

Appendix B—Performance Specifications—Performance Specification 4A—Specifications and Test Procedures for Carbon Monoxide Continuous Emission Monitoring Systems in Statutory Sources

1. Applicability and Principle

1.1 Applicability.

1.1.1 This specification is to be used for evaluating the acceptability of carbon monoxide (CO) continuous emission monitoring systems (CEMS) at the time of or soon after installation and whenever specified in an applicable subpart of the regulations.

1.1.2 This specification is not designed to evaluate the installed CEMS performance over an extended period of time nor does it identify specific calibration techniques and other auxiliary procedures to assess CEMS performance. The source owner or operator, however, is responsible to calibrate, maintain, and operate the CEMS. To evaluate CEMS performance, the Administrator may require, under section 114 of the Act, the source owner or operator to conduct CEMS performance evaluations at other times besides the initial test. See 60.13(c).

1.1.3 The definitions, installation specifications, test procedures, data reduction procedures for determining calibration drifts (CD) and relative accuracy (RA), and reporting of Performance Specification 2 (PS 2), sections 2, 3, 5, 6, 8, and 9 apply to this specification.

1.2 Principle. Reference method (RM), CD and RA tests are conducted to determine that the CEMS conforms to the specification.

2. Performance and Equipment Specifications

2.1 Instrument Zero and Span. This specification is the same as section 4.1 of PS 2.

2.2 Interference Check. The CEMS must be shown to be free from the effects of any interferences.

2.3 Calibration Drift. The CEMS calibration must not drift or deviate from the reference value of the calibration gas, gas cell, or optical filter by more than 5 percent of the established span value for 6 out of 7 test days.

2.4 Relative Accuracy. The RA of the CEMS shall be no greater than 10 percent of the mean value of the RM test data in terms of the units of the emission standard or 5 ppm, whichever is greater. Under conditions where the average CO emissions are less than 10 percent of the standard, a cylinder gas audit may be performed in place of the RA test. In this case, the cylinder gas shall contain CO in 12 percent carbon dioxide as an interference check.

3. Relative Accuracy Test Procedure

3.1 Sampling Strategy for RM Tests, Correlation of RM and CEMS Data, Number of RM Tests, and Calculations. These are the same as PS 2, sections 7.1, 7.2, 7.3, and 7.5, respectively.

3.2 Reference Methods. Unless otherwise specified in an applicable subpart of the regulation, Method 10 is the RM for this PS. When evaluating nondispersive infrared continuous emission analyzers, Method 10

shall use the alternative interference trap specified in section 10.1 of the method. Method 10A or 10B is an acceptable alternative to Method 10.

4. Bibliography

4.1 Same as in Performance Specification 4, section 4.

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40 CFR Part 60

[AD-FRL-3694-5]

Emission Guidelines: Municipal Waste Combustors

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed guidelines and notice of public hearing.

SUMMARY: This notice proposes emission guidelines and compliance schedules for use by States in developing State regulations to control emissions from existing municipal waste combustors (MWC's). The proposed emission guidelines implement section 111(d) of the Clean Air Act (CAA) and are based on the Administrator's determination that MWC emissions cause, or contribute significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare. The intent of the proposed emission guidelines is to initiate State action to develop State regulations controlling MWC emissions from existing MWC's to the level achievable by applying the best demonstrated system of continuous emission reduction, considering costs, nonair quality health and environmental impacts, and energy requirements.

These are proposed rather than final guidelines, and comments are requested. The EPA will consider all comments and new information received during the public comment period, and will make changes to the guidelines, where appropriate, based on these comments.

If requested, a public hearing will be held to provide interested parties an opportunity for oral presentations of data, views, or arguments concerning the proposed emission guidelines.

DATES: Comments must be received on or before March 1, 1990.

Public Hearings.—Public hearings will be 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. All hearings will start at 9:00 a.m. Persons wishing to present oral testimony at the public hearings must call Ms. Ann Eleanor at (919) 541-5578

before January 15, 1990, for the Boston hearing; January 18, 1990, for the Detroit hearing; and January 23, 1990, for the Seattle hearing. Each speaker will be allowed up to 10 minutes, and each group or organization will be allowed a maximum of 20 minutes to speak. If no one requests to speak at a hearing before these dates, the hearing may be cancelled. Persons interested in attending the hearings should also call Ms. Ann Eleanor at (919) 541-5578 to verify that a hearing will be held.

ADDRESSES: Comments.—Comments should be submitted (in duplicate if possible) to: Air Docket (LE-131), Attention Docket No. A-89-08, Room M1500, U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460.

Public Hearing.—The three scheduled public hearings, if requested, will be held at the following locations:

1. Presidents Ballroom, Hyatt Regency, 575 Memorial Drive, Cambridge, Massachusetts;
2. Cobo Hall, Cobo Convention Center, One Washington Boulevard, Detroit, Michigan;
3. Rainier Room, Seattle Center, 305 Harrison Street, Seattle, Washington.

Persons interested in attending a hearing or wishing to present oral testimony should notify Ms. Ann Eleanor, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5578.

Draft Guideline Documents.—The draft guideline document for the proposed emission guidelines consists of one guideline document and this **Federal Register** preamble and proposed guideline. There are also five other background reports used in development of the proposed guidelines. See **SUPPLEMENTARY INFORMATION** for a listing of these documents. Copies of this **Federal Register** notice, the draft guideline document, and the five other background reports, have been provided to State air pollution control agencies, owners and operators of existing MWC's, and interested trade, professional, and environmental organizations for review and distribution. Others interested in reviewing these documents should contact their respective trade, professional, or environmental organization.

Docket.—Docket No. A-89-08, containing the draft guideline document and other supporting information used in developing the proposed emission guidelines, is available for public

inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at the EPA's Air Docket, Room M1500, U.S. Environmental Protection Agency, 401 M Street SW., Washington, DC 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Walter Stevenson [(919) 541-5264] or Mr. Fred Porter [(919) 541-5251], Standards Development Branch, Emission Standards Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

SUPPLEMENTARY INFORMATION: The draft guideline document is entitled, "Municipal Waste Combustors—Background Information for Proposed Guidelines for Existing Facilities", EPA-450/3-89-27e, August 1989. The five other key technical documents used in developing the proposed guidelines are as follows:

1. "Municipal Waste Combustors—Background Information for Proposed Standards: Post-Combustion Technology Performance", EPA-450/3-89-27c, August 1989;
2. "Municipal Waste Combustion Assessment: Combustion Control at Existing Facilities", EPA-600/8-89-057, August 1989;
3. "Municipal Waste Combustion Assessment, Technical Basis for Good Combustion Practice", EPA-600/8-89-063, August 1989;
4. "Municipal Waste Combustors—Background Information for Proposed Standards: Cost Procedures", EPA-450/3-89-27a, August 1989; and
5. "Economic Impact of Air Pollutant Emission Guidelines for Existing MWC's", EPA-450/3-89-005, August 1989.

This draft guideline document and other listed background reports are being provided at no cost to State air pollution control agencies, owners and operators of existing MWC's, and interested trade, professional, and environmental organizations upon request. However, because of the number and size of the reports involved and the associated printing and distribution costs, only a limited number of sets were printed. The reports are being provided to trade groups, and professional and environmental organizations with the understanding that they will allow members access to their document sets. Persons wishing to review the documents should contact their respective State agency or organization. If the agency or organization does not have the documents, a set will be provided to the

organization for the use of their membership.

The following outline is provided to aid in reading the preamble to the proposed emission guidelines.

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I. Introduction

A. Summary of Regulatory Decision

Several studies were performed to determine whether municipal waste combustor (MWC) emissions should be regulated and, if so, under what section of the Clean Air Act (CAA). As set forth in the advance notice of proposed rulemaking (ANPRM) (52 FR 25399, July 7, 1987), the Agency has decided to regulate air emissions from MWC's under Section 111. This notice therefore proposes emission guidelines for regulation by the States of existing MWC's under section 111(d) of the CAA. Under a separate regulatory action in today's *Federal Register*, standards for new MWC's are being proposed pursuant to section 111(b) of the CAA. The Agency has developed an overall agenda to address other municipal solid waste (MSW) disposal issues, and today's air emission guidelines are just one component.

B. Emission Guidelines—General Goals

The CAA requires the promulgation of standards of performance under Section 111(b) for categories of new sources which may contribute to the endangerment of public health or welfare. When standards of performance have been promulgated under section 111(b) for a designated pollutant, the CAA, under section 111(d), requires that States submit plans which establish emission standards for existing sources and provide for implementation and enforcement of emission standards for the designated pollutant. In general, this means that control under section 111(d) is appropriate when the pollutant may cause or contribute to endangerment of public health or welfare but is not known to be "hazardous" within the meaning of section 112 and is not controlled under sections 108-110 because, for example, it is not emitted from "numerous or diverse" sources as required by section 108.

For ease of discussion, pollutants which have been regulated pursuant to the above conditions are defined in the proposed regulations as "designated pollutants," and existing facilities which emit these pollutants are defined in the proposed regulations as "designated

facilities." Designated pollutants can, at a later time, be listed as criteria pollutants under section 108(a) or as hazardous air pollutants under section 112(b)(1)(A). As specified in 40 CFR 60.23, States shall adopt and submit to the Administrator a plan implementing the section 111(d) guidelines within 9 months after the promulgation of the guidelines. Assuming that the final guidelines will be promulgated in December 1990, all States would have to adopt and submit a plan by September 1991. The CAA further requires that the procedure for State submission of a plan shall be similar to the procedure for submission of State implementation plans under section 110 and mandates that EPA shall prescribe a plan according to procedures similar to those in section 110(c) if the State fails to submit a "satisfactory plan."

Section 111(d) requires EPA to approve State emission standards only if they reflect application of the best systems of emission reduction that are reasonably available for designated facilities. Accordingly, EPA has published guideline documents (discussed above) which describe available systems of emission control, identify the best demonstrated systems considering costs, nonair quality health and environmental impacts, and energy requirements, and identify the emission limitations that reflect the application of such systems. State plans will be approved if they include an emission standard equal to or more stringent than that specified in the guideline. For health-related pollutants, as is the case for MWC emissions, State emission standards must ordinarily be at least as stringent as the corresponding EPA guidelines to be approved (section 60.24(c)).

It is recognized, however, that application of today's proposed guidelines, may be unreasonable in some situations (e.g., little useful facility life left, replacement in progress) and justify some relief on a case-by-case basis, provided that a compelling justification is demonstrated in each case. Few such exceptions are expected in the case of MWC's for several reasons. First, the guidelines reflect the EPA's judgment of the degree of control that can be attained by various classes of sources without unreasonable costs, including considerations of retrofit costs, and without unreasonable nonair quality health and environmental impacts, or unreasonable energy requirements. In fact, particular sources within a class may be able to achieve greater control than the presumptive emission guidelines. Second, the

development of the emission guidelines was carried out in the context of a nationwide program encompassing an entire class of sources without consideration of the local air quality conditions that must be considered in nonattainment areas or in prevention of significant deterioration (PSD) in accordance with permitting activities associated with the CAA. In some cases, State standards may be more stringent than these presumptive emission guidelines in order to address concerns which are specific to a particular localized air quality situation. Moreover, States that believe additional control is necessary or desirable will be free under Section 116 of the CAA to require more extensive controls, which might have the effect of closing otherwise marginal facilities, or to ban particular categories of sources outright.

C. Emission Guidelines Decision Summary

Emission guidelines for existing sources are the product of a series of decisions related to certain key elements for the source category being considered for regulation. The elements in this "decision" are generally the following:

1. Identification of source category to be regulated—usually an emission source category, but can be a process or group of processes within an industry.
2. Definition of designated facility—the piece or pieces of equipment that comprise the sources to which the guidelines apply.
3. Selection of designated pollutant(s)—the particular substance(s) emitted by the designated facility that the new source performance standards (NSPS) and guidelines control.
4. Identification of "best demonstrated technology"—the technology on which the guidelines are based, i.e.,

... application of the best 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 for that source category. [Section 111(a)(1)(C).]

5. Selection of format for the guidelines—the form in which the guidelines are expressed, i.e., as a percent reduction in emissions, as emission limits, as pollutant concentrations, or as equipment or work practice guidelines.

6. Development of actual guidelines—generally emission limits based on what "best demonstrated technology" can achieve. Only in unusual cases do guidelines require that a specific technology be used. In general, the

source owner or operator may select any method for complying with the guidelines.

7. Other considerations—in addition to emission limits, emission guidelines usually include: guidelines for visible emissions, modification/reconstruction provisions, monitoring requirements, performance test methods and compliance procedures, and reporting and recordkeeping requirements.

D. Overview of This Preamble

This preamble will:

1. Summarize the important features of these proposed guidelines by discussing the conclusions reached with respect to each of the elements in the decision summary.
2. Describe the environmental, energy, and economic impacts of these guidelines.
3. Present a rationale for each of the decisions in the decision summary.
4. Present a regulatory flexibility analysis.
5. Discuss administrative requirements relevant to this action.

II. Summary of the MWC Guidelines

A. Source Category To Be Regulated

The proposed guidelines would require States to develop standards of performance for the control of air pollutant emissions from existing municipal waste combustors (MWC's). An MWC is defined as any combustion facility used for burning municipal solid waste (MSW). The MSW burned in the MWC's is refuse, more than 50 percent of which is waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustible materials, and noncombustible materials such as glass, metal, and rock. The MSW definition includes household wastes as well as municipal-type wastes from institutional, commercial, municipal, and some industrial sources, but does not include industrial process wastes, or medical wastes. The MSW also includes refuse-derived fuel (RDF), which is solid waste that is shredded and classified by size before combustion.

B. Pollutants To Be Regulated

The pollutant to be regulated by the States under the proposed guidelines is "MWC emissions." Constituents of MWC emissions represent a broad range of pollutants that can generally be categorized into three subclasses: MWC organics (including dioxins/furans), MWC metals (including trace metals which are condensable on particulate matter [PM]), and MWC acid gases (sulfur dioxide [SO₂] and hydrogen

chloride [HCl]). The composite pollutant "MWC emissions" is designated for regulation under section 111(d), which applies to existing sources (the subject of this notice), and under section 111(b),

which applies to new sources. New source performance standards (NSPS) proposed under section 111(b) are published in a separate notice in today's Federal Register. As shown in table 1,

the proposed guidelines establish limits and operating standards to control MWC emissions.

TABLE 1. SUMMARY OF REGULATED POLLUTANT AND GUIDELINES

Pollutant regulated	Pollutant subclasses	Proposed guidelines*
1. MWC Emissions ("designated" for control under Section 111).	MWC Organics.....	● Dioxin/furan emission level
		● Combustor operational guidelines: —CO Level —Load —Flue Gas Temperature —MWC Operator Training
	MWC Metals.....	● PM emission level
		● Opacity level
	MWC Acid Gases.....	● HCl emission level
		● SO ₂ emission level

* Materials separation guidelines are also proposed. These guidelines would result in additional reduction of MWC emissions.

C. Best Demonstrated Technology

The proposed guidelines for MWC's located at small MWC plants (those plants that have an aggregate capacity to combust up to 225 megagrams/day [Mg/day] [250 tons/day] of MSW) are based on the conclusion that the best demonstrated technology for reducing MWC emissions includes: good combustion practices (GCP) for MWC organics control, and an electrostatic precipitator (ESP) for control of MWC metals and PM. This combination of controls can achieve the following emission levels (corrected to 7 percent oxygen [O₂] on a dry basis):

1. MWC organics control: dioxin/furan control to 500 nanograms per normal cubic meter (ng/Nm³) (200 grains per billion dry standard cubic feet [gr/billion dscf]) total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans.

2. MWC metals control: PM control to 69 milligrams per dry standard cubic meter (mg/dscm) (0.030 grains per dry standard cubic foot [gr/dscf]).

The proposed guidelines for MWC's located at large MWC plants (those plants that have an aggregate capacity to combust greater than 225 Mg/day [250 tons/day] but less than or equal to 2,000 Mg/day [2,200 tons/day] of MSW) are based on the conclusion that the best demonstrated technology for reducing MWC emissions includes: GCP for MWC organics control and dry sorbent injection (DSI) followed by an ESP or a fabric filter (FF) to achieve additional control of MWC organics as well as MWC metals and PM, and MWC acid gases. This combination of controls can achieve the following emission levels (corrected to 7 percent O₂ on a dry basis):

1. MWC organics control: dioxin/furan control to 125 ng/Nm³ (50 gr/billion dscf) total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans for all types of MWC's except RDF combustors. For RDF combustors, the dioxin/furan control level would be 250 ng/Nm³ (100 gr/billion dscf);

2. MWC metals control: PM control to 69 mg/dscm (0.030 gr/dscf); and

3. MWC acid gas control including:
a. HCl emissions reduction of 50 percent or an HCl emission level of 25 parts per million, by volume (ppmv), and
b. SO₂ emissions reduction of 50 percent or an SO₂ emission level of 30 ppmv.

