able to raise financing required to retrofit its regional MWC with a SD/FF within the compliance time required by the regulation. He said that, unlike private industry, local governments are not able to raise fees. Also, a recent State law created a regional solid waste authority with responsibility to regulate operation of the city's MWC. Therefore, future rate increases or financing would involve a region-wide plan adopted by this separate administrative entity and would not be at the discretion of the city.

Another commenter (IV-D-70) said his community's MWC plant has a steam contract which expires in 1994. In addition, the community will have paid off its bonds by 1994. He said it would be financially disastrous if the guidelines require the community to retrofit prior to 1994, and suggested greater flexibility in compliance times.

Response: Under certain conditions, States may provide for the application of a less stringent standard or longer compliance schedules for existing MWC's, as indicated in 40 CFR 60.24(f). The basis for this allowance must be demonstrated case-by-case for particular facilities or classes of facilities. The state must demonstrate at least one of the three following conditions:

(1) Unreasonable cost of control resulting from plant age, location, or basic process design.

(2) Physical impossibility of installing necessary control equipment.

(3) Other factors specific to the facility (or class of facilities) that make application of a less stringent standard or final compliance time significantly more reasonable.

Owners or operators of MWC facilities that can demonstrate difficulty in meeting compliance schedules due to institutional factors may be eligible for special consideration under this section of the Code of Federal Regulations. EPA is still assessing the affect the new section 129(b)(2) of the CAA of 1990 may have on this rule.

Comment: One commenter (IV-D-60) said the cost analyses for the proposed guidelines do not adequately address MWC's with capacities below 45 Mg/day (50 tpd). The commenter said her solid waste planning district includes two 5 Mg/day (5 tpd) MWC's and one 3 Mg/day (3 tpd) MWC, but EPA did not estimate control costs for this size MWC. The MWC's currently have no controls and no heat recovery. The commenter believes the cost for control of these very small MWC's would be unreasonable, and that because of their small size there would be little gain in emission reductions.

Another commenter (IV-D-22), who operates two small MWC's with a capacity of 6 Mg/day (7 tpd) said the requirements for flue gas cooling, lower PM emissions, testing, and continuous monitoring would probably be costly enough to put them out of business.

Response: As explained in Chapter 1, the guidelines currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Therefore, MWC's of the size discussed by the commenters will not be subject to these guidelines. However, under Section 129 of the CAA Amendments of 1990, guidelines applicable to MWC units smaller than 225 Mg/day (250 tpd) will be promulgated within 2 years. The inclusion of a lower size cutoff will be considered as part of that rulemaking.

Comment: One commenter (IV-D-93) said the costs for retrofit of PM control, CEM equipment, testing, and reporting could cause their 11 Mg/day (12 tpd) facility to close. If it closed, the commenter said that since the village is located on a strip of barrier beach, they would have to transport waste by ship or by driving on the strip of beach to a landfill on the mainland; either alternative would have negative environmental impacts as well as cost and economic impacts.

Response: As explained in Chapter 1, the guidelines currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Therefore, MWC's of the size discussed by the commenters will not be subject to these guidelines. However, under Section 129 of the CAA Amendments of 1990, guidelines applicable to MWC units smaller than 225 Mg/day (250 tpd) will be promulgated within 2 years. The inclusion of a lower size cutoff will be considered as part of that rulemaking.

Comment: Two commenters (IV-D-60, IV-D-242) thought the exclusion of government units with less than 10,000 population was a deficiency in the economic analysis. Commenter IV-D-60 said there are 15 small MWC's in New Hampshire serving 31 small towns. She said costs to these small governments could be severe. As a rough example, she said EPA estimated capital costs for one of the smaller model plants to be $1.1 million. She said if this capital cost was incurred by one of the small towns in New Hampshire with a population of only 1,300 people, the cost per household could be $846. Another commenter (IV-D-196) said the guidelines would likely force these 15 small MWC's to close and the towns would resort to landfilling. Commenter IV-D-242 said that while there are many very small MWC's in Alaska, there are only 4 cities with populations over 10,000, so the lack of analysis for smaller cities is a serious concern.

Response: As explained in Chapter 1, the guidelines currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Therefore, MWC's of the size discussed by the commenters will not be subject to these guidelines. However, under Section 129 of the CAA Amendments of 1990, guidelines applicable to MWC units smaller than 225 Mg/day (250 tpd) will be promulgated within 2 years. The inclusion of a lower size cutoff will be considered as part of that rulemaking.

Comment: One commenter (IV-F-2.3) said the increased costs of control will put a significant economic burden on small communities. He said that while EPA claims the increased cost of $14/Mg ($13/ton) of MSW is a 20-percent increase on a national basis, for his community it would be a 50-percent increase over current operating costs. Another (IV-D-113) said it would represent a 50-percent increase for many communities.

Response: The percentage increase in costs is a function of the plant's estimated baseline cost per Mg (ton). For a given compliance cost, MWC's with relatively low baseline costs will experience a greater percent increase due to the regulation than MWC's with relatively high baseline costs. For example, for the MWC plant with baseline costs of about $65/Mg ($59/ton), an additional $13/Mg ($12/ton) compliance cost represents a 20-percent increase in costs. Likewise, for the plant with baseline costs of $26/Mg ($24/ton), the $13/Mg ($12/ton) compliance cost represents a 50-percent increase in costs. Communities incurring a high percentage increase over the baseline to meet the requirements of the regulation will not necessarily suffer more severe absolute impacts than those incurring lower percent increases. A higher percentage increase may merely indicate lower baseline costs for these communities.

In addition, the baseline costs incurred directly by a MWC facility may not fully reflect the cost of waste disposal in a community that subsidizes its MWC facility. Where this is the case, the percentage increase over the baseline should be calculated using the real cost of waste disposal. In such instances, the percentage increase in cost due to the regulation would be lower.

To estimate economic impacts on communities, a distributional analysis was performed on a sample of communities with MWC facilities. Impact measures were used in the BID, "Economic Impact of Air Pollutant Emission Guidelines for Existing Municipal Waste Combustors" (EPA-450/3-89-005) to measure a particular government entity's ability to meet the additional financial obligations incurred due to the regulation. One of these measures uses sewer and sanitation expenditures to approximate a municipality's baseline waste disposal costs. The sum of average baseline cost per household and compliance cost per household as a percent of median household income was calculated for individual communities with MWC facilities. No severe impacts were indicated using this impact measure.

Comment: One commenter (IV-D-256 and IV-D-285) said the guideline BID (EPA-450/3-89-27e) lists costs for a 45 Mg/day (50 tpd) plant to comply with the best level of control (SD/FF) as over $3 million. He said this would result in a doubling of their waste disposal costs and cause closure of their city's 45 Mg/day (50 tpd) plant.

Response: The capital cost shown in the BID for the 45 Mg/day (50 tpd) model plant with this control level is about $1 million (rather than over $3 million), with annualized costs of about $300,000. However, the guidelines currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Guidelines for small units consistent with Section 129 of the CAA Amendments of 1990 are being developed over the next 2 years.

Comment: Some commenters (IV-F-2.3, IV-F-2.5, IV-D-60, IV-D-184) said that retrofit costs will result in closure of existing MWC's.

Response: Cost and economic analyses contained in the BID's indicate that the costs of control are reasonable, and closures are not likely to result from the guidelines.

Comment: One commenter (IV-D-111) said the impact of the guidelines on the increased cost of financing has not been adequately addressed. He said that requiring costly and unpredictable retrofitting of existing MWC's will have impacts on the cost of financing and community willingness to construct or continue operating facilities, and suggested that existing sources should be required to upgrade to the NSPS level after 20 years.

Response: The regulation may increase cost of financing if compliance with the regulation increases the debt of a community or firm enough to reduce its bond rating. The affect of the regulation on the bond rating depends on current levels of debt as well as other factors specific to each MWC facility. Further analysis would be needed to determine the regulation's impact on bond ratings for specific communities and firms that own MWC's.

The affect of regulatory uncertainty on the cost of financing and/or community willingness to construct or continue operating MWC facilities has not been quantified for this analysis. It is recognized, however, that a risk premium may be required by financial institutions in the presence of regulatory uncertainty. The two major factors contributing to regulatory uncertainty for any industry are: (1) uncertainty regarding the specific provisions of future regulation and (2) uncertainty regarding the promulgation date of future regulation.

In the past several years much uncertainty regarding Federal and State environmental regulations has existed in the MWC industry. When the guidelines for existing MWC's were proposed on December 20, 1989, the level of uncertainty stemming from both factors listed above was reduced. That is, uncertainty regarding the scope and stringency of the regulation as well as the time schedule for promulgation was reduced. The Federal standard will provide uniformity and the risk premium associated with regulatory uncertainty will be further reduced, thereby reducing the cost of financing. The response to Commenter IV-D-220 in Section 3.6.4 addresses the commenter's point on the possible effects of uncertainty on construction of new MWC's.

<u>Comment</u>: One commenter (IV-F-1.7) believed that the proposed emission levels are not well demonstrated and will not be guaranteed by vendors. He commented that it will be difficult to obtain financing for the retrofit without good assurance that the emission levels will be met.

Two commenters (IV-D-164, IV-D-184) said vendors will not guarantee the acid gas levels proposed for regional existing MWC's. He said this would result in increased costs due to built-in risk premiums or in public assumption of financial liability without a vendor guarantee.

<u>Response</u>: The emission levels included in the final guidelines have been demonstrated. As explained in

Section 7.5.5, the SO_2 reduction for existing very large MWC's was changed from 85 percent to 70 percent (block 24-hour geometric mean), and the HCl reduction was changed from 95 percent to 90 percent. The SO_2 level has been demonstrated based on statistical analysis of long-term CEM data from a SD/ESP controlled MWC, and the HCl level is demonstrated based on tests at three MWC's with SD/ESP systems. Since the acid gas levels in the final guidelines are well demonstrated, vendors should not include high risk premiums in the costs of the control technologies. Communities and vendors are free to negotiate vendor guarantees.