The proposed guidelines for MWC's that are located at regional MWC plants (those plants that have an aggregate capacity to combust greater than 2,000 Mg/day [2,200 tons/day] of MSW) are based on the conclusion that the best demonstrated technology for reducing MWC emissions includes: GCP for MWC organics control and a spray dryer (SD) followed by an FF to achieve additional control of MWC organics as well as MWC metals and PM, and MWC acid gas. This combination of controls can achieve the following emission levels (corrected to 7 percent O₂ on a dry basis):

1. MWC organics control: dioxin/furan control to a level in the range of 5 to 30 ng/Nm³ (2 to 12 gr/billion dscf) total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans (the precise level within this range will be determined between proposal and promulgation);

2. MWC metals control: PM control to 34 mg/dscm (0.015 gr/dscf); and

3. MWC acid gas control:

(a) HCl emissions reduction of 95 percent or an HCl emission level of 25 ppmv, and

(b) SO₂ emissions reduction of 85 percent or an SO₂ emission level of 30 ppmv.

The EPA is also including materials separation provisions (i.e., separation of certain materials from MSW prior to combustion) in the proposed guidelines as part of best demonstrated technology. The proposed guidelines for materials separation would apply to all MWC's. The proposed guidelines would require MSW to be processed before combustion to achieve an overall 25 percent or greater reduction (by weight) through separating for recovery some or all of the following materials: paper and paperboard; ferrous metals; nonferrous metals; glass; plastics; household batteries; and yard waste. However, a maximum of 10 percent of the overall weight of reduction could be attributed to yard waste; the other 15 or more percent would come from the other separated materials. Additionally, the guidelines would preclude the combustion in MWC's of lead-acid vehicle batteries weighing more than 5 kg (11 lbs), and a program to remove household batteries prior to combustion would be required.

D. Format For The Guidelines

Since it is not possible to establish and measure stack levels of "MWC emissions" as a whole, guidelines are set for a subset of pollutants that will ensure control of the three subclasses of MWC emissions (MWC organics, MWC metals, and MWC acid gases). The proposed guidelines for MWC emissions would control MWC organics by establishing an emission guideline for dioxins/furans. Emissions for dioxins/

furans would be calculated as a concentration (ng/Nm^3 [$\text{gr}/\text{billion dscf}$]) at 7 percent O_2 . The proposed guidelines for MWC metals would establish an emission level for PM and an opacity level. Emissions for PM would be calculated as a concentration (gr/dscf) at 7 percent O_2 . Since MWC metals are associated with PM in the flue gas and are removed by PM control devices, achieving the specified levels of PM control would ensure 97 percent or greater control of the range of MWC metals (except mercury, for which a lower percent control would be achieved). This approach is more practical than setting guidelines for each individual metal. The opacity guideline allows continuous monitoring, since there are no systems for continuous monitoring of PM. The proposed guidelines for MWC acid gases (SO_2 and HCl) would establish both a percent reduction (by weight or volume) requirement and a concentration level. The MWC owner/operator may comply with either of these two methods for acid gas compliance. The concentration guideline for HCl and SO_2 are calculated as ppmv (at 7 percent O_2).

In addition to controlling stack emissions, the proposed guidelines would establish combustor operating guidelines for MWC's. These operating guidelines are part of GCP and would ensure that MWC organic (dioxin/furan) control is achieved on a continuous basis. They include guidelines on combustor exhaust carbon monoxide (CO) level, maximum MWC load level, and flue gas temperature at the PM control device inlet.

The proposed guidelines also would require that States require the certification of the chief facility operator and shift supervisors by the American Society of Mechanical Engineers (ASME) and development of a training manual to be used for training other MWC personnel. Training is an integral part of the implementation of GCP.

The proposed guidelines would also require States to require that all existing MWC's incorporate materials separation procedures to process MSW prior to combustion. All MWC's would have to process MSW to achieve an overall 25 percent or greater reduction by weight (annual average) of MSW through separating for recovery some or all of the following materials: paper and paperboard; ferrous metals; nonferrous metals; glass; plastics; household batteries; and yard waste. In calculating the 25 percent overall weight reduction, a maximum credit of 10 percent would be allowed for yard waste separation. In addition, the guidelines would prohibit

the combustion of lead-acid vehicle batteries weighing more than 5 kilograms (kg) (11 lbs), and all household batteries. The materials separation requirements could be achieved by mechanical separation or manual separation at the MWC site, or by an off-site community source reduction or materials separation (recycling) program, or a combination thereof.

E. Proposed Guidelines

The proposed guidelines are subdivided into three sets of requirements, one for MWC's located at small MWC plants (those with the aggregate capacity to combust up to 225 Mg/day [250 tons/day] of MSW), one for MWC's located at large MWC plants (those with the aggregate capacity to combust greater than 225 Mg/day [250 tons/day] but less than or equal to 2,000 Mg/day [2,200 tons/day] of MSW), and one for MWC's located at regional MWC plants (those with the aggregate capacity to combust greater than 2,000 Mg/day [2,200 tons/day] of MSW). The aggregate capacity of all existing MWC's at one site would be added together to define aggregate MWC plant capacity.

MWC Emissions

The proposed guidelines for control of each subclass of MWC emissions are summarized below. Stack guidelines are discussed first, followed by combustor operational guidelines.

MWC Organics.—The proposed guidelines for MWC organics would result in all MWC's at small MWC plants meeting a dioxin/furan emission level of 500 ng/Nm^3 (200 $\text{gr}/\text{billion dscf}$), except for RDF combustors. While it is unlikely that RDF combustors would be constructed at small MWC plants, they would have a dioxin/furan guideline level of 1,000 ng/Nm^3 (400 $\text{gr}/\text{billion dscf}$).

At large MWC plants, the guideline would result in all MWC's meeting a dioxin/furan level of 125 ng/Nm^3 (50 $\text{gr}/\text{billion dscf}$), except for RDF combustors; RDF combustors at large MWC plants would have a guideline level of 250 ng/Nm^3 (100 $\text{gr}/\text{billion dscf}$).

At regional MWC plants, the guideline would result in all MWC's meeting a dioxin/furan level in the range of 5 to 30 ng/Nm^3 (2 to 12 $\text{gr}/\text{billion dscf}$) (at 7 percent O_2). The precise level within this range will be determined between proposal and promulgation. These guideline levels apply to total tetra-through octa-chlorinated dibenzo-p-dioxins and dibenzofurans.

MWC Metals.—The proposed guidelines for MWC metals would result

in all MWC's located at small and large MWC plants meeting a PM emission level of 69 mg/dscm (0.030 gr/dscf). All MWC's at regional MWC plants would meet a PM emission level of 34 mg/dscm (0.015 gr/dscf) at 7 percent O_2 . These PM guideline levels would ensure good control of MWC metals, and are a more practical approach than setting individual guideline levels for every metal. The guidelines would also result in MWC's being subject to an opacity level of 10 percent (6-minute average, measured continuously).

MWC Acid Gases.—The proposed guidelines would not specify acid gas emission levels or percent reduction levels for MWC's located at small MWC plants.

The proposed guidelines for MWC acid gases would result in all existing MWC's at large MWC plants achieving HCl and SO_2 emission reductions. A 50 percent reduction in HCl emissions or a 25 ppmv HCl emission level measured during a compliance test and annual performance tests would be achieved at large plants. All existing MWC's at large MWC plants would also achieve a 50 percent reduction in SO_2 emissions or a 30 ppmv SO_2 emission level (measured on a daily (block) 24-hour average basis, measured continuously).

The proposed acid gas guidelines for MWC's at regional MWC plants would result in a 95 percent reduction in HCl emissions or a 25 ppmv HCl emission limit measured during a compliance test and annual performance tests. Those MWC's at regional MWC plants would also achieve an 85 percent reduction in SO_2 emissions or a 30 ppmv SO_2 emissions level on a daily (block) 24-hour average basis, measured continuously.

Combustion Control.—The guidelines would also specify MWC operating parameters, which are part of GCP and would ensure that MWC organic emissions are minimized on a continuous basis. These operating parameters would include CO emission limits, combustor load levels, and flue gas temperatures at the PM control device inlet.

For modular starved air and modular excess air types of MWC's, the CO emission guideline would be 50 ppmv (at 7 percent O_2 on a block 4-hour average basis). For mass burn waterwall, mass burn refractory, and fluidized-bed types of MWC's, the CO emission guideline would be 100 ppmv (at 7 percent O_2 on a 4-hour block average basis). For mass burn rotary waterwall, RDF, and coal/RDF co-fired MWC's, the CO emission guideline would be 150 ppmv (at 7

percent O₂ on a 4-hour block average basis).

The guidelines would preclude MWC's operating above 100 percent of maximum demonstrated capacity as measured during a compliance test (1-hour average basis). Municipal waste combustor load would be measured by steam output level. Municipal waste combustors that do not generate steam are exempt from maximum load level requirements because it is not feasible to measure load level for these MWC's.

Under the proposed guidelines, all MWC's would maintain a flue gas temperature of 230 °C (450 °F) or less (4-hour block average) at the PM control device inlet to minimize dioxin/furan formation.

ASME Certification and Operator Training.—As part of GCP, the proposed guidelines would result in certification of the shift supervisor and MWC chief facility operator by ASME. In addition, under the proposed guidelines each MWC owner or operator would develop a site-specific training manual to be reviewed by all employees associated with the operation of the MWC. The manual and training would be updated annually.

Materials Separation

Under the proposed guidelines, all existing MWC's would incorporate materials separation procedures to process MSW prior to combustion. All MWC's would process MSW to achieve a 25 percent or greater reduction in MSW by weight (annual average) through separation for recovery of some or all of the following materials: paper and paperboard; ferrous metals (including "white goods," or household appliances), nonferrous metals; glass; plastics; household batteries; and yard waste. In calculating the 25 percent weight reduction, a maximum credit of 10 percent would be allowed for yard waste separation. In addition, all MWC's would be prohibited from combusting wet lead-acid vehicle batteries weighing more than 5 kilograms (kg) (11 lbs), and a program to remove household batteries prior to combustion would be required. The materials separation requirements could be achieved by on-site mechanical separation, on-site manual separation, a community source reduction or materials separation (recycling) program, or a combination thereof. Under the proposed guidelines, materials separation systems or programs capable of achieving the materials separation requirements would be implemented by December 31, 1992.

F. Performance Testing and Monitoring Guidelines

MWC Emissions

Performance testing and monitoring guidelines are being proposed under the guidelines to ensure control of each subclass of MWC emissions. All guideline emission levels are corrected to 7 percent O₂ on a dry basis. However, an MWC owner or operator may request to correct to an equivalent percent CO₂. In these cases, the correlation between O₂ and CO₂ would be established during the compliance test.

MWC Organic Emissions.—The proposed MWC organic emissions guidelines would result in a requirement for performance tests to be conducted in accordance with Method 23 to determine compliance with the dioxin/furan emission limit. Method 23 is proposed today in a separate section of this *Federal Register*. Annual retests would be required by the guidelines for all MWC's. However, if three performance tests in a row indicate compliance with the dioxin/furan emission limit, the guidelines would allow an MWC to skip the annual performance test for the next 2 years. If the next test (after skipping 2 years) shows compliance with the limits, another 2-year period may be skipped. At a minimum, each MWC would be tested at least once every 3 years.

MWC Metals.—Performance tests to determine compliance with the PM emission guidelines (which ensure metals control) would be based on Method 5. Method 1 would be used for selecting the sampling points, and Method 3 would be used for gas analysis. Method 9 (a 6-minute average of 24 observations) would be used to determine compliance with the opacity guideline. Subsequent annual performance tests would be required for all MWC's. However, as with dioxin/furan emissions, if three performance tests in a row indicate compliance with the PM limit, the guideline would allow an MWC to skip the annual performance test for the next 2 years. At a minimum, each MWC would be tested every 3 years.

MWC Acid Gases.—The proposed MWC acid gas guidelines would result in continuous monitoring of SO₂ emissions for existing MWC's at large and regional MWC plants. Compliance with the percent reduction requirement or the emission limit would be determined on a daily (block) 24-hour basis as measured by the continuous emissions monitoring system (CEMS). Quality assurance for the CEMS would be conducted in accordance with Appendix F.

Compliance with the proposed MWC acid gas guidelines for HCl would be determined by HCl performance tests to be conducted in accordance with Method 26 to determine compliance with the HCl percent reduction requirements or emission limits. Method 26 is proposed in a separate notice in today's *Federal Register*. Subsequent annual performance tests would be required for existing MWC's at large and regional MWC plants. However, if three performance tests in a row indicate compliance with the HCl percent reduction requirement or emission limit, an MWC may skip the annual performance test for the next 2 years. At a minimum, each MWC at a large or regional MWC plant must be tested every 3 years.

Operating Guidelines.—Continuous monitoring of certain operating parameters would ensure that GCP are implemented on a continuous basis. These parameters are flue gas CO level, MWC load level, and flue gas temperature at the PM control device inlet. Compliance with the CO guideline would be determined on a block 4-hour average basis as measured by a CEMS. Calculations to determine compliance would be made in accordance with Method 10. Quality assurance would be maintained in accordance with Appendix F. Load level (percent of full load) would be measured using steam flowrate, and a 1-hour average used to determine compliance. Compliance with the temperature guideline would be determined through continuous monitoring and a 4-hour averaging period.

Requirements for CEMS.—A minimum data requirement applicable to all CEMS is also proposed as part of the guideline. Data would have to be collected for a minimum of 75 percent of the MWC operating hours per day for 75 percent of the operating days per month.

Materials Separation

The proposed guidelines provide that all existing MWC's would submit a description of procedures for achieving: (1) The 25 percent overall separation requirement, (2) the lead-acid vehicle battery removal requirement, and (3) the household battery removal requirement. If an off-site or community program is used to comply in whole or in part with the requirements, a plan describing the separation program and the method(s) to be used to measure compliance would be submitted to the State agency for approval.

Compliance with the provision for the 25 percent overall MSW reduction would be determined annually.

Compliance would be based on an average of 12 monthly measurements of the total weight of MSW received, the weight of MSW combusted, and the weight of materials separated for recovery during each month. The first report of the annual percent reduction achieved would be required at the end of calendar year 1993, but this report would not be used to determine compliance. Demonstration of compliance with the annual average percent MSW reduction would not be required until December 31, 1994 (which is the end of the second calendar year after implementation of the separation systems or programs). Annual average calculations would be required for each calendar year thereafter.

Separation procedures could include mechanical separation, manual sorting, or curbside separation programs. If an off-site source reduction or materials separation (recycling) program is used to meet the materials separation requirements, the MWC and the party responsible for off-site separation may enter into a contractual relationship. The contractual relationship could designate the MWC and the off-site separator as co-operators of the MWC regarding compliance with the materials separation requirements. The contract could also specify the responsibilities of each party and the actions the off-site separator will take to meet the requirements for the 25 percent MSW reduction and/or removal of vehicle batteries and/or household batteries, as applicable.

The proposed materials separation requirements would also include a combustion permit provision that would be renewable on an annual basis. The permit would be available for MWC's that separate combustible material (e.g., paper, plastics) for recycle but for which there are no markets for the separated material. When a permit had been issued, the separated material could be combusted in the MWC.

G. Reporting and Recordkeeping Guidelines

Under the proposed guidelines, all MWC owners or operators would submit the results of the initial performance test and performance evaluation of the CEMS.

The proposed guidelines also provide for quarterly reports of CEMS drift tests and accuracy determinations in accordance with Appendix F, and reports of any periods when the minimum data requirements for CEMS are not met.

Records of all data, including results of emission tests and CEMS data, must be maintained for 2 years and made

available to enforcement personnel upon request.

MWC Emissions

Under the proposed guidelines, all MWC's would submit quarterly compliance reports for MWC operating parameters (CO, load, and temperature). Quarterly excess emission reports would be submitted for opacity for all MWC's, and MWC's at large and regional MWC plants would submit quarterly compliance reports for SO₂. Annual compliance reports for dioxin/furan and PM would be submitted for all MWC's, and annual compliance reports for HCl would also be submitted for MWC's at large and regional MWC plants. However, if MWC's have met the criteria allowing them to skip annual compliance tests for dioxin/furan, PM, or HCl, they would submit a simplified annual report.

Materials Separation

Annual compliance reports for materials separation would be submitted under the proposed guidelines. The first report would be submitted at the end of calendar year 1993 (which is 1 year after separation programs are to be implemented), however, this report would not be used to determine compliance. This interim report would be used to observe progress made toward the materials separation requirements. Reports submitted beginning at the end of calendar year 1994 would be used to determine compliance. Records of the weight of MSW received at the MWC, the weight combusted, and the weights of each material separated for recovery (on a monthly basis) would be kept. Additionally, records would be maintained of the weight of vehicle batteries and household batteries removed.

H. Compliance Times

The proposed emission guidelines would stipulate that existing MWC's should achieve compliance with the guidelines within 3 years from the time of promulgation of State regulations. Some MWC's may already be in compliance with the guidelines and not require 3 years to comply, but in most cases 3 years is expected to be required. However, in some cases, compliance times beyond 3 years may be necessary according to the extent of retrofitting that an MWC requires. State plans could address this issue on a site-specific basis. The proposed guidelines include a different compliance time for materials separation. Equipment and procedures capable of attaining the materials separation provisions would be in place

by December 31, 1992. However, the initial demonstration of compliance with the materials separation provisions (annual average basis) would not occur until the end of calendar year 1994.

III. Impacts of the Guidelines

A. Air

MWC Emissions

Under the proposed guidelines, nationwide emissions of dioxins/furans would be decreased by about 190 kilograms/year (kg/year) (420 lbs/year) compared with emission levels under the regulatory baseline. This represents a reduction of over 90 percent. Nationwide emissions of particulate matter (PM) would be decreased by about 8,300 Mg/year (9,100 tons/year) compared with emission levels under the regulatory baseline. Under the proposed guidelines, overall municipal waste combustor (MWC) metal emission reductions of about 97 percent for all metals except mercury would be achieved by the air pollution control systems. Nationwide emissions of sulfur dioxide (SO₂) and hydrogen chloride (HCl) would be decreased by about 37,000 Mg/year (41,000 tons/year) and 86,000 Mg/year (95,000 tons/year), respectively. This represents a reduction of over 50 percent in acid gas emissions.

Materials Separation

The proposal for materials separation would reduce the overall amount of waste combusted by about 25 percent and would reduce overall MWC emissions; however, the amount of emissions reduction cannot be predicted accurately since limited data exist relating materials separation to MWC emissions when materials separation occurs in conjunction with at-the-stack air pollution control devices. Additional reductions in emissions of MWC organics, MWC metals and mercury, and MWC acid gases are expected.

B. Water and Solid Waste

MWC Emissions

Under the proposed guidelines, no significant water pollution impacts are projected because none of the emission control technologies that were considered in developing these guidelines would produce a wastewater stream.

No significant solid waste impacts are projected from these proposed 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 sorbent

solids. Overall, the proposed guidelines would increase the net amount of MWC ash generated by roughly 3 percent or 250,000 Mg/year (280,000 tons/year) relative to baseline. However, the combustion of municipal solid waste (MSW) as opposed to direct landfilling reduces the volume of waste to be disposed of in landfills (by about 90 percent) and extends landfill life. Even with the increased ash, combustion would still reduce the volume of waste by about 90 percent.

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. The EPA is required, under the Resource Conservation and Recovery Act (RCRA) section 4010(c), to develop criteria for sanitary landfills that receive household hazardous waste and small quantity generated hazardous waste, which criteria are to protect human health and the environment taking into account the practicable capability of such facilities. These criteria may ultimately be Federally enforceable if States do not adopt adequate programs to implement them. RCRA section 4005(c). The EPA has proposed criteria for all MSW landfills pursuant to these provisions. These criteria would require such controls as groundwater monitoring, closure, financial responsibility, and corrective action standards for existing MSW landfills, and require in addition risk-based performance standards for new landfills or lateral expansions of existing MSW landfills. 53 FR 33314 (August 30, 1988). Pending legislation, although at an early stage of the legislative process, would require even more stringent controls, and in some bills, a whole separate regulatory system for MWC ash. The EPA thus believes that ash disposal will ultimately be adequately addressed by waste disposal management standards so that considerations of ash quality need not play a significant role in this rulemaking. However, to the extent that future EPA or Congressional action increases the stringency of controls and thereby cost of MWC ash disposal, the increased cost of ash disposal will be considered as part of this rulemaking. The EPA solicits comment regarding the effect of potential future MWC ash disposal standards on this rule.

Materials Separation

The proposed materials separation guidelines would encourage source reduction and recycling of materials, thereby reducing the volume of solid

waste and ash to be disposed of in MWC's or landfills. Any national strategy adopted by Congress and implemented at the State and local level would be credited toward the material separation requirement in this guideline.

C. Energy

MWC Emissions

An MWC regulated under the proposed guidelines would require additional energy to operate the control equipment used to comply with the proposed guidelines. Total national usage of electrical energy would increase by about 73,000 megawatt hours per year (MW-hrs/year), and natural gas use for auxiliary fuel would increase by 810 terajoules (TJ) (7.7×10^{11} Btu) per year. Many of the MWC's that would be affected are cogeneration MWC's that combust MSW and produce steam that is used to generate electricity for sale. For example, a large mass burn MWC would generate about 410,000 MW-hrs per year of electricity. Although these MWC's would require additional energy to operate control equipment, the additional energy would only be about 11,000 MW-hrs of electricity per year at a typical large MWC, which has a very small overall impact on energy generated at the plant (a net reduction in energy generation of 2.6 percent). No other energy impacts would be associated with these proposed guidelines.

Materials Separation

A small additional amount of energy would be used if mechanical materials separation procedures are practiced at the MWC plant. However, on a national basis, positive energy benefits are expected as a result of the materials separation requirements. The recycling of separated materials reduces overall energy use since the combined extraction and development of equivalent virgin raw materials is relatively energy-intensive.

D. Control Costs

The total annualized cost of control would be about \$320 million/year, and the overall national average annualized cost per unit of waste combusted would be \$10.90/Mg (\$9.90/ton) of MSW combusted. This includes the cost of control for MWC emissions and materials separation. For perspective, typical costs incurred by the general public for disposal of MSW range from \$40 to over \$100/Mg (\$36 to over \$90/ton) of MSW, including collection, transportation, combustion, and ash disposal.

Cost increases for typical large and regional MWC plants would range from about \$4 to \$15/Mg (\$4 to \$14/ton) of MSW combusted. Cost increases for typical small MWC plants would range from a negligible cost to about \$19/Mg (negligible to about \$17/ton) of MSW combusted.

The portion of the national cost and model plant impacts attributable to each of the guidelines is summarized below.

MWC Emissions

As a result of implementing the guidelines for MWC emissions, the overall average projected increase in nationwide annualized costs for controlling MWC emissions (using GCP and acid gas/PM control) is projected to be about \$10.90/Mg (\$9.90/ton) of MSW combusted. The nationwide projected increase in capital costs for controlling MWC emissions would be about \$1.2 billion.

On a per plant basis, the annual disposal cost for a typical large or regional MWC would increase by between \$4 and \$15/Mg (\$4 and \$14/ton) of MSW combusted, depending on the size and design of the MWC. Under the guidelines, the annual disposal cost for a typical small MWC would increase by between a negligible cost and \$19/Mg (negligible and \$17/ton) of MSW combusted, depending on the size and design of the MWC.

Materials Separation

Over the long term, the proposed guidelines for materials separation are not expected to result in an increase in national annualized costs. While some costs will be initially incurred to purchase and operate materials separation systems, as markets develop and stabilize, these costs will be offset by credits for sale of separated materials, reduced landfill disposal costs (due to reduced amount of MWC ash generated and disposed of in landfills), and other monetary benefits described in section V.

Annualized disposal cost increases or decreases for materials separation could occur at individual plants depending on material sales assumptions. At typical existing MWC's, materials separation costs could vary from a cost of about \$17/Mg (\$15/ton) of MSW combusted to a net savings of about \$19/Mg (\$17/ton) of MSW combusted when markets for separated materials develop and the materials are sold.

E. Economic Effects

MWC Emissions

The economic effects of the proposed guidelines on individual households are

not projected to be severe. Under the proposed guidelines, over 90 percent of the MWC service areas examined are projected to have household impacts of less than \$30/year and less than 0.15 percent of median household income. Likewise, the increase in waste disposal costs from the proposed guidelines would not result in severe economic impacts on any city or county government units.

Materials Separation

The costs of materials separation, when added to the cost of the other MWC emissions controls, would not cause severe impacts on households or government units. Costs may increase slightly in the short term in some instances where local markets for separated materials are not yet well developed. Also, households will experience some inconvenience in those areas which adopt a curbside separation program. However, as markets develop and stabilize, EPA believes the sale of materials for recovery will offset MSW disposal costs for households and government units. In general, materials separation guidelines and other Agency programs to encourage reuse will reduce the amount of MSW that must be disposed of, thereby reducing the overall costs of MSW disposal.

IV. Rationale for the Guidelines for MWC Emissions

A. Background

The regulatory interest in municipal waste combustors (MWC's) can be traced to the 1971 new source performance standard (NSPS) for particulate matter (PM) emissions from new municipal incinerators larger than 50 tons/day capacity under Section 111(b) of the Clean Air Act (CAA) (40 CFR part 60 subpart E). Similarly, in 1986 a PM standard was promulgated for new industrial-commercial-institutional steam generating units larger than 29 MW (100 million Btu/hour) heat input capacity combusting a number of fuels including municipal solid waste (MSW) (40 CFR part 60 subpart Db). The 1986 PM standard was more restrictive than the 1971 standard. New MWC's that are equipped with steam generating units and process roughly 225 Mg/day (250 tons/day) or more of municipal waste per MWC (which is approximately equivalent to 100 million Btu/hour) are subject to the 1986 NSPS. The Subpart E and Db standards for new MWC's, however, were developed to control emissions of PM and do not address control of toxic organics or health concerns specific to

toxic organics or other components of MWC emissions.

In section 102 of the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA), Congress directed EPA to prepare a report on the magnitude of dioxin risks from MWC's and to identify ways in which dioxin emissions could be minimized. In addition, during 1984 and 1985, the EPA's Office of Air and Radiation (OAR), in the course of assessing candidate air toxics, identified MWC's as a potential source category of concern. In June 1985, the Administrator announced the National Air Toxics Strategy, which included the commitment to regulate source categories of widespread national concern and give high priority to those that emit multiple pollutants such as MWC's. In addition to the above-mentioned regulatory activities, on August 5, 1986, the Natural Resources Defense Council (NRDC) and the States of New York, Rhode Island, and Connecticut petitioned the Administrator of EPA to regulate air emissions from new and existing MWC's under sections 111 and 112 of the CAA.

In response to the Congressional directive and as part of the OAR's air programs, EPA prepared a Report to Congress that was issued in June 1987. This nine-volume report presented a compilation of the available information on MWC's including industry characteristics, emission data, health risks, control technologies, and costs of control. It provided the technical basis for the decision to regulate air emissions from MWC's.

On July 7, 1987, an advanced notice of proposed rulemaking (ANPRM) was published in the Federal Register (52 FR 25339) where EPA announced its preliminary determination to regulate new and existing MWC's under sections 111(b) and 111(d) of the CAA, respectively. The schedule announced in the Federal Register for these actions called for proposal of NSPS for new MWC's and issuance of draft 111(d) emission guidelines for existing MWC's by November 1989 and promulgation by December 1990. The Administrator determined that MWC's would be regulated under sections 111(b) and 111(d) 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 pollutant

under section 112, (3) section 112 could not be used to address particular constituents or subgroups of emissions including lead and hydrogen chloride (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 the EPA guidelines.) Some States already have adopted or are developing their own MWC regulations.

An Agency MSW Task Force was formed in 1988 to address the full range of problems associated with MSW. Today's air emission guidelines are only one component of the plan developed by the MSW Task Force, entitled "The Solid Waste Dilemma: An Agenda for Action" (EPA/530-SW-88-052). Other ongoing and planned activities include regulations for new and existing MSW landfills proposed under RCRA, Subtitle D (53 FR 33314, August 30, 1988). Standards to control air emissions from municipal landfills are currently being developed. In addition, as stated in the "Agenda for Action," EPA encourages the use of recycling programs and source reduction activities to reach the goal of achieving a nationwide waste reduction of 25 percent by 1992. The Agency has also encouraged the development of State and local planning strategies to manage rates.

Today's proposal would apply to all facilities that combust municipal-type solid wastes or mixtures containing municipal-type solid wastes. Certain types of waste incinerators would not be covered by the guidelines for MWC's because they do not combust MSW. These other types of incinerators are regulated elsewhere. For example, hazardous wastes such as industrial sludges and chemical wastes are not covered under these guidelines for MWC's. However, hazardous waste incineration is regulated under RCRA authority (40 CFR 264 and 265 subpart O). The incineration of sewage sludge is regulated by an NSPS (40 CFR 60 subpart O) and also by regulations being developed under the Clean Water Act (40 CFR 503 subchapter O). Medical waste incineration or incineration of infectious wastes from hospitals are not covered by today's proposal, but are being investigated for regulation under a separate standard.

B. Selection of Source Category

As mentioned above, PM emissions from new MWC's constructed after 1971 and 1986, respectively, are presently

regulated under subparts E and Db of 40 CFR 60. In addition, new source review (NSR) and prevention of significant deterioration (PSD) permits for new MWC's are subject to EPA operational guidance. However, because of the increasing trend toward combustion of MSW in the U.S., the large existing population of MWC's, the complex mixture of MWC emissions, and potential public health impacts, a more comprehensive approach to MWC's is necessary. Greater emphasis is being placed on controlling the entire range of emissions from MWC's and on controlling existing as well as new MWC's. This new approach has been adopted for several reasons.

A large amount of MSW is currently combusted by existing MWC's, and additional capacity will be added in the future due to increasing restrictions and limited availability for landfilling. At present, there are over 200 existing MWC plants (over 450 individual MWC's) with a total existing MWC capacity of about 95,000 Mg/day (100,000 tons/day) that would be subject to the emission guidelines.

On a national basis, MWC's would remain a major source of emissions if not adequately controlled. Without the guidelines proposed today, emissions of all pollutants from existing MWC's are approximately 230,000 Mg/year (260,000 tons/year). These emissions include 11,000 Mg/year (12,000 tons/year) of PM, 194,000 Mg/year (210,000 tons/year) of MWC acid gases [sulfur dioxide (SO₂) and HCl combined], and 26,000 Mg/year (29,000 tons/year) of carbon monoxide (CO). In addition, existing MWC's would emit about 55,000 Mg/year (60,000 tons/year) of nitrogen oxide (NO_x).

Existing MWC's are also significant sources of air pollution at the individual plant level. For example, in the absence of additional regulation, a typical 140 Mg/day (150 tons/day) modular starved-air MWC would emit about 78 g/year (0.17 lbs/year) of dioxins/furans, about 15 Mg/year (16 tons/year) of PM, about 180 Mg/year (200 tons/year) of MWC acid gases (SO₂ and HCl), and about 16 Mg/year (18 tons/year) of CO. A typical existing large mass burn MWC with a design capacity of 2,000 Mg/day (2,200 tons/day) would emit about 1,500 g/year (3.3 lbs/year) of dioxins/furans, about 130 Mg/year (150 tons/year) of PM, about 4,000 Mg/year (4,400 tons/year) of MWC acid gases (SO₂ and HCl), and about 170 Mg/year (190 tons/year) of CO.

Finally, due to their nature and magnitude, emissions from existing MWC's, if not adequately controlled, can pose health risks to the public. Both MWC organics and MWC metals

include carcinogens. Ranges of cancer risk estimates for MWC emissions were published in the 1987 ANPRM (52 FR 25339). A recent review of risks using data and information gathered to support development of NSPS found that cancer risks for MWC's are likely at the lower end of the earlier estimated ranges cited in the ANPRM, although there remain significant uncertainties in the risk assessment. Therefore, there is no reason to review the 1987 decision to regulate MWC's under section 111 of the CAA.

In addition to these cancer risks, HCl emissions are also of concern because short-term modeling using the actual reasonable worst-case plant approach showed that, in the absence of further regulation, ambient HCl exposures near some existing MWC plants may exceed the interim short-term health effects level for HCl. The interim long-term welfare effects (materials damage) ambient concentration level of 3.0 micrograms per cubic meter (ug/m³) (1.3 gr/million dscf) (annual average) may also be exceeded by some existing MWC plants.

For the above reasons, MWC's have been determined to be a major source of air pollution which may reasonably be anticipated to endanger public health and welfare. As a result, MWC's have been selected for regulation.

C. Modification or Reconstruction of Existing MWC's

Those MWC's for which construction, modification, or reconstruction commenced before today's date would be subject to the proposed guidelines, while those MWC's for which construction, modification, or reconstruction commenced on or after today's date would be affected by the Subpart Ea NSPS proposed elsewhere in today's Federal Register. "Construction" is defined by 40 CFR 60.2 to mean "fabrication, erection or installation of an designated facility." *Sierra Pacific Power Co. v. EPA*, 647 F.2d 60 (9th Cir. 1981). The designated facility for these emission guidelines is the MWC as defined in the proposed emission guidelines (Section 60.31a). "Commenced" is defined by 40 CFR 60.2 to mean "that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification." The phrase "contractual obligation" means a contractual obligation that cannot be cancelled without incurring significant liability.

Potomac Electric Power Co. v. EPA, 650 F.2d 509, 513-515 (4th Cir. 1981).

If an existing MWC is modified for the purpose of meeting the requirements of the proposed guidelines for existing MWC's or State regulations developed to implement these guidelines, then the MWC would not be considered "modified" or "reconstructed" and would not be subject to Subpart Ea. A special provision is being proposed in the MWC NSPS that would establish this waiver. However, if the existing facility is modified or reconstructed in ways not required to meet the emission guidelines, for example if MWC capacity is increased, then the MWC may be considered modified or reconstructed, and could become subject to subpart Ea.