Comment: One commenter (IV-D-238) said that the alternative of requiring SD/FF control on existing plants smaller than 2,000 Mg/day (2,200 tpd) was not analyzed in the final economic analysis and was prematurely dismissed by EPA.

Response: Regulatory Alternative IV, as described in the proposal preamble, considered application of SD/FF to all plants larger than 225 Mg/day (250 tpd). The national cost, emission reduction and economic impacts on households and governments associated with this alternative are included in the BID volume on economic impacts (EPA-450/3-89-005). Furthermore, after proposal costs of SD/ESP control were estimated for model plants between 45 Mg/day (50 tpd) and 2,050 Mg/day (2,250 tpd) and compared to costs of DSI/ESP and SD/FF. As described in Section 7.5.5, based on this analysis, it was determined that SD/ESP control represents the best demonstrated technology, considering costs, for MWC plants larger than 1,000 Mg/day (1,100 tpd). The additional cost of SD/FF is unwarranted considering the relatively small additional emission reduction it would achieve compared to SD/ESP control. For plants in the 225 to 1,000 Mg/day (250 to 1,100 tpd) size range, the best demonstrated technology, considering costs and other factors, is DSI/ESP as concluded at proposal.

Comment: One commenter (IV-D-115) said that the "negative externalities" argument in support of emission regulations does not apply to most MWC's. The commenter states that MWC's are generally located within the community that they serve, and that each community internalizes the costs associated with pollution from its MWC but, in turn, pays lower prices for waste disposal. The commenter also said that communities using nearby incinerators to dispose of their waste come closer to internalizing their waste disposal costs than do communities exporting their waste to distant landfills.

Response: The phenomenon of "negative externalities" exists when compensatory markets fail to arise when the actions of one party damage another party. The commenter argues that the absence of such markets in the case of MWC emissions is not such a market failure but a reflection of the internalization by the community of the benefits and costs of current emission levels.

There are many instances, particularly in the case of merchant MWC plants, in which the MWC facility serves communities other than the one in which it is located. Furthermore, the cost and benefits of higher MWC emissions are ultimately borne by individuals, not communities. Individuals living in the immediate vicinity of an MWC are likely to have higher levels of exposure to emissions than those living in more remote areas of the same community, yet the Agency knows of no instance where greater exposure is "internalized" by lower waste disposal prices at the individual or household level. It is the Agency's opinion that the absence of compensatory markets for MWC emissions is a reflection of one or more sources of "market failure." Under these circumstances, it is appropriate for the Agency to use the "negative externality" argument as part of its justification for regulation of MWC's. Without commenting on the merits of the commenter's assertions regarding the relative "negative externalities" of landfills and MWC's, the Agency has already proposed more stringent emissions regulations for sanitary landfills under Subtitle D of RCRA.

7.6.5 Benefits Analysis

Comment: One commenter (IV-D-60) said the cost-benefit analysis does not adequately consider MWC's with capacities below 45 Mg/day (50 tpd). She said the analysis indicated potential threats to health and the environment from direct inhalation, but presented no information on the emission rates of very small MWC's (e.g., 5 Mg/day [5 tpd] capacity) or their relative contribution to ambient air pollution.

Response: As explained in Chapter 1, the guidelines currently being promulgated apply only to MWC units with capacities greater than 225 Mg/day (250 tpd). Therefore, MWC's of the size discussed by the commenters will not be subject to these guidelines. However, under Section 129 of the CAA Amendments of 1990, guidelines applicable to MWC units smaller than 225 Mg/day (250 tpd) will be promulgated within 2 years. The inclusion of a lower size cutoff will be considered as part of that rulemaking.

Comment: Two commenters (IV-D-152, IV-D-184) requested further documentation on the benefits analysis methods.

Response: More complete documentation on the methods employed in the benefits analysis is provided in the RIA. The benefits analysis valued PM and SO_2 emission reductions only. Insufficient effects or valuation information was available to value reductions in other pollutants.

The valuation factor used to estimate PM benefits was based on a site-specific analysis of 44 MWC's. Air quality changes around these sites were modeled and mortality, morbidity, and household soiling effects were predicted. The valuation factor was then calculated as the average dollar value per Mg (ton) of PM reduced based on valuations of reduced mortality risks, reduced medical expenditures, increased wages earned, and reduced cleaning expenditures.

The $1,250/Mg ($1,130/ton) valuation factor used to estimate SO_2 benefits in the BID was based on a policy-derived guideline value and thus does not truly reflect economic benefits. This estimate, however, is not inconsistent with results from the partial benefits analysis presented in the Industrial Boilers SO_2 RIA (Docket No. A-89-08, Item No. II-A-058). Instead of employing the policy-derived $1,250/Mg ($1,130/ton) valuation factor, the MWC RIA derived a valuation factor based on the industrial boilers analysis. The best estimate valuation factor was calculated to equal \$1,038/Mg (\$942/ton). This number, however, was computed based on a partial benefits analysis and thus may be considered a low-end estimate.

<u>Comment</u>: One commenter (IV-D-115) believed that the approach used to develop exposure estimates for the PM benefits analysis was too simplistic. This commenter questioned several of the assumptions employed in the exposure assessment and said the model used to predict concentrations for the 44 sites studies was a data base model that <u>simulates</u> the ISC dispersion model and is therefore of questionable accuracy.

This commenter also believed that: (1) the estimated dose-response relationship used to predict acute morbidity effects was inaccurate; (2) that estimated benefits from reduced household soiling should be removed (since the assumption that cleaning expenditures would be reallocated to other priorities after an air quality improvement is not justifiable) and; (3) that a shutdown control measure was used to estimate benefits, but that the benefits of smaller control measures will be lower.

<u>Response</u>: The Model City Program was used to predict PM concentration changes after control around the 44 sites analyzed. The program considers source characteristics and climatological conditions in making concentration predictions. The program does simulate ISC dispersion modeling and is therefore a less accurate predictor than true ISC modeling. However, the Model City Program has been shown to perform nearly as well as full-scale ISC modeling (see, Versar, Inc., Assessment of the Performance of the Model City Program, January 1988). Since the Model City Program is much less time and resource intensive than ISC modeling, it was selected for this analysis.

Acute morbidity effects were predicted using a published analysis by Ostro (Journal of Environmental Economics and Management, 14(1), 1987). This analysis employed predictions of fine particulate concentrations that were based on airport visibility data. To the extent that these predictions of fine particle concentrations are inaccurate, the prediction of acute morbidity effects could be inaccurate. Nevertheless, it was judged that the Ostro analysis provided the most reliable source of exposure response functions to predict acute morbidity effects available at the time. Uncertainty in the benefit estimates is recognized.

The Agency disagrees with the commenter's contention that the assumption that cleaning expenditures would be allocated to other priorities after an air quality improvement is unjustifiable. This assumption follows from straightforward economic theory. In any case, the household soiling model was based on empirically estimated demand equation changes caused by changes in PM concentrations.

The shutdown control scenario was used to obtain an estimate of the average benefit per Mg (ton) removed. This estimate was then multiplied by the emission reduction estimates based on the actual regulatory alternatives analyzed. This procedure assumes that the relationship between emission reductions and benefits is linear. Unlike with costs (where costs may be expected to increase at an increasing rate with emission reductions), there is no clear expectation that benefits should be nonlinear with emission reductions over the range of PM changes under consideration. Thus, linearity was assumed.

Comment: One commenter (IV-D-03) stated that the valuation factor employed for SO_2 appears to be low when compared with valuation factors used in some previous regulatory packages and that no attempt was made to calculate benefits resulting from HCl emission reductions. This commenter suggested that a more complete benefits analysis might support a guideline for acid gas control on small MWC's.

Response: The SO_2 valuation factors employed in the BID and RIA were representative of the valuation analysis performed in the Industrial Boilers RIA. The industrial boilers analysis was judged to be the best source to derive a valuation factor for SO_2 reductions from MWC's. Nevertheless, it is recognized that much uncertainty exists regarding the appropriate size of this factor.

Given the magnitude of HCl emission reductions from the proposed regulations, the feasibility of performing an HCl benefits analysis has been explored. Unfortunately, sufficient effects and valuation information was not available to perform such an analysis at this time.

Comment: Three commenters (IV-D-60, IV-D-158, IV-D-184) suggested that the benefits analysis should be site-specific and employ concentration modeling and exposure assessments.

Response: The PM benefits analysis was based on 44 existing MWC sites and it did not employ concentration modeling and an assessment of population exposure. It was not possible given data, time, and resource constraints to perform such a detailed analysis for emission reductions of other pollutants.

Comment: One commenter (IV-D-184) questioned the size of the PM valuation factor employed, stating that it was high relative to previous EPA estimates.

Response: There are two main reasons why the PM valuation factor employed was higher than that used in previous Agency analyses. First, recent estimates of the value of a statistical life saved have increased. Second, and most importantly, many MWC's are located in heavily populated areas. Hence, the estimated average exposure reduction per Mg (ton) of PM reduced from the proposed MWC regulations was substantially greater than that anticipated or found in previous analyses of regulations reducing PM emissions.

Comment: One commenter (IV-D-158) believed that the benefits of the regulation are substantially lower than the costs.

Response: Total estimated costs exceeded quantified benefits. However, despite quantifying substantial benefits from the regulation, the benefits analysis is very much incomplete. In particular, potentially substantial benefits from acid gas control could not be quantified at this time. Hence, the Agency cannot conclude anything about the size of the net benefits from the regulation.

Comment: Two commenters (IV-D-158, IV-D-232) noted that a complete benefits analysis of the materials separation requirement was not performed.

Response: No attempt was made to compute dollar benefits resulting from the proposed materials separation requirement. Data availability prevents such a benefits assessment at this time.

Comment: One commenter (IV-D-148) asked if credits were taken for removal of MWC emissions that would not come from other solid fuel fired combustors or for removal of MWC emissions that would not occur because of the 25-percent materials separation requirement.

Response: Emission reduction estimates do not include emissions that would not come from other solid fuel fired combustors and they do not account for the projected impact of the 25-percent materials separation requirement proposed by the Agency but withdrawn from the final rules. Steam and electricity generated at MWC's displace steam and electricity that would be generated by coal or other fuel. Theoretically, a benefit from MWC's derives from a reduction in emissions from these other sources. However, the change in the amount of energy displaced as a result of the standards and guidelines is not known.

7.7 SELECTION OF FORMAT OF PROPOSED GUIDELINES FOR MUNICIPAL WASTE COMBUSTOR EMISSIONS

Comment: One commenter (IV-D-143) said regulation of dioxins/furans as total emissions is not supported by current toxicity data and is inconsistent with recent EPA guidance documents and State regulations. He said if EPA enacts inconsistent regulations, consideration should be given to existing facilities which designed their control strategies based on the guidance documents.

Response: The reasons for selection of a total dioxin/furan format rather than a TEF format are explained in the response in Section 3.7. The total dioxin/furan limit is appropriate to assure control technology performance. The same control technologies would be used, and operation of these controls would be the same, to control total dioxins/furans versus TEF. Emission test data on total dioxin/furan emissions were evaluated to determine what levels are achievable with demonstrated control technologies for existing MWC's. The costs of retrofitting existing facilities to achieve these levels were estimated in the BID for the guidelines (EPA-450/3-89-27e), and the Agency determined the costs were reasonable.

The test method to determine total dioxin/furan emissions (Method 23) may also be used to determine TEF by performing different calculations. Therefore, double testing is not required if State agencies of designated facilities find it necessary to determine emission levels in units of TEF.

7.8 PERFORMANCE TEST METHODS AND MONITORING PROVISIONS FOR MUNICIPAL WASTE COMBUSTOR EMISSIONS

7.8.1 Periodic Testing

Comment: One commenter (IV-D-115) thought there should be equitable and similar stack testing requirements for all pollutants at all existing facilities.

Response: Section 111 of the Clean Air Act allows for the Agency to distinguish among classes, types and sizes within categories of affected sources for the purposes of establishing emission guidelines. The best demonstrated technology considering retrofit costs and other impacts of controls was selected for the various types and size classes of existing MWC's. Guideline emission limits were then set to reflect performance of these technologies. The Agency considers the guidelines equitable.

7.8.2 Continuous Monitoring

Comment: One commenter (IV-D-115) thought there should be similar CEM requirements for all pollutants at all existing facilities.

Response: All existing MWC units larger than 225 Mg/day (250 tpd) are subject to the same continuous emission monitoring requirements for SO_2, CO, opacity, load, and temperature.

7.8.3 Comments on Proposed Test Methods

Comment: Some commenters (IV-D-101, IV-D-111, IV-D-155, IV-D-164, IV-D-184) said the issue of how to measure percent SO_2 reduction in systems where sorbent is injected into the furnace or fuel should be addressed if a percent reduction is required. One of the commenters (IV-D-101) said his company has developed a measurement method and has used it to test the DSI system at one MWC and the ammonia injection NO_x control system at another MWC. A description of the methodology was included in Comments IV-D-101 and IV-D-155. Another (IV-D-184) said stack testing with the control system on and off could bias the uncontrolled value on the low side due to residual sorbent in the system. Stack test results compared to potential emissions based on the sulfur/chlorine content of the waste or historic stack test data would also be unreliable due to waste stream variability. The commenter (IV-D-184) felt EPA should develop a standardized testing technique for the measurement of the percent reduction for in-furnace DSI, or an alternate emissions limit for this special case.

Response: The Agency agrees that where furnace sorbent is used, simultaneous acid gas control device inlet and outlet SO_2 levels cannot be obtained and used to calculate permit reduction. However, alternative procedures to demonstrate compliance can be used in these cases. Under the General NSPS Provisions, "After receipt and consideration of written application, the Administrator may approve alternatives to any monitoring procedures or requirements of this part..." [see 40 CFR 60.13(i)]. The procedure submitted by the commenter may be applicable as an alternative method of monitoring compliance. However, details on the use of this or other alternative monitoring methods would need to be developed and submitted for approval on a case-by-case basis under the provisions of 40 CFR 60.13(i).

In order to aid owners or operators of facilities using FSI who may wish to refine this method for use at their facilities, the commenter's letter and an EPA memorandum describing the procedure have been included in the docket (see

Docket A-89-08, Item No. IV-B-22). In general, the procedure described in the memorandum involves measuring emission levels for a period of time without sorbent addition to establish the uncontrolled emission level. The sorbent injection system would then be turned on at predetermined system operating conditions and the resulting SO_2 level would be recorded. The key operating conditions (e.g sorbent feed rate and flue gas temperature) during the test would also be recorded. By repeating this procedure several times at different system operating conditions (e.g., different sorbent feed rates), a relationship between measured outlet SO_2 concentration and the key operating variables versus the uncontrolled SO_2 concentration would be established.

Future compliance with the SO_2 percent reduction requirements would be based on the measured outlet SO level and measured values of key control system parameters. These data would then be compared to the data collected during the compliance test to estimate the uncontrolled SO_2 concentration. The measured outlet SO_2 concentration and estimated uncontrolled SO_2 concentration would then be used to calculated SO_2 percent reduction and compliance with the percent reduction requirement.

Not operating the control device while testing in order to demonstrate compliance with the percent reduction standard could conflict with the NSR provisions governing modifications to major stationary sources. To avoid such a conflict, in the final standards and guidelines, not operating the control device for such purposes are exempted from being considered "physical change or change in the method of operation" for NSR purposes.

<u>Comment</u>: Two commenters (IV-D-124, IV-D-137) said that if Method 23 is used as the compliance method, then the 125 ng/dscm (50 gr/billion dscf) emission guideline will have to be evaluated with respect to any differences between the ASME protocol used for guidelines development and the proposed Method 23.

Response: The promulgated Method 23 test procedure is identical to the method used to gather the emission data used to support the standards and guidelines, and no additional evaluation is needed.

7.9 ENFORCEMENT, REPORTING AND RECORDKEEPING PROVISIONS FOR MUNICIPAL WASTE COMBUSTOR EMISSIONS

Comment: One commenter (IV-D-20) questioned how EPA would enforce emissions guidelines at the Federal level in the event that States failed to issue regulations.

Response: In the event that a State fails to do so, Section 111(d)(2) of the CAA provides that the Administrator has the authority to prescribe a plan for a State and to develop, promulgate, and enforce regulations under such a plan.

7.10 MALFUNCTION PROVISIONS

Comments on the malfunction provisions apply to both the NSPS and guidelines and are presented in Section 3.10.

7.11 LEGAL CONSIDERATIONS

Comment: Two commenters (IV-D-169, IV-D-190) stated EPA does not have the authority to issue standards for PM and SO_2 for existing sources. They said that under Section 111(d) of the CAA, EPA can only regulate pollutants from existing sources that are not already regulated or are not listed under Section 108(a), NAAQS, or Section 112(b), NESHAP.

Response: The pollutant "MWC emissions" has been designated under Section 111 of the CAA. Section 111(d) provides for development of State plans and "standards of performance for any existing source for any air pollutant (i) for which air quality criteria have not been issued or which is not included on a list published under Section 108(a) or 112(b)(1)(A) but (ii) to which a standard of performance under subsection (b) would apply if such existing source were a new source." Regulation of existing MWC's for the pollutant MWC emissions fits these criteria.

The standards of performance are established for this pollutant. Nothing in the CAA prohibits the regulation of a composite pollutant. Indeed, Section 302(g) defines air pollutants an "any air pollutant agent or combination of such agents . . . ." The pollutant MWC emissions is a composite mixture of multiple compounds that affect public health. Municipal waste combustor emissions contain 100 or more components. These compounds generally fall into three subcategories: MWC organics, MWC metals, and MWC acid gases. The category MWC organics includes dioxins/furans, PIC's, and other organic compounds; MWC metals include lead, mercury, cadmium, nickel, chromium, arsenic, beryllium, and other metals; and MWC acid gases include SO_2, HCl, and hydrogen fluoride. It is the broad range of constituents of each of these subcategories that led to the determination that MWC's should be regulated under Section 111.

Conceivably, the Agency could require a source to measure all of the individual components of MWC emissions and establish standards of performance for each one of them. Such an undertaking would, however, impose extremely burdensome and expensive requirements on a source. Rather, the Agency determined that it would be far more practical to establish compliance limits for a certain number of pollutants that would serve as surrogates for the entire range of MWC emissions. Measurement of a limited number of the specific components of the composite pollutant should not be construed to suggest that it is only those components of the mass of MWC emissions that the Agency seeks to regulate. The guidelines the Agency is issuing provide a high level of control of total MWC emissions in a manner that avoids the administrative burden and expense associated with monitoring and measuring all components of MWC emissions.

In order to ensure that the components of MWC emissions (MWC acid gases, MWC metals, and MWC organics) are controlled, emission levels and monitoring provisions in the guidelines include some criteria pollutants regulated under Sections 108 to 110, specifically there are SO_2, CO, and PM levels. These pollutants are used as surrogates because they can be readily measured and indicate control of the other pollutants that are part of MWC emissions. In particular, SO_2 emissions limits (along with HCl limits) ensure MWC acid gas control. Particulate matter emission limits ensure MWC metals control without testing for each and every metal. And CO is one of several emissions parameters monitored to assure MWC organics control. This is a much more practical approach than setting limits for the dozens, if not hundreds, of individual compounds in MWC emissions.