In general, "modification" refers to "any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies * * *" as described in the general NSPS provisions (40 CFR 60.14). "Reconstruction" generally includes "the replacement of components of an existing facility to such an extent that: (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new facility, and (2) it is technologically feasible to meet the applicable standards * * *" (40 CFR 60.15), however, reconstruction is determined on a case-by-case basis. As mentioned above, where such an expenditure is required to meet the proposed emission guidelines, this would not be considered a modification or reconstruction, and the MWC will not be subject to subpart Ea.

D. Selection of Designated Pollutant

The collection of compounds emitted by MWC's, referred to as "MWC emissions", has been selected as the designated pollutant for regulation under sections 111(b) and 111(d) of the CAA. This approach was selected because of the large number of compounds emitted by MWC's that create potential health problems.

Emissions from MWC's are a complex mixture of numerous pollutants that affect public health. There are three general subclasses of pollutants within MWC emissions. These are MWC organics, MWC metals, and MWC acid gases. Organic emissions from MWC's, in particular dioxins/furans, are potentially carcinogenic. Emissions of MWC metals contain various metals that have carcinogenic and noncarcinogenic health impacts. The

great majority of MWC metal emissions are condensed on PM emissions. These include cadmium, chromium, lead, beryllium, and arsenic. Emissions of MWC acid gases (specifically HCl and SO₂) pose several health and welfare-related problems. Of specific concern are emissions of HCl where short-term ambient exposure levels around some existing large MWC's may exceed short-term health effects levels. Also, long-term ambient concentrations may exceed welfare-effects levels for materials damage. Furthermore, MWC acid gases are precursors in the formation of acid deposition (acid rain), which adversely affects vegetation, surface water quality, and aquatic life. In combination, these effects support a health-based designation of MWC emissions under Section 111, although there are also welfare considerations.

The EPA has determined that it is unnecessary to measure MWC emissions as an entity and that it makes far more sense to develop guideline levels for certain component parts of MWC emissions. However, MWC emissions contain 100 or more components (many diverse metals and organics, for example). Although it is theoretically possible to measure all of these components, such a task would be extremely burdensome, expensive, and quite impractical. The guidelines EPA is proposing provide a high level of control of total MWC emissions, and do so in a way that avoids the administrative burden and expense associated with monitoring and measuring all components of MWC emissions.

E. Selection of Designated Facilities

For the proposed emission guidelines, the designated facility, an MWC, is defined as any combustion device used to burn MSW (including refuse-derived fuel (RDF)). The proposed guidelines would apply to incinerators (with and without heat recovery) and all types of MSW-fired steam generating units.

An MWC would be covered by this guideline if it burns MSW (including RDF) or a mixture of wastes or fuels containing MSW. The MSW is defined as refuse, more than 50 percent of which is municipal-type waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustibles, and noncombustible materials such as glass, metal, and rock. The MSW burned in the MWC's includes municipal-type waste from households as well as institutional, commercial, municipal, and industrial sources. These wastes can be characterized in a number of ways. Household wastes include municipal-type wastes generated by single and

multiple-family dwelling units (including garbage, trash, and yard wastes). Wastes from multiple-family units are usually collected in large containers and removed by commercial haulers. These wastes are also covered by today's guidelines. Institutional wastes include mixtures of municipal-type wastes generated by schools and colleges, and similar public buildings. Nonpathogenic wastes from medical institutions such as hospitals and nursing homes (e.g., wastes from their cafeterias and administrative offices) are also covered by these guidelines. Commercial MSW includes municipal-type waste mixtures generated by retail stores, shopping centers, office buildings, restaurants, hotels, airports, wholesalers, and other commercial establishments. The guidelines also cover municipal-type wastes generated by municipal public works or industries—such as mixtures containing corrugated boxes and other packing materials, tree and brush trimmings, cafeteria wastes, and paper towels. These guidelines do not cover any hazardous or nonhazardous industrial process wastes. They also do not cover infectious hospital wastes. It should be noted that MSW can be mixed with and combusted with sewage sludge from publicly-owned treatment works, and such combustion would be covered by the proposed guidelines. However, combustion of sewage sludge alone would not be covered.

Municipal solid waste also includes RDF. To produce RDF, the solid waste is shredded and classified by size prior to combustion.

As noted in the preceding paragraph, a source burning any amount of MSW would be classified as an MWC for purposes of these guidelines, and would consequently have to meet the State standards for MWC's which result from the promulgation of these guidelines. If a unit were classified under more than one set of standards (for example, a boiler burning MSW which also burns fossil fuel), it would have to meet both State and federal standards, and the more stringent standard in the event of an overlap. The EPA believes this is appropriate given that the source has chosen to burn MSW and therefore should have to meet the demonstrated standards for burning that material. The EPA realizes, however, that this reading would discourage burning of small amounts of MSW in units other than dedicated MWC's, and solicits comments on whether this is a desirable result. Commenters advocating some type of *de minimis* feed exception in the MSW definition should justify their choice of the cutoff.

The proposed emission guidelines are subdivided into three sets of requirements, one for MWC's located at small MWC plants with aggregate capacities to combust up to 225 Mg/day (250 tons/day) of MSW, one for MWC's located at large MWC plants with aggregate capacities to combust greater than 225 Mg/day (250 tons/day) but less than or equal to 2,000 Mg/day (2,200 tons/day) of MSW, and one for MWC's at regional MWC plants with aggregate capacities to combust greater than 2,000 Mg/day (2,200 tons/day) of MSW. For purposes of determining the regulatory size category of an existing MWC plant, the capacity of all existing MWC's at the same location would be aggregated (i.e., added together). Municipal waste combustor capacity is defined as the maximum demonstrated charging rate for each MWC, as measured in Mg/day (tons/day) of MSW combusted. Only existing MWC's that commenced construction prior to today's date would be considered in determining existing MWC capacity. Any MWC's that commenced construction on or after today's date would not be considered in existing MWC capacity calculations, but would instead be subject to the proposed MSWPS under section 111(b) of the Act.

As mentioned above, the proposed capacity aggregation provision under the guidelines would apply to all existing MWC's that have been constructed at the same location. For the purpose of these proposed guidelines, "same location" refers to the same or contiguous property that is under common ownership or control. Properties are considered contiguous if they are directly adjoining or are separated only by a street, road, highway, or other public right-of-way. Properties are considered under the same ownership or control if owned or operated by the same entity, a parent entity, a subsidiary, or subdivision, or any combination. Included are properties owned or leased by a business, government, or quasi-governmental entity (e.g., a public utility district or regional waste disposal authority).

The proposed capacity aggregation provision is necessary because of the common practice within the MWC industry of constructing multiple MWC's at the same location. This aggregation ensures that similar MWC plants with similar emission potential are subject to the same emission guidelines regardless of the number of individual MWC's at the plants. Because multiple MWC's can have the same emission quality impacts as a larger single MWC, it is reasonable

to apply the proposed emission guidelines to all existing MWC's at the same location, regardless of the exact timing of their construction. However, as noted above, new MWC's (i.e., those not covered under the guideline) would be subject to separate proposed standards under section 111(b) of the CAA published elsewhere in today's Federal Register.

As discussed in section IV.C., changes and additions made to existing MWC's for the purposes of complying with today's proposed guidelines would not be considered "modifications" or "reconstructions," and these MWC's would remain subject to the guidelines rather than to Subpart Ea.

F. Selection of Best Demonstrated Technology

Types of Combustors

There are three main types of technologies that can be used to combust MSW: mass burn, modular, and RDF. In addition, less prevalent unique designs are found at a few existing MWC plants. Although these are the main types of MWC technologies, there are variations within these categories, and there are designs that incorporate features of more than one type.

Mass burn MWC's are field-erected units covering a wide size range with individual MWC's ranging in size from 45 to 900 Mg/day (50 to 1,000 tons/day) of MSW combusted. There are typically two or three MWC's per plant, and MWC plant capacities range from about 90 to 2,700 Mg/day (100 to 3,000 tons/day) of MSW. The technology is called mass burn because the waste is combusted without any preprocessing other than removal of items too large to go through the feed system. Typical mass burn MWC's use hydraulic rams or pusher grate sections to push the refuse from the fuel chute onto the grate. Additional grates or rams are used to move the waste through the MWC and to promote complete combustion by agitation of the thick fuel bed. Many of the more recently constructed mass burn MWC's are constructed of waterwalls, which is a method used for cooling the combustion chamber and recovering heat. Some of the older mass burn MWC's are refractory wall MWC's which do not have heat recovery capability.

Modular MWC's also burn waste without preprocessing, but are usually shop-fabricated, small MWC's ranging in size from 5 to 110 Mg/day (5 to 120 tons/day) of MSW. Plants typically have one to four MWC's (although a few have more), and plant capacities typically

range from about 14 to 360 Mg/day (15 to 400 tons/day) of MSW.

To allow shop fabrication size restrictions while also providing sufficient flue gas residence time to complete combustion, modular MWC's employ two or more combustion chambers. Depending on the design, combustion air is supplied to the primary chamber either in excess of the stoichiometric amount required for complete combustion (modular excess-air MWC) or at substoichiometric levels (modular starved-air MWC). In the excess-air designs, excess air (above stoichiometric levels) is introduced into the primary chamber. Additional air needed to promote mixing and complete burnout may be added in the secondary chamber. In this design, the secondary chamber provides additional residence time for mixing and for completing of combustion. This is functionally similar to larger mass burn MWC's. In the starved-air designs, sufficient air is supplied to the primary combustion chamber to volatilize combustible materials in the waste while minimizing entrainment of fuel particles and ash in the flue gas. The incomplete combustion products and particulates then pass into the secondary combustion chamber where additional air is added to complete combustion. Most modular MWC's have refractory-lined combustion chambers. Although many of the more recently constructed modular MWC's recover heat with waste heat boilers, some of the older and smaller existing modular MWC's do not have heat recovery.

The third class of MWC burns pretreated and shredded municipal waste, broadly referred to as RDF. The degree of processing used in RDF production can vary from simple removal of bulky items accompanied by shredding of the remaining waste to extensive pretreatment to produce a finely divided fuel containing relatively little noncombustible material. The RDF is generally fed with a stoker onto a moving grate. Some RDF MWC's are designed to combust only RDF, while others combust a mixture of RDF and other fuels such as wood or coal. In addition, a few boilers initially designed to combust pulverized coal may add some RDF as a supplemental fuel. Most RDF MWC's are medium to large sized MWC's with individual MWC's ranging in size from 270 to 900 Mg/day (300 to 1,000 tons/day) capacity. Plants typically have two to four MWC's, and RDF plant sizes range from 550 to 3,600 Mg/day (600 to 4,000 tons/day) capacity. In general, RDF MWC's are constructed

of waterwalls and employ heat recovery.

The last class of MWC's is comprised of various unique MWC designs that are found only at existing plants. For example, there are eight batch-fed refractory wall MWC's of various types currently in operation. However, these MWC's are generally 15 to 20 years old and no new ones are being built. Another unique design, the refractory kiln MWC, consists of a rotary kiln only, with no grate sections. This MWC is equipped with a waste heat boiler. However, only one of these MWC's is known to exist. There are also three plants with fluidized-bed MWC's.

Emission Control Technologies for MWC Emissions

There are basically three methods to controlling emissions from MWC's. The first method involves separation of materials prior to combustion, and exclusion of certain materials from combustion. Another method is to alter the combustion process to reduce emissions of MWC organics [referred to as good combustion practices (GCP)]. The third method is adding pollution control equipment after the MWC to control emissions of MWC metals and MWC acid gases, and to obtain additional MWC organics control. These control methods can be applied separately or in combination. The GCP and add-on methods are described in this section. Materials separation is described in section V of this preamble.

Good Combustion Practices: Good combustion practices include the proper design, construction, operation, and maintenance of an MWC. Municipal waste combustor emissions may originate from the feed waste or fuel, reactions occurring in the combustion chamber, or reactions on the surface of PM at temperatures from 250 to 400 °C (480 to 750 °F). The use of GCP reduces MWC organic emissions, including emissions of dioxins/furans and their precursors, by promoting more thorough combustion of these pollutants. Generally, newer existing MWC's have incorporated GCP features in their initial design, whereas older facilities may have to retrofit various components of GCP.

Important factors in MWC design and operation that reduce MWC organic emissions include: maintaining uniform waste feed rates and conditions; the use of pretreated air to combust wet or difficult to combust materials; maintaining adequate combustor temperature and residence time; providing proper total combustion (excess) air levels; supplying proper

amounts and distributions of primary (underfire) and secondary (overfire) air; minimizing PM carryover; monitoring degree of waste burnout; and the use of auxiliary fuel during startup and shutdown.

Carbon monoxide concentration in the combustor flue gas is a good indicator of combustion efficiency, and high MWC organic (i.e., dioxin/furan) emissions are associated with poor combustion. Thus, if high levels of CO are present in combustor flue gases, it is likely that significant quantities of MWC organic emissions are also present.

The techniques employed to minimize CO are closely related to those employed to minimize MWC organic emissions. Combustor load is also related to MWC organic emissions. At loads above 100 percent, PM carryover would increase and furnace residence times would decrease, contributing to increased MWC organic (i.e., dioxin/furan) emissions at high loads. The maximum load would be established for each MWC during its compliance test.

According to available information, MWC organics (i.e., dioxins/furans) form on fly ash in the presence of excess oxygen at temperatures in the range of 250 to 400 °C (480 to 750 °F), with maximum formation rates occurring at about 300 °C (570 °F). Available data indicate that cooling flue gases and operating the PM control device at temperatures of 230 °C (450 °F) or less prevents formation of MWC organics (i.e., dioxins/furans) in the flue gas. Flue gas cooling is typically accomplished by the economizer at MWC's with heat recovery capability, but could also be accomplished by other methods such as humidification.

Proper operation of MWC's is key to GCP. Operation of MWC's is complex and, as mentioned above, there are many interrelated parameters that influence emissions. Since only a few parameters such as combustor CO emissions, load, and flue gas temperature, can be specified and measured in emission guidelines, operator certification and training is another element of GCP. The emission guidelines would allow flexibility concerning time requirements for existing MWC's to implement operating certification and training programs.

The American Society of Mechanical Engineers (ASME) has developed a certification program that consists of an initial provisional certification followed by full operator certification. To obtain provisional certification, a candidate must demonstrate that certain requirements of experience and education have been met and must pass a written examination covering the

basics of municipal waste combustion. The initial provisional certificate, which is valid for 5 years, is not specific for any particular MWC technology or jurisdiction.

After attaining a provisional certification and gaining 6 months of experience at a particular MWC facility, a chief facility operator or shift supervisor may pursue an operator certification. This certificate is issued upon passing a site-specific oral examination on the operation, maintenance, and safety procedures at the facility. Operator certificates are valid only for facilities of similar size and technology. They are valid for 3 years and may be renewed upon demonstration that the operator has maintained knowledge of the particular MWC and permit requirements. New certificates are required upon transfer to a facility of a different size or technology. The ASME certification will ensure national consistency and will allow individuals to transfer their certification from one State to another.

In addition, all plant personnel who are in positions associated with the combustion process—including the control room operators, ash handlers, personnel involved with MWC maintenance, and crane/load operators, and any other persons associated with MWC operation should receive training in MWC operation on a yearly basis. Such training is best provided through use of a training manual which focuses on how each subject area, or component of MWC operation, can impact MWC performance and emissions. In addition, the manual should specify remedial measures that are effective in regaining good performance during startups, shutdowns, and malfunctions of the MWC. As with any routine training program, the training manual should be revised as appropriate from time to time to reflect any changes.

The following training elements should be included in any training manual developed under the emission guidelines.

Introduction. This portion of the manual should include an explanation of the regulation applicable to MWC emissions and how certain MWC operating procedures (which would be discussed in detail later in the manual) should be followed in order to maintain compliance with the guidelines and to achieve GCP.

Basic Combustion Theory. This portion of the manual should address the interrelationships of temperature, residence time, and fuel/air mixing and their effects on combustion performance and destruction of trace organics including dioxins/furans.

Procedures for Receiving, Handling, and Feeding Waste. This portion of the manual would address which specific types of MSW should be eliminated from the waste stream because of their physical and chemical characteristics (e.g., oversized, bulky wastes that can jam feed hoppers; explosive or hazardous wastes, such as propane tanks) and materials that cannot be combusted. These wastes may contribute to upsets which result in excessive CO or MWC organic (i.e., dioxin/furan) emissions. Because the loader/crane operator can affect the stability of the combustion process by thoroughly mixing incoming feed material to blend wastes with high and low moisture contents and heating values, this portion of the manual also should include a discussion of the proper waste feed rates and feed uniformity, and their effect on combustion stability. Maintaining combustion stability would aid in achieving continuous reductions in MWC organic emissions.

Start-up and Shutdown Procedures. Because higher levels of MWC organic emissions can occur during startup and shutdown due to low combustion temperatures and poor mixing, the training manual should set forth specific procedures for minimizing the effects of these episodes.

Auxiliary Fuel Use. Some MWC's fire auxiliary fuel during conditions other than start-up and shutdown (e.g., to maintain steam load during waste feed interruptions). Thus, this portion of the manual should address how changes in operation, such as combustion airflow rates and distributions, may be necessary when firing auxiliary fuels.