Comment: Several commenters (IV-F-1.6, IV-F-1.7, IV-F-2.5, IV-F-2.32, IV-F-3.2, IV-D-78, IV-D-101, IV-D-111, IV-D-115, IV-D-137, IV-D-139, IV-D-145, IV-D-152, IV-D-155, IV-D-164, IV-D-231) said the 2,000 Mg/day (2,200 tpd) capacity distinction between large and regional MWC plants was not justified. Some (IV-F-2.5, IV-D-115, IV-D-145, IV-D-231) said that the EPA's decision to require existing "regional" facilities to meet more stringent guidelines is arbitrary and capricious. Another (IV-D-152) said the decision is unlawful and ignores the requirements of Section 111. He said the EPA's model plant approach fails to address either site-specific costs or environmental benefits of imposing the more stringent standards on these facilities. Some commenters said the BID's and the regulatory alternatives did not present an analysis of regional MWC's as a distinct category. (See additional comments and responses on the regional size classification which do not address legal issues in Section 7.5.5.1.)

Response: The guidelines for very large (regional) plants are not arbitrary and capricious, and the distinction between large and very large plants is justified. The final guidelines for very large MWC's reflect several changes since proposal. First, the final guidelines define very large MWC plants as those with capacities larger than 1,000 Mg/day (1,100 tpd) rather than 2,000 Mg/day (2,200 tpd) as proposed. Second, emission levels for these plants are based on SD/ESP rather than SD/FF as best demonstrated control technology considering cost and other factors. Consistent with this decision on best demonstrated technology, the MWC acid gas and dioxin/furan limits are slightly less stringent than those proposed for regional plants. Control costs for SD/ESP systems are considerably less than the costs for SD/FF retrofit, because at many plants the SD/ESP option will allow use of existing ESP's, whereas the SD/FF option would require removal of ESP's and complete replacement with a FF system.

These changes were made based on a new analysis of control performance and costs of SD/ESP systems that was done after proposal in order to respond to comments and to determine what level of control was appropriate for very large MWC's and what the size category breakpoint should be. The analysis included model plants from 45 Mg/day (50 tpd) to 2,050 Mg/day (2,250 tpd). Costs and emission reductions for DSI/ESP, SD/ESP, and SD/FF controls were examined over the same range.

The analysis showed that control cost per Mg (ton) of MSW combusted and incremental cost effectiveness per Mg (ton) of acid gas control is similar for plants with capacities above 1,000 Mg/day (1,100 tpd), but costs increased more rapidly for plants below this size. For example, costs of SD/ESP control for model plants of 1,000 Mg/day (1,100 tpd) to 2,050 Mg/day (2,250 tpd) were in the range of $9 to $12/Mg ($8 to $11/ton) of MSW combusted, but for model plants from 180 to 800 Mg/day (200 to 900 tpd), costs were $19 to $30/Mg ($17 to $27/ton) of MSW. Further information on the results of the analysis is presented in Section 7.5.5.1, but these results support defining very large plants as those with capacities above 1,000 Mg/day (1,100 tpd).

For very large plants, the costs of SD/ESP control systems are reasonable. However, as described in Section 8.5.5.1, it was determined that the additional cost of SD/FF control was unreasonable given the relatively small additional emission reductions that would be achieved.

There are about 45 very large existing MWC plants with capacities above 1,000 Mg/day (1,100 tpd). About 27 are already controlled with SD/ESP or equivalent controls, while the other 18 are controlled with ESP's and would be expected to retrofit acid gas controls under the guidelines. Economic analyses concluded that no severe economic impacts are expected to result from these guidelines.

Some of the commenters suggested that site-specific situations be considered. The model plants were developed to be representative of the various sizes and types of existing facilities, and retrofit costs due to space constraints and downtime were included in the analysis. The results of the analysis, and the guidelines, are therefore appropriate for the vast majority of existing plants. The provisions of 40 CFR 60.24(c) specify that State standards must generally be at least as stringent as the guidelines. However, Section 60.24(f) allows States to consider site-specific factors that may justify a less stringent standard on a case-by-case basis. Such specific analyses are better left to State and local agencies.

7.12 WORDING OF GUIDELINES

Comment: One commenter (IV-D-93) said Section 60.38a should be explicit in exempting small facilities from HCl and SO_2 testing and monitoring requirements since there are no corresponding guideline emission levels.

Response: The guidelines currently being promulgated do not cover small facilities.

Comment: One commenter (IV-D-257) said the term "significant liability" which is used to define the phrase "contractual obligation" under modification and reconstruction of existing MWC's should itself be defined in terms of a specified percentage of the cost of a designated facility.

Response: As provided in the General Provisions in 40 CFR 60.2, if an owner or operator has undertaken or entered into a contractual obligation to undertake a continuous program of construction or modification prior to proposal of the MWC NSPS, the MWC is considered an existing source and is subject to the emission guidelines. If such a contractual obligation did not exist prior to proposal, the source would be considered a new source subject to the NSPS. A contractual obligation is one that cannot be canceled without incurring significant liability (Potomac Electric Power Co. v. EPA, 650 F.2d 509, 513-515 [4th Cir. 1981]). The Agency has long used this threshold standard of "significant liability" for determining when a source has commenced construction for purposes of Section 111. To the extent that the commenter is challenging the General Provisions of 40 CFR 60.2, that is outside the scope of this rulemaking. The same principle would apply to any contractual obligation entered into for purposes of modification or reconstruction. It should be noted, however, that as to "reconstruction," a specific economic test is applied to determine whether the existing source will be subject to the new source standards. The provisions of 40 CFR 60.15 specify that if the fixed capital costs of the new components exceed 50 percent of the fixed capital cost of a new unit, then the new source would be considered a reconstructed source.

Comment: One commenter (IV-D-258) pointed out that in Subpart Cb, Section 60.30b, the emission guideline for sulfuric acid must have been improperly converted from 0.25 g/kg sulfuric acid produced to 0.05 lb/ton. The correct conversion is 0.5 lb/ton.

Response: Subpart C of 40 CFR Part 60 is being amended to include the new MWC regulations. Subpart Ca is being designated for MWC's while Subpart Cb is being designated for sulfuric acid production plants. The Agency agrees with the commenter that the actual conversion of 0.25 g/kg is 0.5 lb/ton. The incorrect number was due to a typographical error and will be corrected.

7.13 COMPLIANCE TIMES FOR MUNICIPAL WASTE COMBUSTOR EMISSIONS

Comment: Several commenters (IV-F-1.11 and IV-D-158, IV-F-2.5, IV-D-115, IV-D-132, IV-D-134, IV-D-137, IV-D-158, IV-D-219, IV-D-257) argued that a 3-year compliance time is inadequate for most existing MWC's. One of the commenters (IV-D-134) said the 3-year compliance period provides no opportunity for phasing of individual units. One commenter (IV-D-257) stated the analysis provided in the NPRM failed to include time for obtaining approval of state permits to construct new air pollution control equipment. Another

(IV-D-115) felt the compliance time did not include time required for land acquisition for additional equipment, engineering activities, or contractual negotiations and financing. Another commenter (IV-F-1.11 and IV-D-158) suggested that due to site-specific factors, each plant would have to go through a lengthy design process, and test control systems on a pilot scale to ensure they would achieve the desired results before shutting down the MWC and performing the full-scale retrofit. He said a 6-year compliance time would be more reasonable. He suggested that the longer compliance time be included in the guidelines rather than expecting States to analyze each case and determine when compliance times longer than the proposed 3 years are reasonable. Other commenters (IV-F-2.5, IV-D-115, IV-D-132) agreed but suggested a 5-year or 10-year compliance time.

One commenter (IV-D-137) discussed a case study of a MWC acid gas cleaning system retrofit. Even with diligent planning, engineering and permitting activities, the installation and demonstration of compliance took 42 months. The commenter said EPA should keep in mind that during the same period of time that existing MWC's will be expected to install acid gas controls and FF's or upgrade their ESP's, over 250 fossil fuel fired electric utility units potentially will be undergoing SO_2 scrubber retrofits under acid rain legislation. This could lead to delays due to shortages in qualified manpower to install the devices. The commenter also pointed out that State requirements could be more stringent than the Federal standards and thus industry will not be able to begin planning engineering and permitting before the actual promulgation of the State standards. The commenter suggested the compliance time be extended to 6 years.

One commenter (IV-D-219) stated the New York City Department of Sanitation has a complex program planned, designed and funded to upgrade three operating incinerators, which will allow the facilities to comply with the emissions requirements of the proposed guidelines. The incinerators are being retrofitted in accordance with a 200-million dollar, 5-year capital plan, that began in calendar year 1990 and anticipates completion by December 1995. The City will be unable to comply with an EPA retrofit deadline that becomes effective any time before December 1995. The commenter said if a municipality like New York City which already has a planned, designed, and funded upgrade program cannot comply with the proposed time frames, then those time frames would not be realistic for those municipalities which do not already have upgrade programs in place. Therefore, he proposed that EPA amend its existing incinerator guidelines to authorize States to extend the compliance deadline for municipalities that have an established retrofitting program.

In addition, two commenters (IV-D-78, IV-D-70) pointed out that for publicly owned MWC's more time would be needed for voter education and tax approval. One of these (IV-D-70) suggested greater flexibility in compliance times. The other commenter (IV-D-78) said the EPA's suggestion of raising tipping fees to offset the cost of the regulation is an overly simplified approach. The commenter recommended that EPA add specific contingencies to the time frame for compliance to allow for individual problems within municipalities. The commenter also pointed out that major utilities were given a 10-year compliance period yet emissions from coal utilities are much higher than those from MWC's.

Several commenters (IV-F-3.13, IV-D-56, IV-D-104, IV-D-105, IV-D-117) thought the compliance time is too long. Two commenters (IV-F-3.13, IV-D-56) said the compliance time should be shortened to 1 year after promulgation of the standards. Others (IV-D-105, IV-D-117, IV-D-186) contended if the EPA's own assessment indicates compliance could be reasonably achieved in 19 to 25 months, then there is no reason to allow any more time. Two commenters (IV-D-104, IV-D-199) thought compliance would require 18 to 24 months. The commenters suggested a two-tiered approach. Facilities that could achieve emission standards through process changes, operating training, and so forth without requiring retrofitting should be allowed 18 months for compliance, while facilities requiring retrofit of controls would be allowed around 23 months.

Response: The 3-year retrofit compliance time for existing facilities is being retained in the final guidelines. During the development of the proposed guidelines, the Agency analyzed available information in order to determine what length of time would be reasonable for most designated facilities to achieve compliance with the guidelines. The amount of time required for an existing MWC plant to retrofit its current control system to comply with the proposed emission guidelines will depend on the individual characteristics of the plant. Some important plant characteristics are the MWC design type, the MWC size, the controls currently in place, and the amount of available space near the MWC. These characteristics will influence such considerations as the time needed to design the retrofit system, the time delay anticipated when ordering necessary equipment, and time needed to construct, install, and start-up the retrofitted system.

While some facilities will require little or no modification to meet the guidelines, many will require significant retrofitting. It is estimated that typical time to retrofit sorbent injection and upgrade an existing ESP (including front-end engineering, vendor selection, fabrication, on-site construction, and downtime) would be 15 to 24 months. However, if there are significant space limitations impacting construction, an additional 6 months may be required. The time needed for a SD retrofit and ESP upgrade would be up to 25 months in a typical case, although again, an extra 6 months could be required if there are severe space constraints. Since these technologies are commercially available and demonstrated, and important design factors are known, pilot scale testing would not be needed at every MWC prior to full scale retrofit (in contrast to the suggestions of one of the commenters). As a result of these analyses, the Agency concluded that 3 years would be a sufficient interval for typical facilities to achieve compliance.

The Agency's established policies and regulations for implementing revisions to State plans resulting from implementation of Section 111(d) guidelines provide allowances for case-by-case consideration of unique concerns that may justify longer compliance times for individual designated facilities (see 40 CFR 60.24(f)). In this instance, however, the Agency anticipates few variances in compliance times. The lead time between proposal of the guidelines and the Agency's promulgation of actual approvals of State plan revisions will provide additional time for planning and design of additional emission control retrofits for designated facilities. Further, the flexibility inherent to the process of State plan development provides for shorter compliance times when appropriate. The Agency does note that certain designated facilities are already capable of meeting the control levels specified in the guidelines.

Comment: One commenter (IV-D-93) stated he operated a small 11 Mg/day (12 tpd) capacity MWC that began reconstruction and rehabilitation prior to publication of the proposed guidelines. Noting that the incinerator will have a finite life and that the cost of retrofitting new controls might force the facility to shutdown, the commenter asked to be exempted from the guidelines until the end of the useful life of the MWC when restored.

Another commenter (IV-D-70) thought existing incinerators that are currently meeting the EPA standards should be given maximum latitude in meeting the new standards. He felt the publicly owned modular incinerator in his area should be allowed to complete its short life expectancy before significant modifications are required in order to avoid placing significant financial burdens on the community.

Response: The facility identified by the first commenter is not subject to the guidelines currently being promulgated since these guidelines apply only to MWC units larger than 225 Mg/day (250 tpd). In regard to the age of the combustion units, under 40 CFR 60.24(f) States are allowed to consider site-specific factors including plant age or life expectancy when developing regulations pursuant to the guidelines. State standards may be developed for a particular source that are less stringent than the guidelines, however, the reasons for doing so would have to be clearly justified.

Comment: Two commenters (IV-D-152, IV-D-184) requested guidance from EPA on establishing priorities for retrofit compliance time frames. The commenters stated that since all retrofit applications cannot be processed by State agencies at the same time, a priority time frame based on current impact or level of technology is warranted. Commenter IV-D-184 wanted guidance on evaluation criteria for site-specific cost-benefit analyses to determine priorities. The commenter suggested the schedule could be established as part of the implementation plan required under Section 111(d). In addition, one commenter (IV-D-184) thought an expedited permit and review process should be established. While noting that individual States are best equipped to establish the procedures, he thought that guidance from EPA would be helpful to provide consistency.

Response: The guidelines contain a compliance time of 3 years. The bases for this compliance time are described in the first response in this section. State plans are expected to require that MWC's comply within this time period. States must follow the procedures in 40 CFR 60.23 and 60.24 for adopting plans and developing specific compliance schedules within this 3-year retrofit period that include increments of progress. As described in previous responses, there are provisions to allow States to establish shorter or longer compliance times on a case-by-case basis if the need is demonstrated.

8.0 EMISSION GUIDELINES - MATERIALS SEPARATION

Chapter 8.0 includes comments which pertain specifically to materials separation issues for existing facilities. Where a comment applied to both new and existing facilities, it is presented in Chapter 4.0 and has not been duplicated in this chapter.

8.1 SELECTION OF MATERIALS SEPARATION PROVISIONS

8.1.1 Percent Separation

Comment: One commenter (IV-D-109) opposed a specific separation level for existing facilities. The commenter said that installation of separation equipment to existing facilities may be impractical or cost prohibitive, and the MWC would then have to rely on off-site separation which would not be in the control of the MWC operator. The commenter felt that the requirements should not be imposed where an operating MWC is a part of the established waste disposal infrastructure in that area.

Response: While the Agency has determined that the materials separation requirements are technically achievable for existing facilities, for reasons described in the preamble to the NSPS, the Agency has decided not to require 25 percent materials separation as a national presumption for existing sources at this time.

Comment: One commenter (IV-D-109) said that their State had one existing MWC and that the materials separation guidelines would conflict with the State's recycling goals and ongoing recycling efforts.

One commenter (IV-D-196) from a small town with an existing MWC supported the 25-percent requirement, but said that few small communities could achieve more than this level.

Response: The Agency analyzed the feasibility and cost of materials separation and determined that the 25-percent requirement is technically achievable. However, for reasons described in the NSPS preamble, the Agency has decided not to require materials separation as a national presumption for existing sources at this time.

8.1.2 Lead-acid Vehicle Battery Prohibition

Comments on the proposed lead-acid vehicle battery prohibition apply to both the NSPS and guidelines and are presented in Section 4.1.2.

8.1.3 Household Battery Separation

Comment: Two commenters (IV-D-78, IV-D-126) said that removing batteries would be prohibitively expensive for their respective towns. Commenter IV-D-126 was also unsure about what should be done with the batteries once they are separated.

Response: The proposed requirement for household battery and lead acid battery separation have not been included in the final standards, and communities will not incur associated costs.

8.2 IMPACTS OF PROPOSED MATERIALS SEPARATION GUIDELINES

8.2.1 Environmental

Comment: One commenter (IV-F-2.8) opposed the materials separation requirements and said that their MWC was undersized by design and only burns a portion of the community's waste. If they have to separate 25 percent, they will bring in other waste and burn the same amount of waste that they are presently burning. Therefore, air emissions and ash will not be reduced. The commenter added that even if inputs to MWC's are reduced, air emissions and ash generation from coal-fired power plants will increase since these plants will have to compensate for the energy not produced by MWC's. Other commenters (IV-F-1.3, IV-F-1.35, IV-D-138, IV-D-139, IV-D-232) also said the provisions would also not reduce air emissions unless existing facilities were de-rated. Any reduction in the amount of combustibles resulting from these provisions locally would immediately be filled by surrounding communities' wastes, because of the demands for combustor capacity.

Another commenter (IV-D-184) said that the reduction in materials could cause an MWC to have to operate below capacity, and this could cause increased emissions if the MWC has to operate outside of design conditions.

Response: Separation programs generally would not tend to cause existing MWC's to de-rate. Since a shortage of landfills already exists and is expected to increase over time, the capacity needed at MWC's is expected to quickly expand. As source separation and recycling increases in communities served by MWC's, EPA anticipates that most existing MWC's would expand their service areas and still combust a similar amount of waste. Separation programs may reduce the overall capacity of new MWC's needed to meet this demand. However, mandatory separation program requirements are not included in the final guidelines.

8.2.2 Health and Risk Assessment

Comments on health impacts of materials separation apply to both the NSPS and guidelines and are presented in Section 4.2.2.

8.2.3 Energy

Comments on the energy impacts of materials separation apply to both the NSPS and guidelines and are presented in Section 4.2.3.

8.2.4 Cost, Economic, and Market

Comment: Two commenters (IV-D-29, IV-D-70) opposed the materials separation requirements saying they would cause their community's existing MWC to be under-utilized and operationally inefficient, lower steam production and associated revenues, cause financial and administrative burdens associated with administering new programs, and denigrate their commitment to a particular waste management strategy. One (IV-D-70) added that their steam customer would have to make up the lost energy by using scarce natural resources such as gas and oil. Another commenter (IV-F-2.5) said the materials separation requirements amount to a capacity downsizing with potentially great economic impact on existing MWC's.

However, one commenter (IV-D-73) recommended that incinerators should help bear the burden of reducing pollution from both the incineration of recyclable goods and the refining and manufacture of goods replacing those that have been unnecessarily burned.

Response: Separation programs would not tend to cause existing MWC's to operate at reduced capacity. Existing MWC's could receive additional waste from outside their original service area and still combust the same amount. Therefore, there would not be a loss of steam production revenues. However, for reasons described in the preamble, the Agency has decided not to require materials separation as a national presumption for existing sources at this time.