Maintaining Proper Combustion Air Supply Levels. Providing the proper amount and distribution of underfire (or primary) air is important in maintaining proper MWC temperatures and stoichiometries and in reducing emissions of organics and particulates from the MWC. This is especially important for modular MWC's with primary chambers designed to operate at substoichiometric conditions. As feed rates and waste properties change, it is sometimes necessary to adjust primary air distributions to maintain local stoichiometries. This portion of the manual should address what adjustments are needed depending on the specific MWC design type. In addition, this portion of the manual should also highlight the need for proper design and operation of overfire (or secondary) air because it plays a major role in the mixing process and in the destruction of MWC organics. Again,

secondary air design and operating practices will vary depending on the specific MWC design type. Because air preheat (used to assist in the combustion of high moisture, low heating value wastes) can affect the ability of an MWC to achieve good combustion, this portion of the manual should also instruct the operator to anticipate this potential problem and how to adjust or initiate air preheat as a corrective action.

Upset or Off-Specification Conditions. This portion of the manual should provide the operator with guidance on implementing corrective action in response to a number of periodic process upsets, including, but not limited to, low (or excessive) furnace temperatures, high CO levels, high (or low) operating load, high (or insufficient) flue gas cleaning device inlet temperatures, and poor waste burnout conditions.

Minimization of Particulate Matter Carryover. This portion of the manual should address the problem of PM carryover and instruct the operator how to minimize PM carryover within normal operating parameters. High levels of PM carryover may increase PM concentrations in the flue gas and may contribute to downstream formation of MWC organics (i.e., dioxins/furans).

Performance of GCP: Use of GCP, including exhaust gas cooling to 230 °C (450 °F), in conjunction with PM control can generally achieve dioxin/furan emission levels of 500 ng/Nm³ (200 gr/billion dscf) or less for existing MWC's except RDF MWC's, taking into account retrofitting the existing MWC. Levels of 1,000 ng/Nm³ (400 gr/billion dscf) can be achieved at existing RDF combustors.

Add-on Controls: The most frequently used PM control devices for existing MWC's are electrostatic precipitators (ESP's) and, less commonly, fabric filters (FF's). Other PM control technologies (such as cyclones, electrified gravel beds, and venturi scrubbers) have been used to a much lesser extent.

In ESP's, flue gas flows between a series of high voltage discharge electrodes and grounded metal plates. Negatively charged ions formed by this high voltage field (known as a "corona") attach to PM in the flue gas, causing the charged particles to migrate toward the grounded plates. Once the charged particles are collected on the grounded plates, the resulting dust layer is removed from the plates by rapping, washing, or some other method, and collected in a hopper. The most common types of ESP's used by MWC's are: (1) Plate-wire units in which the discharge electrode is a bottom-weighted or rigid wire and (2) flat plate units which use

flat plates rather than wires as the discharge electrode.

Fabric filters (also called baghouses) are used at some existing MWC's for particulate control, particularly when used in combination with acid gas control. Fabric filters are of two basic designs, reverse-air and pulse jet. In a reverse-air FF, flue gas flows through unsupported filter bags, leaving the particulate on the inside of the bags. The particulate builds up to form a particulate filter cake. When the pressure drop across the filter cake reaches a defined limit, flue gas flow is stopped and clean air is directed through the filter in the opposite direction, the filter bag collapses, and the filter cake falls off and is collected at the bottom of the hopper. Following cleaning, flue gas is again directed through the clean filter bags and the cycle is repeated. In a pulse jet FF, flue gas flows through supported filter bags leaving particulate on the outside of the bags. To remove the built-up particulate filter cake, a pulse of compressed air is introduced inside of the filter bag, the filter bag expands and the filter cake falls off and is collected. The pulse jet system may be cleaned while on-line or off-line.

Well-designed and operated ESP's or FF's are highly efficient PM collectors and can reduce total PM emission levels to 34 mg/dscm (0.015 gr/dscf) or less (at 7 percent O₂) at new or retrofit installations. Available data indicate that upgrades of existing ESP's can achieve PM emission levels of 69 mg/dscm (0.030 gr/dscf) or less (at 7 percent oxygen [O₂]).

Municipal waste combustor metals emissions include arsenic, beryllium, cadmium, chromium, lead, mercury, and nickel. All of these metals, except mercury, are removed with the fine particulates collected by ESP's or FF's. Well-designed ESP's or FF's operated at 230 °C (450 °F) or less remove over 97 percent of arsenic, cadmium, and lead and about 99 percent of beryllium, chromium, and nickel from MWC exhaust.

In general, little or no mercury control is observed at MWC's with PM control alone (i.e., no acid gas controls).

Control of MWC acid gases (including SO₂ and HCl) can be achieved by reaction of dry or slurried alkali sorbents (e.g., lime) into the flue gas. This technology would have to be retrofitted at most existing MWC's. Available acid gas control technologies include addition of dry sorbents into the flue gas duct or into the combustor, and spray drying. Acid gas controls are typically followed by an ESP or a FF. Two levels of acid gas control were

considered in developing regulatory alternatives. These are dry sorbent injection (DSI)/PM control (ESP or FF) systems that provide an intermediate level of acid gas control (approximately 50 percent), and spray dryer (SD)/FF systems that provide higher efficiency control (approximately 90 percent). These two levels are discussed below.

Dry sorbent injection technologies have been developed primarily to control acid gas emissions. However, when DSI is combined with flue gas cooling and an upgraded ESP or a FF, control of MWC organic (dioxin/furan), MWC metal, and MWC acid gas emissions are achieved. Dry sorbent injection/ESP systems are an attractive retrofit control option for existing plants and allow use of the existing (upgraded) ESP. The DSI/ESP technology, is therefore, frequently less expensive than DSI/FF technology for existing plants. Two primary subsets of DSI technologies exist, duct sorbent injection and furnace sorbent injection.

In duct sorbent injection, powdered sorbent is pneumatically injected into either a separate reaction vessel or a section of flue gas duct located downstream of the combustor economizer or quench tower. The sorbent reacts with acid gases to form alkali salts. By lowering the acid content of the flue gas, downstream equipment can be operated at reduced temperatures while minimizing the potential for acid corrosion of equipment. Reaction products, fly ash, and unreacted sorbent are collected with the ESP. Available sorbents include hydrated lime (Ca(OH)₂), soda ash (NaOH), and sodium bicarbonate (NaHCO₃).

Furnace sorbent injection generally takes less space than duct injection (a major consideration in retrofit). Furnace sorbent injection technology involves the injection of powdered alkali sorbents into the furnace section of an MWC. This can be accomplished by addition of sorbent to the overfire air, injection through separate ports, or mixing with the waste prior to feeding to the MWC. As with duct sorbent injection, reaction products, fly ash, and unreacted sorbent are collected using the existing (upgraded) ESP or FF.

Both types of DSI systems (duct or furnace injection) followed by an upgraded ESP or FF can achieve a 50 percent reduction in SO₂ emissions or an outlet SO₂ concentration of 30 ppmv at 7 percent O₂ (daily 24-hour average basis). A 50 percent reduction in HCl emissions or an outlet concentration of 25 ppmv is achievable (daily 24-hour average basis) by furnace sorbent injection/ESP or FF

systems. Greater levels of HCl control may be achieved by duct injection, which preferentially controls HCl over SO₂. The site-specific configuration of existing MWC's will determine whether furnace or duct injection technology is more feasible to retrofit. All types of existing MWC's except RDF's applying either a DSI/ESP or DSI/FF system can meet a dioxin/furan emission level of 125 ng/Nm³ (50 gr/billion dscf) (at 7 percent O₂). Existing RDF's with DSI/ESP or DSI/FF systems can meet a dioxin/furan emission level of 250 ng/Nm³ (100 gr/billion dscf) (at 7 percent O₂).

A PM emission guideline level of 69 mg/dscm (0.030 gr/dscf) can be achieved for existing MWC's equipped with DSI/ESP or DSI/FF. Dry sorbent injection/ESP or DSI/FF systems achieve 97 percent or greater removal of arsenic, cadmium, and lead, and 99 percent removal of beryllium, chromium, and nickel. In addition, DSI/ESP systems typically achieve about 30 percent control of mercury and DSI/FF systems typically achieve a higher percent removal of mercury. However, the data on mercury emissions and control levels are highly variable among MWC's.

Lime spray drying followed by FF is a higher performance technology than current DSI/ESP or DSI/FF technology and was initially developed to control acid gas emissions. However, the system also controls emissions of MWC organics (dioxins/furans), and MWC metal emissions. In the spray drying process, atomized lime slurry is injected into a SD vessel; the water in the lime slurry evaporates to cool the flue gas and the lime reacts with acid gases to form dry sulfate/sulfite salts that are removed by the FF. The key design and operating parameters that significantly affect the performance of the system are the temperature of the spray dryer reaction/drying vessel and lime-to-acid gas stoichiometric ratio. The outlet temperature is controlled by the amount of water in the slurry. As more water is added, the temperature is lowered.

More effective acid gas removal occurs at lower temperatures, but the temperature must be kept high enough to ensure that the slurry and reaction products are adequately dried prior to collection in the FF. Otherwise, caking will occur and the system may have to be removed from service for removal of the cake. Spray dryer systems generally operate at flue gas discharge temperatures of 150 °C (300 °F) or less. For MWC flue gases containing significant chlorine, a minimum spray dryer outlet temperature of around 115

°C (240 °F) is required to control agglomeration of PM and sorbent by calcium chloride.

Spray dryer/FF systems on existing MWC's can achieve either an 85 percent reduction in SO₂ emissions or an outlet SO₂ concentration of 30 ppmv at 7 percent O₂ (24-hour average basis). Either a 95 percent reduction in HCl emissions or an outlet HCl concentration of 25 ppmv is also achievable by SD/FF systems on existing MWC's. Spray dryer/FF systems also achieve outlet dioxin/furan concentrations in the range of 5 ng/Nm³ (2 gr/billion dscf) to about 30 ng/Nm³ (12 gr/billion dscf) (at 7 percent O₂). The SD/FF systems are the most effective add-on control systems for dioxins/furans, and achieve 99 percent control and low outlet emission levels, however, the exact performance level has not been specified in the proposed guidelines. Measured emission levels vary among MWC's, and additional test data from MWC's with SD/FF controls are currently being collected and analyzed. The exact dioxin/furan emission level achievable by SD/FF controls will be determined prior to promulgation of these guidelines, and a single emission level will be included in the promulgated guidelines. Specific comments are solicited on the achievable emission level.

A PM emission guideline level of 34 mg/dscm (0.015 gr/dscf) is achievable by all MWC's equipped with SD/FF systems. At this PM emission level, SD/FF systems achieve 99 percent removal of all metals except mercury.

The observed removal efficiencies for mercury vary widely among MWC's. Tests at three MWC's with SD/FF controls showed over 70 percent mercury removal rates and outlet concentrations below 200 µg/dscm (85 gr/million dscf). On the other hand, compliance test data from three other MWC's with SD/FF systems indicated little or no mercury control. One of these three MWC's, however, was retested later and results indicated over 75 percent control. It has been postulated that mercury emissions may be related to NO_x control, and that use of ammonia injection for NO_x control may reduce mercury control in some cases. However, another possibility is that the adsorption and removal of mercury may be dependent on carbon in the fly ash. Review of data from tests of MWC's with and without NO_x control tend to show that combustors with very good combustion and very low concentrations of organics and PM in the flue gas upstream of the SD/FF filter achieve lower mercury removal. This may be

because there is little carbon in the fly ash onto which mercury can adsorb for subsequent removal by the FF. Other explanations for the observed variation in mercury control are also possible. A joint EPA/industry task force is being established to investigate mercury emissions and controls. Their finding will be considered in development of the final emission guidelines.

Spray dryer/ESP systems have been used on a few MWC's. Available data indicate that these systems may achieve less removal of MWC acid gas, MWC organic, and mercury emissions than SD/FF systems. However, SD/ESP systems may be an attractive retrofit technology because MWC plants could make use of an existing ESP and would only have to retrofit a SD. This would result in lower costs compared to retrofitting both a SD and a FF. This issue will continue to be investigated, following proposal, and comments on the performance of SD/ESP systems are requested.

A third MWC control method includes MSW materials separation, which is the separation of certain components from the waste stream prior to combustion in an MWC. Additional reductions in MWC emissions, including mercury, may be achieved with application of materials separation as discussed in section V.

Regulatory Alternatives for MWC Emissions

Five regulatory alternatives were considered in selecting MWC emissions guidelines for proposal. A baseline alternative is also presented which represents the emission level expected in the absence of the proposed guidelines. For existing MWC's, the baseline level of GCP and add-on emission control varies depending on the type, unit size, and age of the individual combustors.

The five regulatory alternatives considered in developing guidelines for MWC's represent varying levels of control for MWC organics (dioxins/furans), MWC metals (as indicated by PM), and MWC acid gases (including HCl and SO₂). Some of the regulatory alternatives also subdivide MWC plants into two size categories. Categorization of MWC's into small and large plants was initially considered because: (1) Control cost increases associated with the various control technologies, on the bases of percent of MWC capital cost and dollars per ton of MSW combusted, are greater for small plants, and (2) large plants generally have greater emissions potential and account for over 90 percent of existing capacity.

Therefore, some of the regulatory alternatives require less stringent control of small plants, while others apply the same level of control to all MWC plants. The regulatory alternatives define small MWC plants as those with aggregate existing MWC plant capacities of 225 Mg/day (250 tons/day) of MSW or below, and large plants as those with aggregate MWC capacities greater than 225 Mg/day (250 tons/day) of MSW. The EPA requests comment on whether another size category cutoff might be more appropriate. The aggregate capacity of all existing combustors at the MWC facility is used to determine if the MWC meets the large or small plant definition.

Table 2 presents the five regulatory alternatives in terms of control technologies. Table 3 presents these five regulatory alternatives in terms of the emission limits for dioxins/furans, PM, and acid gases that would be specified

in the actual guidelines. Table 4 presents GCP operating guidelines (see section V for a separate discussion of materials separation).

TABLE 2.—TECHNOLOGICAL BASIS FOR REGULATORY GUIDELINES ALTERNATIVES FOR EXISTING MWC UNITS

Regulatory alternative	Control guidelines by total MWC plant capacity Mg MSW/day (tons MSW/day)	
	Small plants <225 Mg/day (<250 tons/day)	Large plants >225 Mg/day (>250 tons/day)
I	GCP PM control to 0.080.	GCP. PM control to 0.030.
IIA	GCP PM control to 0.080.	GCP. MWC acid gas by DSI. PM control to 0.030.

TABLE 2.—TECHNOLOGICAL BASIS FOR REGULATORY GUIDELINES ALTERNATIVES FOR EXISTING MWC UNITS—Continued

Regulatory alternative	Control guidelines by total MWC plant capacity Mg MSW/day (tons MSW/day)	
	Small plants <225 Mg/day (<250 tons/day)	Large plants >225 Mg/day (>250 tons/day)
IIB	GCP MWC acid gas by DSI. PM control to 0.030.	GCP. MWC acid gas by DSI. PM control to 0.030.
III	GCP PM control to 0.080.	GCP. MWC acid gas by SD/FF. PM control to 0.015.
IV	GCP MWC acid gas by DSI. PM control to 0.030.	GCP. MWC acid gas by SD/FF. PM control to 0.015.

TABLE 3. POTENTIAL EMISSION LIMITS ASSOCIATED WITH 111(D) REGULATORY GUIDELINE ALTERNATIVES

Regulatory alternative		Control levels by plant capacity	
		Small plants <225 Mg/day (<250 tons/day)	Large plants >225 Mg/day (>250 tons/day)
I	Dioxins/furans	500 ng/Nm ³ (1,000 ng/Nm ³)*	500 ng/Nm ³ (1,000 ng/Nm ³).
	PM	0.080 gr/dscf	0.030 gr/dscf.
	HCl	no limit.	no limit.
	SO ₂	no limit.	no limit.
	GCP/Operating Standards	See Table 4.	See Table 4.
IIA	Dioxins/furans	500 ng/Nm ³ (1,000 ng/Nm ³).	125 ng/Nm ³ (250 ng/Nm ³).
	PM	0.080 gr/dscf	0.030 gr/dscf.
	HCl	no limit.	50% or 25 ppmv.
	SO ₂	no limit.	50% or 30 ppmv.
	GCP/Operating Standards	See Table 4.	See Table 4.
IIB	Dioxins/furans	125 ng/Nm ³ (250 ng/Nm ³).	125 ng/Nm ³ (250 ng/Nm ³).
	PM	0.030 gr/dscf	0.030 gr/dscf.
	HCl	50% or 25 ppmv.	50% or 25 ppmv.
	SO ₂	50% or 30 ppmv.	50% or 30 ppmv.
	GCP/Operating Standards	See Table 4.	See Table 4.
III	Dioxins/furans	500 ng/Nm ³ (1,000 ng/Nm ³).	5 to 30 ng/Nm ³ .
	PM	0.030 gr/dscf	0.015 gr/dscf.
	HCl	no limit.	95% or 25 ppmv.
	SO ₂	no limit.	85% or 30 ppmv.
	GCP/Operating Standards	See Table 4.	See Table 4.
IV	Dioxins/furans	125 ng/Nm ³ (250 ng/Nm ³).	5 to 30 ng/Nm ³ .
	PM	0.030 gr/dscf	0.015 gr/dscf.
	HCl	50% or 25 ppmv.	95% or 25 ppmv.
	SO ₂	50% or 30 ppmv.	85% or 30 ppmv.
	GCP/Operating Standards	See Table 4.	See Table 4.

* Emission levels in () are for RDF MWC's.

TABLE 4. EMISSION AND OPERATING PARAMETER LIMITS FOR GCP

Pollutant or parameter	Limit
Maximum load level	100% of demonstrated capacity.
Maximum temperature at PM control device inlet	230 °C (450 °F).
CO Emissions:	
Modular MWC's	50 ppmv.
Mass burn waterwall	100 ppmv.
Mass burn refractory	100 ppmv.
Fluidized bed combustor.	100 ppmv.

TABLE 4. EMISSION AND OPERATING PARAMETER LIMITS FOR GCP—Continued

Pollutant or parameter	Limit
Mass burn rotary waterwall.	150 ppmv.
RDF spreader stoker	150 ppmv.
Coal/RDF cofired	150 ppmv.
Operator certification and training.	All operators certified by ASME. Training manual and training for other personnel.

Regulatory Alternative I, the least stringent nonbaseline regulatory alternative shown in Table 2, requires reductions in MWC emissions to levels achievable with GCP for plants of all sizes, as well as various levels of PM control upgrade depending on plant size. For small plants (i.e., those MWC's located at plants with aggregate capacities equal to or below 225 Mg/day [250 tons/day] of MSW), PM emission limits correspond to a level of 180 mg/dscm (0.080 gr/dscf). Under Regulatory Alternative I, this same level would be

applied to all existing small MWC plants with no lower size cutoff. Municipal waste combustors located at large MWC plants (i.e., those with aggregate capacities of greater than 225 Mg/day [250 tons/day] of MSW) would be required to achieve PM control to 69 mg/dscm (0.030 gr/dscf). No add-on acid gas controls would be required for any MWC under this alternative. Based on use of GCP and PM control, emissions of dioxins/furans would be reduced to 1,000 ng/Nm³ (400 gr/billion dscf) at RDF MWC's and to 500 ng/Nm³ (200 gr/billion dscf) at all other types of MWC's. The PM controls required would achieve significant reductions in metals emissions, and the higher costs of acid gas controls would not be incurred.

Regulatory Alternative IIA is more stringent than Regulatory Alternative I. Municipal waste combustors at large MWC plants would be required to reduce emissions to levels achievable with moderate acid gas add-on control (based on DSI/ESP or DSI/FF control). Control requirements and emission levels for MWC's at small MWC plants are the same as Regulatory Alternative I. For large MWC plants, MWC acid gas control based on DSI/ESP or DSI/FF (50 percent SO₂ and 50 percent HCl control) and PM control to 69 mg/dscm (0.030 gr/dscf) by ESP upgrade are required, and emissions of dioxin/furan would be reduced to 250 ng/Nm³ (100 gr/billion dscf) at RDF MWC's and 125 ng/Nm³ (50 gr/billion dscf) at all other types of MWC's. Under Regulatory Alternative IIA, small MWC plants are allowed a lower cost and less efficient control,

which would avoid the greater costs of add-on acid gas controls for smaller MWC plants.

Regulatory Alternative IIB requires MWC emission reductions to levels achievable with GCP, acid gas control based on DSI/ESP or DSI/FF, and PM control to 69 mg/dscm (0.030 gr/dscf) for all MWC plants (both large and small). This alternative would result in reduction of dioxin/furan emissions as well as reductions in acid gas emissions for all MWC plants, but has higher costs for small plants than Regulatory Alternative I or IIA.

Regulatory Alternative III is similar to Regulatory Alternative IIA by not requiring acid gas control or small MWC plants, but it would require emission levels based on GCP, acid gas control based on SD/FF (85 percent SO₂ and 95 percent HCl control), and PM control to 0.015 gr/dscf on MWC's at large MWC plants, reducing dioxin/furan emissions to a level in the range of 5 to 30 ng/Nm³ (2 to 12 gr/billion dscf) for large MSW plants. The exact emission level within this range that is achievable with SD/FF controls will be determined prior to promulgation. Compared to Regulatory Alternative IIB, this alternative would require more stringent control of large MWC plants, but less stringent control of small PWC plants. Municipal waste combustors at small MWC plants would be required to achieve emission levels based on use of GCP plus PM control to 80 mg/dscm (0.08 gr/dscf), but no acid gas controls.

Regulatory Alternative IV is the most stringent alternative analyzed. Like

Regulatory Alternative III, Regulatory Alternative IV is based on MWC emission levels achievable with GCP, acid gas control based on SD/FF (85 percent SO₂ and 95 percent HCl control), and PM control to 34 mg/dscm (0.015 gr/dscf) for large MWC plants. For small plants, MWC emission levels corresponding to GCP, acid gas control based on DSI/ESP or DSI/FF (50 percent SO₂ and 50 percent HCl control), and PM control to 69 mg/dscm (0.030 gr/dscf) would be required. The requirements for small MWC plants are, therefore, more stringent than under Regulatory Alternative III. Regulatory Alternative IV has the lowest emissions but the highest cost of any of the regulatory alternatives presented.

Model Plant Impacts of the Regulatory Alternatives for MWC Emissions

Table 3 shows the air pollutant emission concentration or present reduction limits for small and large MWC plants under each regulatory alternative, and Table 4 shows GCP operating requirements. Tables 5 and 6 present the ranges of individual small and large model MWC plant emissions and emission reductions of PM, dioxins/furans, and MWC acid gases (SO₂ and HCl) under the baseline and the regulatory alternatives. These emission estimates were derived by applying the different control technologies to small and large MWC plants as specified by the regulatory alternatives. They are expressed as ranges to represent the different types and sizes of MWC's within the small and large MWC plant categories.

TABLE 5.—RANGE OF MWC EMISSIONS FOR INDIVIDUAL SMALL MWC PLANTS UNDER THE BASELINE AND REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	MWC metals PM Mg/yr	MWC organics Dioxin/Furan g/ yr	MWC acid gases	
			SO ₂ Mg/yr	HCl Mg/yr
Baseline.....	15-190	21-890	30-150	41-210
I.....	6-46	21-130	30-148	41-210
IIA.....	6-46	21-130	30-150	41-210
IIB.....	1-6	5-32	18-89	6-42
III.....	6-46	21-130	30-150	41-210
IV.....	1-6	5-32	18-89	6-42

TABLE 6.—RANGE OF MWC EMISSIONS FOR INDIVIDUAL LARGE MWC PLANTS UNDER THE BASELINE AND REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	MWC metals PM Mg/yr	MWC organics Dioxin/Furan g/yr	MWC acid gases	
			SO ₂ Mg/yr	HCl Mg/yr
Baseline.....	22/146	109-9,600	300-2,400	420-2,400
I.....	12-73	109-580	300-2,400	420-2,400
IIA.....	12-73	27-150	180-1,400	84-480
IIB.....	12-73	27-150	180-1,400	84-480
III.....	12-73	2.7-16	31-240	13-73
IV.....	12-73	2.7-16	31-240	13-73

As shown in Table 5, PM emissions from small MWC plants (i.e., those with capacities equal to or less than 225 Mg/day [250 tons/day] of MSW) range from 15 to 190 Mg/year (16 to 210 tons/year) at baseline. Regulatory Alternatives I, IIA, and III require small MWC plants to achieve PM levels of 180 mg/dscm (0.08 gr/dscf). Under Regulatory Alternatives I, IIA, and III some small model MWC plants would be required to add additional PM controls to meet this emission level, but other existing MWC plants would already be controlled to a PM level of 180 mg/dscm (0.08 gr/dscf) or below at baseline. Under Regulatory Alternatives I, IIA, and III, PM emission reductions of up to 76 percent over baseline would be achieved for individual model MWC plants, and emissions would range from 6 to 46 Mg/year (7 to 51 tons/year). Under Regulatory Alternatives IIB and IV, which require MWC's at small MWC plants to achieve PM emission levels of 69 mg/dscm (0.030 gr/dscf), all small MWC plants would apply additional controls, resulting in PM emissions ranging from 1 to 6 Mg/year (1 to 7 tons/year). These emissions represent reductions of 80 to 97 percent in PM emissions as compared to baseline emissions for the model MWC plants.

At baseline, dioxin/furan emissions at small MWC plants range from 21 to 890 g/year (0.05 to 2.0 lbs/year). Some small MWC plants incorporate GCP at baseline and would not achieve additional dioxin/furan control under Regulatory Alternatives I, IIA, and III. For those MWC plants which do not employ GCP at baseline, dioxin/furan emission reductions of up to 93 percent can be achieved by the addition of GCP. Under Regulatory Alternatives I, IIA, and III dioxin/furan emissions range from 21 to 130 g/year (0.05 to 0.3 lbs/year). Under Regulatory Alternatives IIB and IV, acid gas controls are required for small MWC plants. The controls required for existing small MWC plants under Regulatory Alternatives IIB and IV reduce dioxin/furan emissions by 75 to 99 percent relative to baseline (depending upon whether the plant employs GCP at baseline) resulting in emissions ranging from 5 to 32 g/year (0.01 to 0.07 lbs/year).

At baseline, SO₂ emissions at small MWC plants range from 30 to 150 Mg/year (33 to 160 tons/year), and HCl emissions range from 41 to 210 Mg/year (45 to 230 tons/year). Since MWC acid gas controls are not required for small MWC plants under Regulatory

Alternatives I, IIA, or III, no reductions in MWC acid gases are achieved under these alternatives. Municipal waste combustor-acid gas controls based on DSI/ESP or DSI/FF technology are required for small MWC plants under Regulatory Alternatives IIB and IV, and emissions of MWC acid gases (SO₂ and HCl combined) would be reduced by over 50 percent. Under Regulatory Alternatives IIB and IV, SO₂ emissions at small MWC plants range from 18 to 89 Mg/year (20 to 98 tons/year), and HCl emissions range from 8 to 42 Mg/year (9 to 46 tons/year).

Table 6 shows the ranges of emission impacts for large MWC plants (i.e., those with aggregate capacities greater than 225 Mg/day [250 tons/day] of MWS) under the baseline and the regulatory alternatives. At baseline PM emissions at large MWC plants range from 22 to 150 Mg/year (24 to 160 tons/year). Municipal waste combustors at large MWC plants are required to meet PM emission levels of 69 mg/dscm (0.030 gr/dscf) under Regulatory Alternatives IIA and IIB, and 34 mg/dscm (0.015 gr/dscf) under Regulatory Alternatives III and IV. A few large MWC plants already meet these levels of control and would not need additional PM controls under the regulatory alternatives. Other large MWC plants would have to retrofit additional PM control under the regulatory alternatives. Under Regulatory Alternatives I through IV, PM emissions at large MWC plants would range from 12 to 73 Mg/year (13 to 80 tons/year) resulting in PM emission reductions for individual model MWC plants of up to 88 percent relative to baseline emissions.

Baseline emissions of dioxins/furans at large MWC plants range from 110 to 9,600 g/year (0.24 to 21 lbs/year). Under Regulatory Alternative I dioxin/furan reductions of up to 90 percent would be achieved at plants which do not employ GCP at baseline. No reductions in dioxin/furan emissions relative to baseline emissions would be achieved at large plants which employ GCP at baseline since no acid gas controls are required under Regulatory Alternative I. Under Regulatory Alternative I, dioxin/furan emissions at large MWC plants would range from 110 to 580 g/year (0.24 to 1.3 lbs/year). Emissions of dioxins/furans would be reduced by 75 to 98 percent (depending on whether the MWC plant employs GCP at baseline) at large model plants under Regulatory Alternatives IIA and IIB due to the requirement of acid gas controls based

on DSI/ESP or DSI/FF. Under Regulatory Alternatives IIA and IIB, dioxin/furan emissions at large MWC plants would range from 27 to 150 g/year (0.06 to 0.33 lbs/year). Under Regulatory Alternatives III and IV, which require acid gas controls based on SD/FF technology, dioxin/furan emissions would be reduced by 98 to greater than 99 percent relative to baseline emissions (depending upon whether the plant employs GCP at baseline) for large MWC plants. Under the two most stringent alternatives, dioxin/furan emissions at large MWC plants would range from 2.7 to 16 g/year (0.006 to 0.035 lbs/year).

At baseline, emissions of SO₂ at large MWC plants range from 300 to 2,400 Mg/year (340 to 2,700 tons/year), and emissions of HCl range from 420 to 2,400 Mg/year (460 to 2,700 tons/year). No reductions in MWC acid gases would be achieved under Regulatory Alternative I since MWC acid gas controls are not required. Under Regulatory Alternatives IIA and IIB, MWC acid gas controls based on DSI/ESP or DSI/FF technology are required for all large MWC plants. Under Regulatory Alternatives IIA and IIB, MWC acid gas emissions would be reduced by over 50 percent resulting in emissions of SO₂ ranging from 180 to 1,400 Mg/year (200 to 1,600 tons/year) and emissions of HCl ranging from 84 to 460 Mg/year (92 to 530 tons/year). Under the most stringent alternatives, Regulatory Alternatives III and IV, large MWC plants are required to control MWC acid gas emissions to levels based on SD/FF technology. Under Regulatory Alternatives III and IV, SO₂ emissions would be reduced by about 90 percent relative to baseline emissions resulting in emissions ranging from 31 to 240 Mg/year (34 to 270 tons/year). This 90 percent long-term average emission reduction level is consistent with a minimum 24-hour average percent reduction of 85 percent. Emissions of HCl would be reduced 97 percent relative to baseline emissions and would range from 13 to 73 Mg/year (14 to 80 tons/year).

Tables 7 and 8 present the ranges of increased (over baseline) capital costs for retrofit air pollution controls, increased total annualized costs, and increased total annualized cost per Mg MSW combusted for small and large MWC plants under each regulatory alternative.

TABLE 7.—RANGES OF INDIVIDUAL SMALL PLANT CONTROL COSTS UNDER THE REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	Capital cost (\$1,000)	Total annualized cost (\$1,000/yr)	Total annualized cost per Mg MSW combusted (\$/Mg)
I.....	<1-5,700	<1-1,200	<1-19
IIA.....	<1-5,700	<1-1,200	<1-19
IIB.....	1,600-7,400	660-2,000	10-48
III.....	<1-5,700	<1-1,200	<1-19
IV.....	1,600-7,400	660-2,000	10-48

TABLE 8.—RANGES OF INDIVIDUAL LARGE PLANT CONTROL COSTS UNDER THE REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	Capital cost (\$1,000)	Total annualized cost (\$1,000/yr)	Total annualized cost per Mg MSW combusted (\$/Mg)
I.....	<1-15,000	<1-1,900	<1-7
IIA.....	2,200-18,000	1,000-4,300	4-13
IIB.....	2,200-18,000	1,000-4,300	4-13
III.....	7,000-33,000	2,000-13,000	<12-28
IV.....	7,000-33,000	2,000-13,000	12-28

Table 7 shows that under Regulatory Alternatives I, IIA, and III, capital costs of retrofit air pollution controls at individual small MWC plants could increase by less than \$1,000 to \$5.7 million and additional cost per unit of MSW combusted ranges from a negligible increase to an increase of \$19/Mg MSW (\$17/ton MSW). For perspective on the increase in the annual cost of MSW, typical costs for MSW combustion including collection, transportation, combustion, and MWC ash disposal currently range from \$40/Mg (\$36/ton) to over \$100/Mg (over \$90/ton) of MSW collected.

Under Regulatory Alternatives IIB and IV, small plants must add acid gas controls (based on DSI/ESP or DSI/FF), and control costs increase. For Regulatory Alternatives IIB and IV, increased capital costs (relative to baseline) for retrofit air pollution controls at small MWC's range from \$1.6 million to \$7.4 million. Increased annualized costs of control range from \$660,000 to \$2.0 million, and the

increased cost per unit of waste combusted ranges from \$10 to \$48/Mg MSW (\$9 to \$44/ton MSW).