Comment: One commenter (IV-D-06) said that the costs of implementing materials separation programs at existing facilities would be passed on to municipalities and that these monies could be better spent on developing overall recycling programs that are not attached to combustion facilities. Another commenter (IV-D-49) said that their community, which uses an MWC, is implementing a materials separation program without government mandate, and the materials separation requirements will only burden the community with unnecessary regulations and costs. Commenter IV-D-164 said that costs associated with implementation of separation plans, changes in contractual commitments, demonstrating compliance, assessment of markets, and siting additional landfill space or storage (for unmarketed materials), and loss of energy revenues and tipping fees will be devastating for existing facilities.

One commenter (IV-D-116) said that merchant MWC's would be adversely impacted economically if their waste stream is reduced by 25 percent since these plants have been built based on projections of available waste streams.

One commenter (IV-D-78) said that his community invested in an MWC as a practical way to dispose of MSW, and that while they continue to look for innovative and environmentally sound ways to manage waste, the materials separation requirement unreasonably penalizes those who have already chosen MWC's as an option.

Response: The Agency remains convinced that material separation programs can be beneficial for MWC's and the communities they serve. The Agency does not consider separation programs to result in a penalty against communities which have already invested in MWC's. These programs actually would allow the community to expand for a longer period of time before additional MWC capacity is necessary, or an alternative waste management strategy undertaken. However, materials separation is not required in the final guidelines.

Comment: One commenter (IV-D-60) supported the goal of 25 percent separation, but said that the weighing requirements would be costly and would require modifications to their recycling drop-off units.

Response: The specific reference to weighing requirements is moot since the Agency has withdrawn the specific proposed program which included them. However, the costs associated with weighing separated materials are typically considered reasonable. Recyclable materials are usually weighed at the market where they are bought and sold. Also, programs, such as New Jersey's often contain sample forms which provide volume-to-weight conversion factors for a variety of common recycled materials. These conversion factors reduce the difficulty of documenting off-site separation for those communities that do conduct separation activities.

Comment: Two commenters (IV-D-36, IV-F-2.3), from small communities with MWC's, said that markets for recyclable materials are a considerable distance from their respective communities, and the financial burden for acquiring storage facilities and transportation equipment for the separated materials is cost prohibitive and will far exceed the EPA's estimated costs for materials separation.

Response: The Agency determined that most communities with MWC's will not incur severe economic impacts as a result of the guidelines for materials separation programs. However, for reasons described in more detail in the NSPS preamble, the Agency has not included materials separation as part of BDT.

8.3 COMPLIANCE PROVISIONS FOR MATERIALS SEPARATION

8.3.1 Calculation of Percent Separation

Comment: One commenter (IV-D-194) said there was no reasonable rationale for the 10-percent cap on creditable yard waste, and that it would disallow one of the most successful components of the county's existing waste reduction program.

Response: This comment is moot since the 10-percent cap was a component of the proposed EPA program which has been dropped from the final rules. However, the Agency is aware that in some areas, and during some seasons, yard wastes may exceed 30 percent of the waste stream. The 10-percent cap on credit for yard waste in other programs could provide a balance between the goals of encouraging the separation and composting of yard waste and encouraging the separation of other materials.

Comment: One commenter (IV-D-163) said that the proposed emission guidelines should stipulate that materials separated for credit toward the 25-percent requirement cannot be processed into RDF and burned in another boiler. The commenter did stipulate that tires burned for fuel should be creditable.

Response: See Chapter 4.0, Section 4.3.1 for responses to similar comments.

8.3.2 Contractual Arrangements

Comment: Some commenters (IV-D-155, IV-D-158) suggested that the materials separation provisions are in conflict with RCRA provisions prohibiting State and local law from inhibiting or impairing contract negotiations for the supply of wastes to resource recovery facilities.

Response: The commenters refer to RCRA Section 4003(a)(5) which states that State Subtitle D plans "shall provide that no State or local government ... shall be prohibited under State or local law from negotiating and entering into long-term contracts for the supply of solid waste to resource recovery facilities... ." Separation programs would not tend to impede long-term contracts for the supply of solid waste to MWC's. Separation programs merely result in diversion of recoverable materials from the material to be combusted. The Agency believes that such programs not would impede entering into long-term contracts to supply waste to MWC's.

Comment: One commenter (IV-D-137) noted that making the necessary arrangements to perform front-end separation will be much more difficult for existing MWC's, which were built without such separation in mind, and may require retrofit. The commenters said the municipalities served by such MWC's already have contracts, and will not easily share the responsibility for separation, leading to lengthy and acrimonious negotiations over financing the retrofit and establishing the separation program. Another commenter (IV-D-115) noted that existing MWC's would encounter space constraints on the storage of separated materials. However, one commenter (IV-D-263) said that because of the contracts that do exist, separation and recycling will never happen except by mandates such as the proposal.

Response: The final guidelines do not include a materials separation requirement.

Comment: Several commenters (IV-F-1.35, IV-F-2.5, IV-D-137, IV-D-139, IV-D-155, IV-D-158, IV-D-164, IV-D-166, IV-D-194) said that if existing MWC's were effectively down-sized by 25 percent to meet the 25-percent reduction requirements, such actions would interfere with existing contracts. The commenters said the materials separation requirements might result in some communities being unable to fulfill their contractual obligations to the MWC. One commenter (IV-D-115) suggested that MWC's would then be unable to fulfill their contractual obligations to deliver an agreed-upon amount of steam or electricity. Two commenters (IV-D-155, IV-D-158) suggested some municipalities would have to pay for this shortfall in delivered waste. Two of these commenters (IV-F-2.5, IV-D-155) said downsizing may be necessary, perhaps the only way an existing facility may be able to comply with the provisions for materials separation.

Response: The Agency does not expect that MWC's would typically reduce the amount of refuse that is combusted in response to addition of a separation program in a given community. Rather, it expects they would expand their service area such that net combustion after separation would not change. Any MWC project is necessarily a cooperative effort from the onset. Negotiations between the community and the developer/operator are the norm, and financing is often affected by the commitments made. In some cases, the financing is arranged through a bond, again demonstrating community commitment to the project. It is often common for these contractual arrangements to have provisions for the costs associated with meeting new regulations, as well as other "new" costs. Moreover, communities would be expected to realize long-term savings from reduced regular disposal costs, revenues from waste importation to maintain MWC throughout, and revenues from recovered materials sales.

8.3.3 Combustion Permit

Comment: One commenter (IV-D-194) said the combustion permit program is administratively too burdensome. Another commenter (IV-D-163) said that the proposed emission guidelines would promote storage of unrecyclables, which would be environmentally unsound. The commenter noted that the 120-day storage required was logistically unworkable. Some commenters (IV-D-78, IV-D-83, IV-D-107, IV-D-194) said that typical existing facilities lacked the storage capacity to hold materials that could not be recycled for 120 days prior to getting a combustion permit. One commenter (IV-F-1.32) said that to hold 25 percent of 120 days waste receipts at a typical facility receiving 1,360 Mg/day (1,500 tpd), an area about the length of a football field squared and 6 m (18 ft) deep would be required. Other commenters (IV-D-107, IV-D-184) said that these stored materials would present a health threat if stored for an extended period of time.

Response: These comments are moot since they refer to specific implementation processes which were unique to the proposed materials separation requirements which were not included in the final guidelines.

8.3.4 Enforcement Guidance/General Enforcement Comments

Comment: One commenter (IV-D-11) suggested that a list be prepared of each existing facility that would be required to preprocess waste prior to incineration.

Response: These final guidelines do not require any existing MWC to burn "processed waste" as defined in the proposal because the 25 percent materials separations provisions are not included in the final guidelines.

Comment: One commenter (IV-D-93) said it would be difficult to demonstrate the 25-percent requirement since they have no scale at their existing MWC. Another commenter (IV-D-279) from an existing 450 Mg/day (500 tpd) MWC, noted that the existing scalehouse was already near capacity. The commenter was also concerned about the potential for the increased traffic to the scalehouse to result in a negative response on the part of the host community.

Response: The comments are moot since they refer to specific implementations process which were unique to the materials separation requirements proposed by the Agency but not included in the final guidelines.

8.3.5 Battery Separation Compliance

Comment: Commenter IV-D-137 said that the prohibition on lead-acid batteries is even more infeasible for existing facilities than new facilities because existing facilities may not have enough space to retrofit an inspection system. The commenter was also concerned about how compliance would be measured.

Response: The proposed prohibition on the combustion of lead-acid vehicle batteries has not been included in the final guidelines.

8.4 REPORTING AND RECORDKEEPING PROVISIONS FOR MATERIALS SEPARATION

Comment: Four commenters (IV-F-3.6, IV-D-155, IV-D-158, IV-D-279) said that private MWC operations lacked the authority to require households or recyclers to report on their separation activities.

Response: This comment is moot since the potential direct relationship between private MWCs and community recycling was an issue unique to the materials separation requirements proposed by the Agency but not included in the final guidelines.

Comment: One commenter (IV-D-78) said many MWC's in smaller communities lack scale capacity to keep the records necessary to verify the amount of material separated.

Response: This comment is moot since it refers to an implementation process which was unique to the materials separation requirements proposed by the Agency but not included in the final guidelines.

8.5 LEGAL AUTHORITY TO ISSUE MATERIALS SEPARATION GUIDELINES

Comment: One commenter (IV-D-129) was concerned that it had taken too long to develop this proposal, and that many MWC's had been permitted that would not be subject to the NSPS. The commenter wanted assurance that these MWC's also be required to meet the same materials separation requirements as new MWC's.

Response: Neither the NSPS or final guidelines include materials separation requirements.

8.6 OVERALL AGENCY STRATEGY TO PROMOTE MUNICIPAL SOLID WASTE REDUCTION AND RECYCLING

8.6.1 Separation for Landfills

Comment: As with new MWC's, some commenters said to accomplish the source reduction goals, the materials separation requirements must be applied to existing landfills rather than only to existing and new MWC's. (See additional comments in Section 4.6.1.)

Response: This comment is moot since the Agency has not included the materials separation requirements for combustors.

8.6.2 Overall Strategies

Comment: Several commenters (IV-F-1.3, IV-F-1.13, IV-F-1.14, IV-F-2.4) expressed frustration at these regulations because the communities they represented had closed most landfills years ago and built expensive MWC's. One commenter (IV-F-2.4) stated that their communities were already involved in recycling and that the added burden of the materials separation provisions, as well as the necessity to retrofit their existing MWC's, was unreasonable. Another commenter (IV-F-1.3) stated that the materials separation provisions would only increase the paperwork burden for these communities with active programs in place, without increasing separation or recycling at all. Some commenters (IV-D-150, IV-D-163) said the materials separation provisions of the emission guidelines can only be effectively implemented under an integrated solid waste program, such as RCRA. In particular, one commenter (IV-D-150) said close scrutiny must be given to avoid conflicts that would threaten the effectiveness of existing programs, or with imminent Federal legislation. The commenter noted that most programs today are an integration of source reduction, recycling, combustion and landfilling, consistent with the "Agenda for Action," with many States and communities already having comprehensive recycling measures in place. The commenter said the proposal would disrupt implementation of approved integrated solid waste management plans.

Response: No mandatory materials separation requirments, are included in the final guidelines. The Agency acknowledges and applauds the efforts of many States and communities which are already involved in source reduction and separation. The Agency believes that efforts by cities such as Seattle demonstrate the technical feasibility and substantial benefits of separation for recycling programs. However, for reasons described in the NSPS preamble, the Agency has not included the proposed national separation requirement for communities with combustors in these guidelines.

Comment: One commenter (IV-D-163) faulted the proposal as being too narrow, by focusing on just the MWC as a solid waste disposer. The commenter said that the bills currently under consideration to enhance recycling through RCRA and the majority of State efforts are aimed at increasing recycling through incentives and enhanced markets rather than a percentage requirement as presented in the proposal. The commenter said the narrow view of the proposal would make a compliance demonstration virtually impossible, because compliance would require more knowledge about the incoming waste than is practicable. The commenter argued that the MWC lacked authority to demand much of the information it would need from other sources to demonstrate compliance.

Response: This comment is moot since it relates to implementation procedures unique to the materials separation program proposed by the Agency but not included in the final guidelines.

8.7 WORDING OF REGULATION

Comment: One commenter (IV-D-78) recommended that EPA enumerate the site-specific difficulties it will allow States to consider when they establish regulations based on the proposed guidelines for materials separation.

Response: This comment is moot since the Agency has not included the materials separation requirements for combustors in the final guidelines.

8.8 MISCELLANEOUS COMMENTS ON MATERIALS SEPARATION

Comment: Many commenters (IV-D-25, IV-D-28, IV-D-29, IV-D-30, IV-D-31, IV-D-32, IV-D-33, IV-D-34, IV-D-35, IV-D-36, IV-D-37, IV-D-38, IV-D-39, IV-D-41, IV-D-43, IV-D-45, IV-D-46, IV-D-48, IV-D-49, IV-D-52, IV-D-53, IV-D-54, IV-D-58, IV-D-60, IV-D-77, IV-D-78, IV-D-99, IV-D-111, IV-D-179, IV-D-180), especially small communities with local MWC's or MWC equipment vendors and contractors, saw these provisions, and the resultant uncertainty about permit violations, as threatening the viability of existing MWC's as a solid waste treatment strategy. These commenters recommended that the materials separation requirements be deleted from the MWC regulation and guidelines. One commenter (IV-D-179) agreed with the separation of materials which result in problem emissions, but did not agree with separating typical combustible materials. One of these commenters (IV-D-32) suggested that requiring States to develop a plan for reducing waste volume by 25 percent might be a workable alternative to the materials separation requirements. Another commenter (IV-D-109) said the materials separation guidelines would conflict with immediate State plans, even though the plans would require the same 25 percent reduction in the near future.

Response: The Agency supports separation for recycling programs. To the extent that more source reduction and recycling is achieved and there is less waste to be disposed of, overall air emissions will decrease.

The Agency does not believe that new separation programs would threaten the viability of MWC's as a responsible solid waste management tool, an important part of a responsible solid waste management program, because not all materials can be technically recycled, or the market for a particular recyclable material may be currently unavailable. Some examples of materials which cannot be recycled are tissues and contaminated papers. Since there is inadequate and shrinking capacity in landfills, incineration is a means to reduce the volume of materials that would otherwise be disposed of in landfills. Additionally, energy can be produced through the combustion of MSW, which offsets the need for increased fossil fuel combustion. However, for reasons described in the preamble, the national separation program for combustor areas proposed by the Agency has been not been included in the final guidelines.

Comment: One commenter (IV-D-163) said that the proposed emission guidelines would promote centralized processing rather than source separation because of the difficulty of claiming credit for source separation. One commenter (IV-D-163) said the proposed emission guidelines would delay approval of proposed capacity.

Response: The Agency believes that many States and communities have considerable experience both in crafting separation and recycling programs and in tabulating the quantities separated or recycled in these programs. Coordinated efforts involving separation are underway presently, and many on-site systems and programs are available as well.

The Agency expects that separation for recycling programs may actually facilitate approval of proposed MWC capacity by reducing the uncertainty about the requirements such new capacity would have to meet, and by easing public concern over emissions. However, for reasons described in the NSPS preamble, the national material separation requirements are not included in the final guidelines.

Comment: Another commenter (IV-D-68) was opposed to the materials separation requirements because the owner or operator of an existing MWC had no legal authority to force a municipality to recycle. The commenter suggested that the rules should be rewritten to place the responsibility on the municipalities directly, and also upon waste management district using landfills. Similar comments were made for new MWC's (see Chapter 4.0).

Response: This comment is moot since the Agency has not included the materials separation requirements in the final guidelines.

Comment: One commenter (IV-D-279) from a 450 Mg/day (500 tpd) MWC said that the scale-house at their facility was near capacity, and the increased traffic associated with weighing separated material would cause problems.

Response: Most materials are weighed when they are taken to market, and weight receipts from such transactions are often used to determine weights of separated materials.

Comment: One commenter (IV-F-3.6) said that his company's MWC was responsible for combusting waste from foreign cruise ships when they come to dock in the community. He said that according to Department of Agriculture regulations, all of the waste must be incinerated. The commenter also said that his company's MWC was responsible for destroying confidential documents, computer printouts, and computer disks under contract with local, State, and Federal agencies. Therefore, an exclusion from the materials separation requirements should be granted in such situations.

Response: This comment is moot since the Agency has not included the separation requirements in the final guidelines.

Comment: One commenter (IV-D-56) recommended that compliance should be required within 1 year, and testing for compliance would begin within 2 years. Others (IV-D-105) agreed that the compliance time proposed was too long.

However, some commenters (IV-D-78, IV-D-164, IV-D-184) said the compliance times for existing MWC's to achieve 25 percent separation is unreasonably short. One commenter (IV-D-184) said the materials separation requirements for existing MWC's should allow for a phased-in compliance schedule because of the difficulties over preexisting contracts that may result. The commenter noted that this is much more of a problem for existing MWC's than for new MWC's. One commenter (IV-D-194) noted that to develop a comprehensive recycling program and construct an adequate resource recovery facility to process waste would take longer than allowed. One commenter (IV-D-122) asked that the guideline for existing MWC's be revised to link compliance for materials separation to the effective date of the State emission standards. The commenter felt that the proposed provisions would leave some sources no time to put required programs into place.

Response: The final guidelines do not include materials separation provisions.

9.0 MISCELLANEOUS COMMENTS ON MUNICIPAL WASTE COMBUSTOR EMISSION GUIDELINES

9.1 PROCEDURAL ISSUES

Comment: One commenter (IV-D-78) expressed concern that the emission guidelines rulemaking is mandating actual performance standards for existing sources. The commenter said 42 U.S.C. 7411(d) provides for EPA to develop only procedural guidelines by which the States shall then establish performance standards.

Response: The CAA provides a general framework from which regulatory activities are developed. In response to the CAA, rules were proposed and promulgated in 1975 which describe implementation of Section 111(d). These rules (40 CFR 60.20-29) are now law. Under these rules, the Agency develops and publishes emission guidelines which establish emission levels. States then develop their plans from these guidelines.

9.2 COFIRING

Comment: Two commenters (IV-D-174, IV-D-212) thought EPA failed to adequately examine the environmental impacts associated with combustion of individual MSW components in industrial boilers and the implementation issues associated with applying the rules to industrial solid fuel units. One commenter (IV-D-122) stated the preamble gives no indication that the Agency has examined the extent to which small amounts of nonprocess waste materials are burned in industrial boilers and no information is cited concerning the differences in emissions when such units are combusting only fossil fuels versus when fossil fuels are cofired with waste materials. He said without such emissions test data, there is no basis to conclude that emissions from industrial boilers burning small amounts of waste materials are similar to MWC's in any way.

Furthermore, control technologies suitable for MWC's may not perform similarly on a unit designed to fire fossil fuels or wood residues.

He mentioned that the National Council of the Paper Industry for Air and Stream Improvement is in the midst of conducting a survey of industry waste disposal practices, and the results of that survey will provide information on how many mills use MSW-type mixtures or individual, nonrecyclable MSW components as auxiliary or supplementary fuel in existing boilers. Unfortunately, the survey results will not be available until late spring. Similarly, the American Paper Institute/National Forest Products Association is examining the feasibility of combusting nonrecyclable paper in existing industrial boilers, and hopes to have some information to submit to the docket several weeks after the close of the comment period. He hoped EPA would be willing to consider the results of both studies.

Response: The CAA Amendments of 1990 specify that combustors which fire fuel feed streams comprised of 30 percent MSW or less, by weight, are not subject to the MWC standards and guidelines. The NSPS only covers those MWC's with unit capacities above 225 Mg/day (250 tpd) that combust a fuel containing more than 30 percent MSW or RDF. Therefore, existing industrial units firing fuel streams containing small amounts of MSW not be subject to the NSPS.