Table 8 shows the increased costs of control (relative to baseline) for individual large MWC plants under the regulatory alternatives. Under Regulatory Alternative I, all large plants must incorporate GCP and meet a PM level of 69 mg/dscm (0.030 gr/dscf). Some existing large MWC plants meet this level of control by design at baseline and incur a negligible control cost, but other MWC plants must add GCP and/or additional PM controls to meet this level of control. Under Regulatory Alternative I, increased capital costs for retrofit air pollution controls (relative to baseline) would range from negligible amounts to \$15 million. Increased annualized costs (relative to baseline) would range from negligible amounts to \$1.9 million, and increased cost per unit of MSW combusted would range from less than \$1 to \$7/Mg MSW (less than \$1 to \$6/ton MSW). Under Regulatory Alternatives IIA and IIB, large MWC plants must add MWC acid gas controls based on DSI/ESP or DSI/FF technology. For Regulatory Alternatives IIA and IIB, increased capital costs (relative to baseline) for retrofit air pollution controls would range from \$2.2 million to \$18 million, total increased annualized costs would range from \$1.0 million to \$4.3 million, and increased cost per unit of MSW combusted would range from \$4 to \$13/Mg MSW (\$4 to \$12/ton MSW). Control costs would increase under Regulatory Alternatives III and IV for large MWC plants since MWC acid gas controls based on SD/FF technology must be added. Under Regulatory Alternatives III and IV, increased capital costs (relative to baseline) for retrofit air pollution controls for large MWC plants would range from \$7.0 million to \$33 million. Increased annualized costs would range from \$2.0 million to \$13 million, and increased cost per unit of waste combusted would range from \$12 to \$28/Mg MSW (\$11 to \$25/ton MSW).

National Impacts of the Regulatory Alternatives for MWC Emissions

The national annual emissions of PM, dioxins/furans, and MWC acid gases SO₂ and HCl under the baseline and each of the regulatory alternatives are shown in Table 9. Acid gas (SO₂ and HCl) emissions account for the great majority of the total emission reduction for all alternatives, except Regulatory Alternative I.

TABLE 9.—NATIONAL MWC EMISSIONS UNDER BASELINE AND THE REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	MWC metals PM Mg/yr	MWC organics dioxin/furan kg/yr	MWC acid gases	
			SO ₂ Mg/yr	HCl Mg/yr
Baseline.....	11,000	200	86,000	110,000
I.....	4,900	54	86,000	110,000
IIA.....	4,900	18	56,000	33,000
IIB.....	3,100	13	52,000	22,000
III.....	4,900	7	17,000	17,000
IV.....	3,100	2	14,000	6,000

As shown in Table 9, PM emissions at baseline are 11,000 Mg/year (12,500 tons/year). Reductions of 57 percent are achieved under Regulatory Alternatives I, IIA, and III, resulting in national emissions of about 4,900 Mg/year (5,400 tons/year). Slightly greater PM emissions reductions (73 percent relative to baseline) are achieved under Regulatory Alternatives IIB and IV since additional PM control must be added to small MWC plants to meet a PM level of 69 mg/dscm (0.030 gr/dscf). All alternatives would achieve a high degree of metals control.

Baseline emissions of dioxins/furans are 200 kg/year (440 lbs/year). Dioxin/furan emissions are reduced 73 percent under Regulatory Alternative I due to the incorporation of GCP at all MWC plants, and reductions of dioxins/furans are increased further under Regulatory Alternatives IIA, IIB, III, and IV since MWC acid gas control requirements become more stringent with each successive alternative. Under Regulatory Alternative IIB, national emissions of dioxin/furans for MWC plants would be reduced by 94 percent, resulting in emissions of 13 kg/year (29 lbs/year). The most stringent alternative (IV) represents a 99-percent reduction in dioxins/furan emissions relative to baseline emissions.

At baseline, national emissions of SO₂ and HCl are 86,000 Mg/year (95,000 tons/year), and emissions of HCl are 110,000 Mg/year (120,000 tons/year). No reductions in these MWC acid gases are achieved under Regulatory Alternative I. Increasing reductions of MWC acid gases are achieved under Regulatory Alternatives IIA, IIB, III, and IV as acid gas control requirements become more stringent. Under Regulatory Alternative IIB, based on DSI/ESP or DSI/FF Control for all MWC's, overall emissions of MWC acid gases are reduced by over 50 percent. National emissions of SO₂ are reduced to 52,000 Mg/year (56,900

tons/year), and emissions of HCl are reduced to 22,000 Mg/year (24,000 tons/year). Regulatory Alternatives III and IV, which are based on SD/FF for large MWC's, reduce SO₂ emissions by 80 to 85 percent and HCl emissions by 85 to 95 percent relative to baseline.

Table 10 shows the national total increased (over baseline) capital costs for retrofit air pollution controls, total increased annualized cost, and overall increased annualized cost per unit of MSW combusted for each of the regulatory alternatives. National increased costs given in this table are for existing MWC plants and plants that are operating or have commenced construction prior to proposal of the NSPS (subpart Ea proposed in today's Federal Register).

TABLE 10.—NATIONAL CONTROL COSTS UNDER THE REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	Total Capital Cost (\$10 ⁶)	Total annualized cost (\$10 ⁶ /yr)	Annualized cost per Mg MSW (\$/Mg)
I	510	100	5.50
IIA	930	260	9.00
IIB	1,100	340	11.60
III	2,200	570	19.40
IV	2,400	640	21.80

As shown in Table 10, national total increased capital cost (relative to baseline) ranges from \$510 million under Regulatory Alternative I to \$2.4 billion under Regulatory Alternative IV. Total increased annualized cost ranges from \$100 million/year under Regulatory Alternative I to \$640 million/year under Regulatory Alternative IV. National costs of Regulatory Alternatives III and IV, which require retrofit of SD/FF controls, are approximately double the costs of Regulatory Alternatives IIA and IIB which represent a less stringent level of acid gas control based on retrofit of DSI and use of the existing upgraded ESP. Annualized cost per unit of waste

combusted ranges from \$5.50/Mg (\$5.00/ton) for Regulatory Alternative I, to \$11.60/Mg (\$10.50/ton) for Regulatory Alternative IIB, to \$21.80/Mg (\$19.80/ton) for Regulatory Alternative IV. For perspective, tipping fees currently charged at MWC's for MSW received average about \$44/Mg (\$40/ton) of MSW and range from less than \$10/Mg (\$9/ton) to over \$100/Mg (over \$90/ton). Disposal costs incurred by the general public (including MSW collection, transportation, combustion, and ash disposal), however, typically range from \$40/Mg (\$36/ton) to over \$100/Mg (over \$90/ton) of MSW.

Economic Impacts of Regulatory Alternatives for MWC Emissions

Other studies have considered impacts on households to be "severe" if annual compliance cost per household exceeds \$220, or if annual compliance cost per household exceeds 1 percent of median household income. Using these criteria, household impacts are not considered severe under any of the regulatory alternatives for MWC emissions. Under the most stringent alternative (Regulatory Alternative IV), over 90 percent of the household impacts were less than \$60 per year, and less than 0.3 percent of median household income. None of the household impacts in the communities examined were above \$100 per year or 0.5 percent of median household income under any of the regulatory alternatives for MWC emissions.

Economic impacts on government units (counties and municipalities) have been considered "severe" in other studies if both of the following two conditions are met: (1) The sum of total current debt service and additional debt service associated with compliance with the regulation as a percent of total general revenues exceeds 15 percent, and (2) the sum of the average sewerage and sanitation cost per household and the control cost per household as a percent of median household income exceeds 1 percent. Government units

have also been considered to be severely affected if a third condition is met: (3) control costs as a percent of total general expenditures exceed 1 percent. Using these criteria, the analyses indicate that the increased costs imposed by any of the regulatory alternatives for control of MWC emissions do not result in severe economic impacts on government units.

The EPA believes that these studies, which were also used by EPA in assessing impacts of the proposed RCRA Subtitle D standards, provide a reasonable measure for evaluating impacts, since the studies are specifically designed to gauge impacts on households and governmental entities.

It is difficult to estimate the impact of cost increases on actual tipping fees at MWC's. This is because these fees, which are payments to MWC's for permission to dump MSW at the MWC, are set by local governments and may include subsidies. However, for our analysis, if it is assumed that all increased costs are passed through to the tipping fee, then tipping fees for the various size plants would increase by the amounts shown in Tables 7 and 8. Under the least stringent alternative (Regulatory Alternative I), tipping fees for the various MWC plants would increase by less than \$1 to \$13/Mg (less than \$1 to \$12/ton) of MSW combusted, and under the most stringent alternative (Regulatory Alternative IV), tipping fees would increase by \$8 to \$47/Mg (\$7 to \$43/ton) of MSW combusted. For comparison, the average MWC tipping fee is currently about \$44/Mg (\$40/ton) MSW, although tipping fees charged at individual sites can range from negligible to over \$100/Mg (\$90/ton) of MSW.

Partial Benefits Analysis

Table 11 presents partial total and incremental national benefits, benefit to cost ratios, and an implicit valuation of acid gas emission reduction under each of the five regulatory alternatives.

TABLE 11.—PARTIAL NATIONAL BENEFITS OF THE REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	Partial benefits for PM control (\$10 ⁶ /yr)		Annualized costs (\$10 ⁶ /yr)		Overall B/G ratio	Incremental B/C ratio	Value of MWC acid gas control resulting in incremental B/C = 1.0 (\$/MG)
	Total	Incremental	Total	Incremental			
I	100	100	100	100	1.0	1.0	0
IIA	100	0	260	160	0.4	NA	1,600
IIB	130	27	340	80	0.4	0.3	3,200
III	100	0	570	230	0.2	NA	6,000
IV	130	0	640	300	0.2	NA	5,800

The benefits shown are only for emission reductions of PM. Benefits are calculated based primarily on reduced mortality, morbidity, and property deterioration. The benefits of PM emissions reduction are valued at \$16,000/Mg (\$14,000/ton). This figure is significantly greater than previous Agency estimates for PM. The EPA requests comment on the methodology and data used to derive these estimates.

Under Regulatory Alternative I, the incremental benefit to cost ratio is equal to 1, and incremental net benefits are equal to incremental costs. Under the remaining alternatives acid gas control is applied. The MWC acid gas (HCl and SO₂) emissions would have to be valued at \$3,200/Mg (\$2,900/ton) or more for the incremental benefit/cost ratio for Regulatory Alternatives IIA and IIB to be greater than 1. Acid gas emissions would have to be valued at more than \$5,800/Mg (\$5,300/ton) for the incremental benefit/cost ratio to exceed 1 under Regulatory Alternatives III and IV.

While EPA benefit estimates for SO₂ emissions reduction are generally about \$1,250/tons HCl emission reduction benefits have not been qualified. Emissions reductions of HCl are greater than for other pollutants, and modeling indicates that some plants have ambient HCl concentrations that exceed the HCl welfare effects level of 3 µg/m³ (1.3 gr/million dscf) (annual average) at baseline. Regulatory Alternatives IIA, IIB, III, and IV would reduce HCl emissions by from 50 to 95 percent, and reduce ambient concentrations to below the welfare effects level for all model plants. Despite these potential benefits, no monetary evaluation of HCl emissions is possible at this time. A dose-response function relating health and welfare effects to reduced emissions of HCl is not currently available. Thus, potential benefits associated with these alternatives in terms of reduced HCl emissions are not considered by the benefits analysis.

There are also other benefits not included in the analysis. Health effects benefits for dioxins/furans control were not included. Health effects benefits from reduced exposure to metals were also not included, but have been at least partially counted via the PM benefits analysis. In addition, benefits from reduced landfilling and reduced emissions of acid gases which contribute to acid rain have not been included in the analysis. The benefits analysis does not take into consideration the reductions of MWC organics, MWC metals, and MWC acid

gases resulting from the materials separation requirements nor the nonair quality environmental benefits achieved by materials separation; however, these benefits are discussed in section V.

The EPA requests comment on all parts of the benefits analysis. The EPA is especially interested in comment regarding the benefit estimates for PM and SO₂, the appropriate benefits for HCl and dioxin/furan control, and other benefit(s) not included in this analysis.

Regulatory Alternative Selected.—Under the proposed guidelines, the selected alternative for control of MWC emissions from existing MWC's encompasses features of Regulatory Alternatives IIB and III. The selected alternative is based on the determination that the combination of GCP and an ESP to control PM emissions to a level of 60 mg/dscm (0.030 gr/dscf) is best demonstrated technology for controlling MWC emissions from existing MWC's at small MWC plants with the aggregate capacities of up to 225 Mg/day (250 tons/day) of MSW.

For MWC's located at large MWC plants with aggregate capacities to combust greater than 225 Mg/day (250 tons/day) but less than or equal to 2,000 Mg/day (2,200 tons/day), the selected alternative is based on the determination that the combination of GCP and DSI/ESP or DSI/FF is best demonstrated technology for controlling MWC emissions from existing MWC's in this size range.

The alternative selected for control of MWC emissions from existing MWC's at regional MWC plants with aggregate capacities greater than 2,000 Mg/day (2,200 tons/day) is based on the determination that the combination of GCP and SD/FF is best demonstrated technology for controlling MWC emissions from MWC's in this very large plant size range.

While the emission levels are based on performance of the technologies, the owner or operator of an MWC could use other technologies to comply with the emission guidelines. In particular, EPA will continue to investigate performance of SD/ESP systems after proposal.

The regulatory alternatives selected for each of the three size categories of MWC's represent best demonstrated technology considering cost, nonair quality health, and environmental impacts and energy requirements. The combinations of control technologies identified as best demonstrated technology have been demonstrated at

MWC's in the U.S., and no severe cost or economic impacts are expected to result from their application.

Relative to the regulatory baseline, the alternatives selected achieve over 90 percent reduction in MWC organic emissions, about 70 percent reduction in emissions of PM, and over 50 percent reduction in emissions of MWC acid gases. The annualized costs for these alternatives for controlling MWC emissions are about \$10.90/Mg (\$9.90/ton) of MSW, which is comparable to the cost increase for the NSPS proposed in today's Federal Register.

Application of controls based on SD/FF were chosen for regional existing MWC plants with capacities above 2,000 mg/day (2,200 tons/day) since these plants have very large MWC emissions potential and they account for about 25 percent of the total existing MWC capacity. As shown in Table 12, 8 plants currently operating and 7 plants under construction would be subject to the regional MWC plant guidelines. The average age of the eight currently operating regional MWC's is about 4 years, so they are very new and will likely be in service for several decades. In addition, 5 of these 15 existing regional MWC's already either have installed or are currently planning to install SD/FF emission control systems. Most of the plants without SD/FF control have provided space to retrofit a SD/PM control system. The EPA requests comments concerning the proposal to require more stringent emission controls (i.e., based on GCP and SD/FF) for regional MWC's. Comments on the specific level of dioxin/furan control that should be specified in the guideline are also requested. As mentioned previously, a range of 5 to 30 ng/Nm³ (2 to 12 gr/billion dscf) is being proposed, while additional data from MWC's with SD/FF systems are being collected and analyzed. At promulgation, a single emission level will be adopted. Another control option that could be considered for regional MWC's is a SD/ESP system. However, as previously discussed, available data indicate performance of these systems is not as good as SD/FF performance. The EPA will continue to investigate performance of SD/ESP systems after proposal, and requests comments on this control option. The EPA solicits comment on the proposed 2,000 Mg/day [2,200 tons/day] cutoff for the very large MWC's (regional MWC's) and whether another cutoff level may be more appropriate.

TABLE 12.—EXISTING MWC'S LARGER THAN 2,000 MG/DAY CAPACITY

City/County	State	Capacity (Mg/day)	Acid gas Control	Best acid gas control (SD/FF)
Operating				
Baltimore (Resco)	MD	2,050	No.....	No.
Bridgport..	CT	2,050	Yes.....	Yes.
Columbus.	OH	2,750	No.....	No.
Dade County.	FL	2,750	No.....	No.
Detroit.....	MI	3,000	No.....	No.
Indianapolis.	IN	2,150	Yes.....	Yes.
Pinebluffs	FL	2,750	No.....	No.
Westchester County Under Construction	NY	2,050	No.....	
Bergen County (Ridgely)	NJ	2,750	Yes.....	No.
Broward County (South).	FL	2,050	Yes.....	No.
Delaware Co.	PA	2,450	Yes.....	Yes.
Essex County.	NJ	2,050	Yes.....	No.
Fairfax.....	VA	2,750	Yes.....	Yes.
Hempstead.	NY	2,050	Yes.....	Yes.
Honolulu...	HI	2,550	Yes.....	No.

Although additional reductions of about 5 percent for MWC organic emissions, and 30 percent for MWC acid gases could be achieved by application of SD/FF systems to all MWC's at

plants with aggregate capacities above 225 Mg/day (250 tons/day) of MSW (Regulatory Alternatives III and IV), the cost impacts would be unreasonable. The average cost (over baseline) of retrofitting SD/FF systems on typical large MWC plants (MWC plants with aggregate capacities greater than 225 Mg/day [250 tons/day] but less than or equal to 2,000 Mg/day [2,200 tons/day] of MSW) would be about \$23/Mg (\$21/ton) of MSW compared to an average of about \$10/Mg (\$9/ton) for retrofitting DSI alone. Thus, the average cost for application of DSI systems to large MWC plants is close to the national average disposal cost increase for the selected alternative (\$10.90/Mg [\$9.90/Mg] of MSW), but the average cost of retrofitting SD/FF systems would be more than twice this amount. In addition, application of SD/FF systems to all MWC's at plants with capacities above 225 Mg/day (250 tons/day) of MSW could roughly double the total national annualized cost (see Table 10).