Comment: One commenter (IV-D-74) thought existing industrial boilers should be allowed to cofire clean, combustible, source-separated materials until adequate markets for the recycled materials are established.

Response: As described above, the final guidelines would exclude units firing or cofiring small amounts of MSW. If combustible source-separated materials such as paper are discarded by residences, or commercial or institutional facilities, the materials are considered MSW as defined in the final standards and guidelines.

Comment: Two commenters (IV-F-2.54, IV-D-162), whose power company operates an FBC facility, said the opacity guidelines are overly restrictive for their FBC. The combustor fires a mixture of 50 percent RDF and 50 percent wood. Limestone is injected into the fluid bed boilers for acid gas control and an electrified filter gravel bed is used for PM control. He said the unit can meet the levels for dioxins/furans, PM, SO_2, and HCl. However, the opacity level of 10 percent could not be met on a continuous basis due to varying fuel characteristics, particularly the moisture contents of the wood and RDF. Their permit opacity level is 20 percent. They urged EPA to allow States to develop alternate opacity limits on a case-by-case basis, or to amend the guidelines to allow a waiver in cases where PM emission levels are met, but opacity levels are not. These commenters also commented on the CO guidelines for their cofired FBC (see Section 7.5.4).

Response: As explained in responses in Sections 3.5.2 and 7.5.2, there are procedures in the General Provisions of 40 CFR 60 for establishing site-specific opacity limits in cases where PM limits and other standards are met but the opacity limit is not met.

9.3 PREVENTION OF SIGNIFICANT DETERIORATION CONSIDERATIONS

Comment: Several commenters (IV-D-115, IV-D-122, IV-D-137, IV-D-138, IV-D-150, IV-D-155, IV-D-190) urged EPA to specify in the guidelines and NSPS that facilities retrofitting to comply with the guidelines will not be required to undergo PSD review.

Response: In commenting on a permit issued to Northern Indiana Public Service Company (NIPSCO)[1], the Agency has clarified its interpretation of the definition of a physical or operational change as it applies to new source requirements for sources adding or improving APCD's. Essentially, this clarification recognizes that a source solely adding or enhancing systems or devices whose primary functions are the

[1]Letters from David Kee, EPA Region V, to Timothy Method, Indiana Department of Environmental Management, commenting on proposed construction permit for a clean coal technology demonstration project at NIPSCO's Bailly Generating Station, January 30, 1990, and March 8, 1990.

reduction of air pollution would not constitute a physical or operational change triggering new source requirements. To receive this consideration, such a change at a source would have to be determined to be not less environmentally beneficial than any emission control system or device it replaces, if any. Consequently, NSPS and PSD and nonattainment new source review would not apply to these types of activities.

Under the clarification, the authorized permitting authority would make a presumption that the installation or improvement of pollution control systems at an existing source would not cause an increase in capacity utilization. Under that presumption, retrofits would not trigger review of such a source for either nonattainment or PSD purposes as long as hourly emissions would not increase. This approach is consistent with the proposed NSPS, which exempts pollution control equipment from the definition of a modification.

Obviously, on an hourly basis, emissions of the pollutant that is the target of the control technology will not increase due to the installation and operation of control equipment. For the other pollutants (those not directly the target of control), the source must ensure that the hourly emissions do not increase.

The complete exemption from PSD review requested by the commenters is unworkable in that some limited PSD applicability review will still be necessary. This review is to ensure that pollution control retrofit projects cannot be used as a shield to exclude life extension projects or other source modifications that might otherwise trigger new source review. Under the clarification, owners or operators making permanent emissions control system or device changes would provide a description of the proposed activity and a rationale for why they should qualify for an exclusion from the definitions of a "physical change" or a "change in the method of operation" of a source. The owner or operator would demonstrate that an emissions control system or device installation would consist of the replacement of an existing emissions control system or device with an improved or upgraded emissions control system or device, or the installation of a new emissions control system or device at an existing uncontrolled source. Physical or operational changes which would be made to restore original capacity, or be made to improve the operation or efficiency of the source, would not be considered an emissions control system installation or improvement, even if conducted in conjunction with the installation or improvement of an emissions control system. The owner or operator would also demonstrate that an emissions control system or device installation would not cause or contribute to a violation of a SIP, a condition in a permit issued pursuant to regulations approved or promulgated under the CAA, or any applicable NAAQS or PSD increment. Further, the owner or operator would also need to demonstrate that the replacement or addition of the emissions control system would not result in an environmental harm. The authorized permitting authority would thus review each proposed project on a case-by-case basis to ensure whether additional physical changes made at the source at the same time should be considered non-routine.

Comment: Three commenters (IV-D-137, IV-D-138, IV-D-155) requested that the emission guidelines specify that any emissions increase resulting from compliance with the materials separation requirements should not trigger PSD review.

Response: After considering the revised significance levels (see comment on significance levels in Section 6.3), the Agency concluded that any changes in emissions that could be directly attributable to materials separation requirements are unlikely to exceed the significance levels. Therefore, any emissions changes directly attributable to materials separation are not expected to result in new source review. However, for reasons discussed in the preamble, materials separation requirements are not included in the final guidelines.

9.4 NITROGEN OXIDES CONTROL FOR EXISTING MUNICIPAL WASTE COMBUSTORS

Comment: Four commenters (IV-F-1.27, IV-F-2.39, IV-F-2.40, IV-D-117) said that the guidelines for existing MWC plants should include NO_x emission levels. One commenter (IV-F-2.39) pointed out that NO_x impairs breathing especially for people with lung diseases, and NO_x is an ozone precursor. This commenter stated that the adverse health effects of NO_x support requiring add-on NO_x controls for new MWC's, and likewise should be used to support NO_x control for existing MWC's. Another commenter (IV-D-164) noted the EPA's inconsistency in considering NO_x a pollutant from new but not existing sources.

One commenter (IV-D-117) stated that for existing MWC's, a NO_x level of 200 ppm should be achievable using yard waste separation and prudent operating practices, with lower levels achievable using retrofit technology.

Response: Emission guidelines are not prescribed for NO_x because NO_x is a criteria pollutant regulated under Sections 108 to 110 of the CAA. Under Section 111(b), NSPS for new sources can be developed for criteria pollutants including NO_x. It is also possible to "designate" noncriteria pollutants for regulation under Section 111 if these pollutants are not regulated under another section of the CAA and may endanger public health and welfare. As explained in Section 3.2, the pollutant MWC emissions, composed of MWC organics, MWC metals, and MWC acid gases was designated under Section 111. When a pollutant is designated, emission guidelines are developed for existing sources of the pollutant under Section 111(d). However, Section 111(d) allows guidelines to be developed only for designated pollutants and not for criteria pollutants such as NO_x.

Comment: One commenter (IV-D-184) acknowledged that the proposal for no additional control of NO_x for existing MWC's is appropriate due to the relatively high cost of control, the limited environmental benefits which would result, and the need to store and handle a hazardous material (ammonia).

Response: As explained in the previous response, the provisions of the 1977 CAA were the reason that guidelines were not developed for NO_x emissions from existing sources. The decision was based on the existing structure of Section 111(d) of the 1977 CAA rather than on technical considerations. The CAA of 1990 requires that the Agency develop NO_x standards for both new and existing combustors.

9.5 OTHER

Comment: One commenter (IV-D-109) requested guidance for case-by-case planning by individual States, particularly with respect to the use of reasonable levels of expenditure in \$/Mg (\$/ton) contaminant and \$/Mg (\$/ton) MSW disposal since these costs show a great variation nationwide. The commenter also asked for guidance on prioritizing control efforts for the different pollutants.

Response: The pollutant MWC emissions was designated because it may cause or contribute to endangerment of public health. In accordance with 40 CFR 60.24(c) unless there is compelling site-specific rationale, State regulations must be at least as stringent as the guidelines and must include all the pollutants and parameters specified in the guidelines. The provisions of 40 CFR 60.24(f) describe the procedures for States to develop less stringent emission standards or longer compliance times for particular sources on a case-by-case basis. There are no bright lines to determine whether or not a particular site merits an exception, however, unreasonable cost of control is one reason specified in 40 CFR 60.24(f). In considering whether costs of controls are unreasonable, factors such as plant age, location, and basic process design may be taken into account.

Comment: One commenter (IV-D-159) said he submitted to EPA corrections for errors in Chapter 6.0 of the BID, "Municipal Waste Combustors - Background Information for Proposed Guidelines for Existing Facilities," which were related to inaccuracies concerning his facility and the model plant. The commenter said with few exceptions the changes were not made and thus the document is still significantly flawed.

Response: The Agency reviewed this submittal and corrections were made to the BID where deemed necessary. The BID to which the commenter is referring (EPA-450/3-89-27e) is a model plant report. Model plants are analytical tools and do not represent any one particular existing plant. The Agency determined that their model plant analysis was appropriate. Individual facilities will have site-specific differences.

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

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15. SUPPLEMENTARY NOTES
Additional discussion of public comments can be found in the Federal Resigter promulgation notices.

16. ABSTRACT

EPA is preparing for promulgation under Clean Air Act §111(b) emission standards for new MWC's and, under §111(d), emission guidelines for existing MWC's. The standards and guidelines will apply to MWC units with a capacity to combust 250 or more tons of municipal solid waste per day. The standards and guidelines were proposed in the Federal Resister on December 20, 1989 (54 FR 52251 and 54 FR 52209). Public hearings were held in January 1990 in Boston MA, Detroit MI, and Seattle WA. These meetings were open to the public and the public was given an opportunity to comment on the proposal. Additionally, EPA received over 300 written comment letters. The report summarizes all comments and presents the Agency's responses.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group

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