The costs for retrofitting SD/FF systems on large MWC plants are high because fewer than 10 percent of these plants already have SD/FF systems, so a large number of plants would have to remove their existing ESP's, and retrofit both a SD and a FF. Under the selected alternative, large plants could use or upgrade existing ESP's, and would only have to retrofit DSI acid gas control. Also, MWC's at plants in this size range tend to be older than those at regional MWC's. The average age of MWC's at large plants is about a decade, and some have been in service for 2 to 3 decades. Since these plants tend to be older than

the regional plants, there are likely to be greater retrofit constraints.

The selected regulatory alternative includes GCP and PM control but no acid gas control for small MWC plants with capacities of up to 225 Mg/day (250 tons/day) of MSW. Although additional reductions of about 3 percent for MWC organic emissions and about 8 percent for MWC acid gases could be achieved by application of acid gas controls to small MWC plants, the cost impacts would be unreasonable. As shown in Figure 1, disposal costs (over baseline) for applying DSI/ESP controls increase greatly for small MWC plants. The increased disposal cost for adding DSI/PM control would be as much as \$22 to \$58/Mg (\$20 to \$53/ton) of MSW for typical small MWC plants compared to an increase of about \$4 to \$17/Mg (\$4 to \$15/ton) of MSW for most large MWC plants. Figure 2 shows that application of GCP and PM controls to small plants can result in disposal cost increases of about \$5 to \$28/Mg (\$4 to \$25/ton) of MSW; however, these increases are not as great as those resulting from application of acid gas controls and are more comparable to the \$/Mg cost increases incurred by large plants under the selected alternative. Application of GCP and PM control would result in good control of MWC organic and MWC metals emissions from small plants. Considering the cost impacts and relatively small potential emissions reduction, EPA believes that control of acid gas emissions from small MWC plants would be unreasonable, and that application of GCP and PM control is best demonstrated technology.

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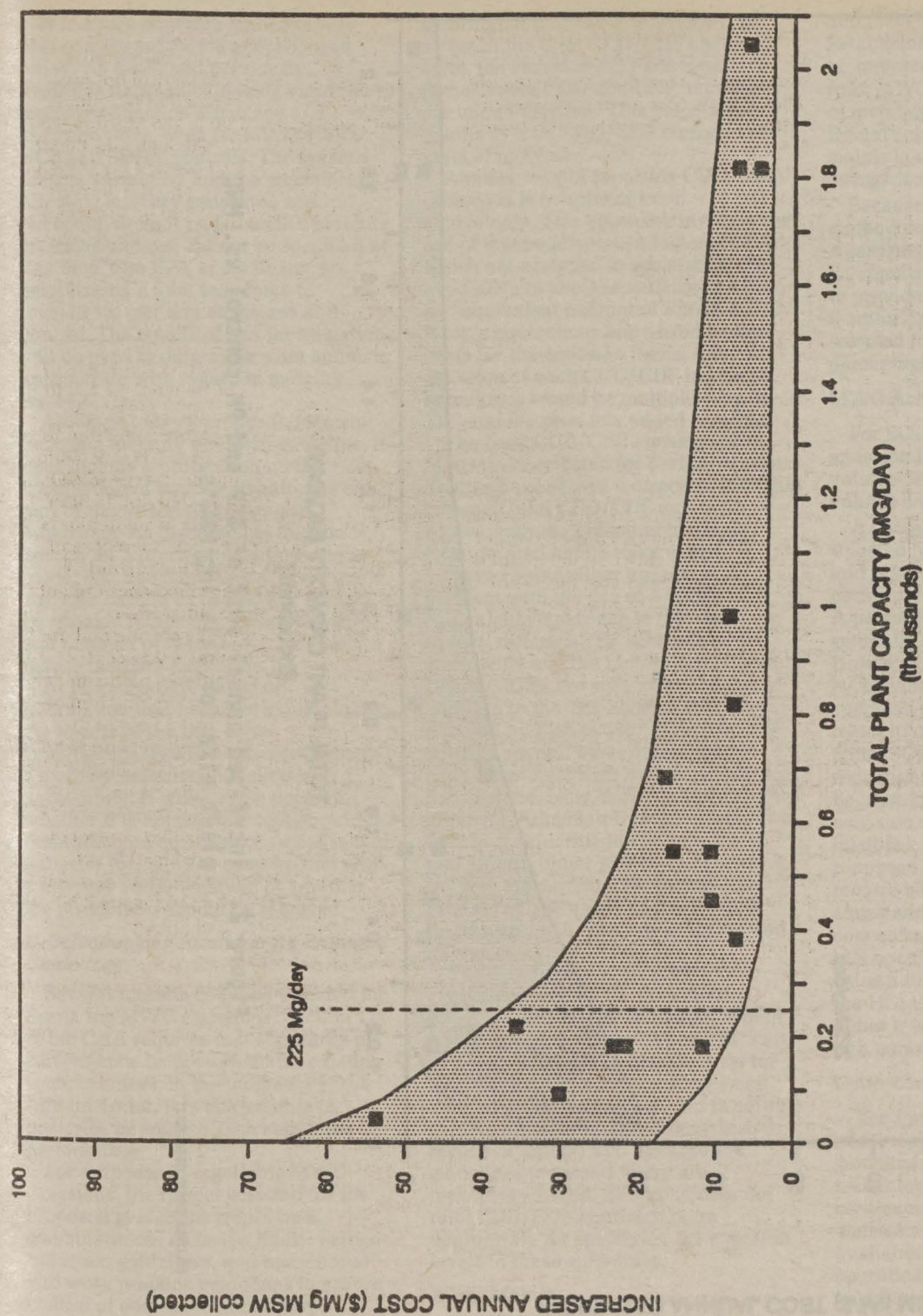


Figure 1. Increased annual cost of GCP and DSI/ESP control vs. MWC plant size for existing MWC's.

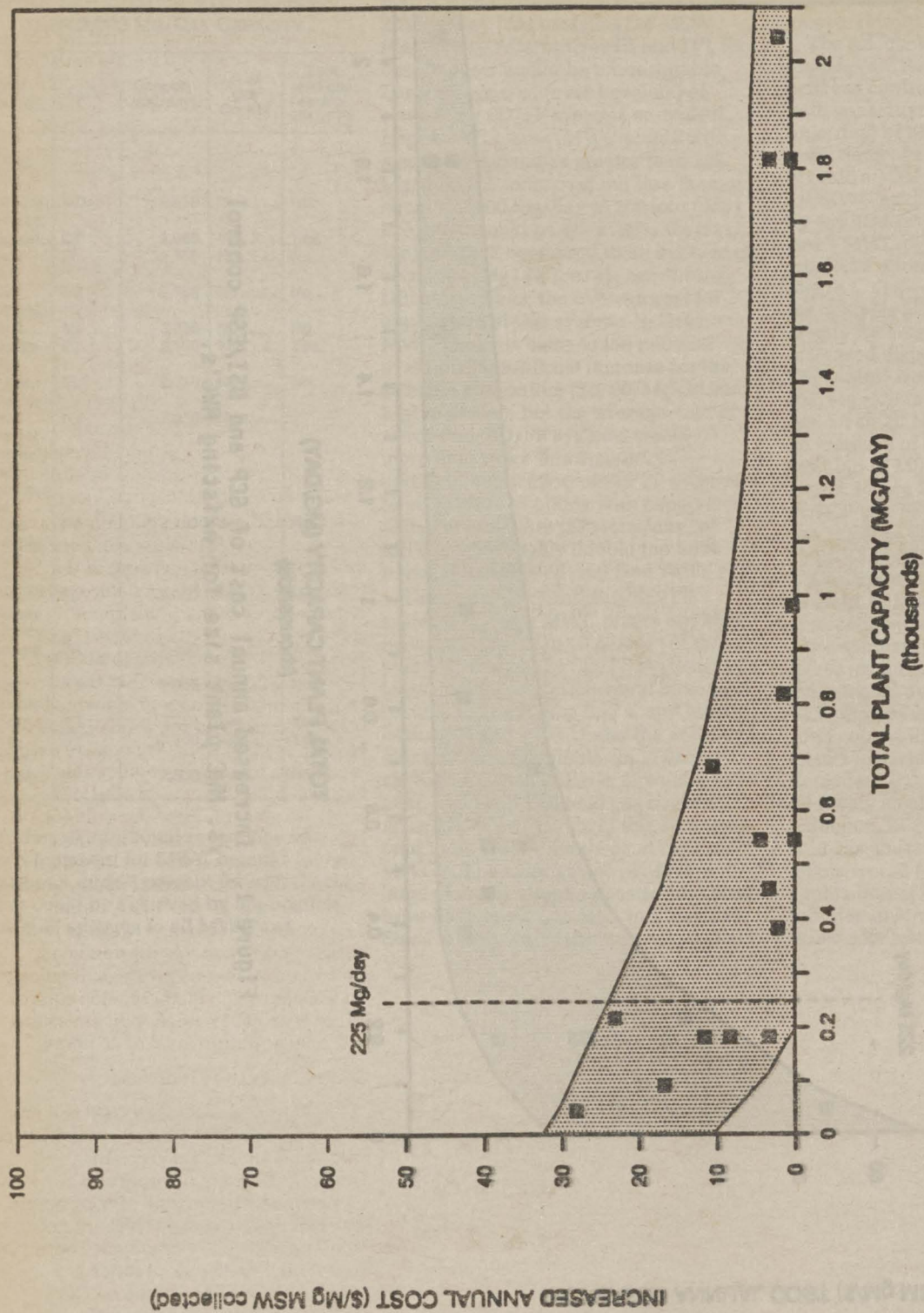


Figure 2. Increased annual cost of GCP and PM control vs. MNC plant size for existing MNC's.

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A mercury emission guideline was also considered, but is not proposed today. As explained previously, available data indicate wide variation in mercury collection efficiency and emission rates, even for MWC's with GCP and SD/FF controls. The reasons for this variability and the mechanisms affecting mercury emissions and collection are not understood. Therefore, an emission level cannot be specified at this time. The EPA and industry are establishing a joint task force to investigate mercury emissions and control. The results of this investigation will be used to determine what action is appropriate with regard to mercury issues.

Although today's proposal does not include a mercury emission guideline, it does include a prohibition on the combustion of household batteries as part of the materials separation provisions. As discussed in Section V, household batteries (including mercury oxide, alkaline manganese, silver oxide, and zinc carbon batteries) are thought to be a major source of mercury in MSW, and removal of these batteries would reduce mercury emissions.

At promulgation, based on information that becomes available and the results of the task force investigation, it will be decided whether a mercury emission guideline is appropriate. It will also be decided whether it is appropriate to maintain the prohibition on combustion of household batteries (possibly in combination with a mercury emission level) or whether the prohibition should be removed.

G. Selection of Format for the Proposed Guidelines

Several formats could be selected for regulating MWC emissions. Section 111 of the CAA requires that standards of performance be prescribed for existing sources unless, in the judgment of the Administrator, it is not feasible to prescribe or enforce such standards of performance.

For purposes of regulating MWC emissions, the format selected for the proposed guidelines would be a combination of emission limits, percent reduction guidelines, and operational and work practice guidelines to ensure control of each subclass of MWC emissions. The specific format of the guidelines proposed for each pollutant or operational practice and the reasons for selection are discussed below.

MWC Organics

Under the proposed guidelines, MWC organic emissions are measured in units of total tetra- through octa-chlorinated dibenzo-p-dioxins (CDD) and

chlorinated dibenzofurans (CDF). To arrive at the total CDD/CDF emission level, the emissions of each tetra- through octa-CDD and CDF homologue are added together. This calculation results in total CDD/CDF emissions in units of ng/Nm³.

Another way of reporting CDD/CDF emissions is in units of toxic equivalents. This approach involves the use of toxic equivalence factors (TEF), which are assigned to specific CDD's and CDF's to express toxicity in terms of an "equivalent amount of 2,3,7,8-TCDD." If toxic equivalents were used as the basis for the emission limits, the emission of each CDD/CDF isomer or homologue would be multiplied by its TEF and the products added together.

The total CDD/CDF emission level format was selected for several reasons. Studies have shown a direct relationship between total CDD/CDF and toxic equivalency, so reduction in dioxin/furan-related health risks would be achieved using either approach. A problem with the use of a toxic equivalency approach is that there are several different TEF schemes in use worldwide and the factors for individual CDD's/CDF's are subject to change. In addition to the TEF scheme that was adopted by EPA in 1987 (EPA/5625/3-87-012), several other organizations have developed their own schemes (e.g., Switzerland, New York, California, Food and Drug Administration). Furthermore, EPA is considering the adoption of a new International TEF (I-TEF) scheme, but like the current EPA factors, this new set of TEF's will be considered interim and will continue to be revised as necessary.

The disadvantage to using a toxic equivalent scheme for the emission guidelines is that the guidelines would need to be revised by EPA as TEF's are updated. Setting an emission level for total CDD/CDF is a more simple and straightforward approach and is entirely in keeping with the technology-based regime of section 111. Because the guidelines proposed today are technology-based, EPA considers the total CDD/CDF approach more appropriate for specifying the emission levels in these guidelines.

MWC Metals

Establishing emission limits for each of the numerous metals emitted from MWC's was considered but was not adopted as a reasonable format for regulating MWC metals because the types and amounts of metals emitted from an MWC are highly variable and site-specific. In addition, this method might not be practical economically because of the expense of monitoring

and measuring for specific metals. Establishing an emission limit for PM as an indicator of all the metals emissions from MWC's ensures adequate control of metal emissions. Therefore, the format selected for regulating MWC metals is a PM emission limit (expressed as mg/dscm or gr/dscf).

Because a continuous monitoring methodology does not exist for measuring PM emission rates directly, an opacity guideline was also selected to provide an indirect means of monitoring PM emissions. The format selected for regulating opacity is a percentage format.

MWC Acid Gases

For SO₂ or HCl emissions, the emission limit is a combined weight- or volume-percent reduction guideline or a volume concentration guideline.

A percent reduction guideline was selected because it is the most accurate and representative measure of the performance of acid gas control systems. A percent reduction guideline is generally appropriate for MWC's. However, in cases where inlet SO₂ or HCl levels are very low and the specified percent reductions would result in concentration levels below 30 ppmv SO₂ or 25 ppmv HCl, these percent reductions may not be achievable because of limitations in SO₂/HCl emission measurement control loop feedback systems. Therefore, the proposed SO₂ emission limits would require either a percent reduction in SO₂ emissions or a 30 ppmv SO₂ outlet concentration, whichever results in the higher emission concentration level, using a daily 24-hour average. Similarly, the HCl emission limits would require either a percent reduction in emissions or a concentration level of 25 ppmv.

Good Combustion Practices

The format selected for GCP is a mix of several operational and work practice guidelines since measurement technologies for measuring and continuously monitoring MWC organic emissions leaving the MWC are not available or are not practical. These operational and work practice guidelines consist of limits on CO emissions, MWC load, flue gas temperature at the inlet to the PM control device, and operator certification and training requirements. Each of these items can be related to the level of MWC organic emissions in the gases leaving the MWC, and compliance with the requirements associated with each of these items can easily be monitored.

H. Performance Test Methods and Monitoring Guidelines

The performance testing and emission monitoring guidelines included in the proposed guidelines would apply to all MWC's subject to the proposed guidelines for MWC organics, MWC metals, and MWC acid gases, except as noted below. An initial compliance test would, unless otherwise specified in the guidelines, consist of three separate runs using the applicable test method, and the arithmetic mean of the three runs shall be used to determine compliance. The same test methods would be used under the guidelines and the NSPS.

All emission guidelines for MWC emissions are corrected to 7 percent O_2 (dry basis). Some MWC's may have carbon dioxide (CO_2) monitors rather than O_2 monitors, or may prefer to correct to an equivalent percent CO_2 . Owners or operators may request an equivalent emission limit corrected to CO_2 rather than O_2 . Generally, a correction to 7 percent O_2 is equivalent to a correction to 11 or 12 percent CO_2 . However, there is not an exact conversion that is universally applicable because of variations in the carbon content of MSW. The owner or operator making the request must establish the relationship between O_2 and CO_2 for an individual MWC during compliance testing.

MWC Organic Emissions

An initial performance test would be required for all MWC's to determine compliance with the proposed dioxins/furans emission guideline. The emission level pertains to total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans. The performance test would be conducted in accordance with Method 23. Following the initial performance test, an annual performance test would be required for all existing MWC's. However, if three performance tests in a row indicate compliance with the dioxin/furan limit, the guidelines provide that an MWC would be exempt from the annual performance test for the next 2 years. However, at a minimum, each MWC must be tested every 3 years.

MWC Metals

An initial performance test would be required for all MWC's to determine compliance with the proposed MWC metals (i.e., PM) emission limit. The performance test would be conducted in accordance with Method 5. Method 1 would be used for determining the number and location of sampling points. Method 3 would be used for flue gas analysis. All performance tests would

consist of a minimum of three runs using Method 5 conducted under representative operating conditions (e.g., full load). The average PM emission rate of the three runs would be used to determine compliance.

Following the initial performance test, an annual performance test would be required for all existing MWC's. However, if three performance tests in a row indicate compliance with the PM limit, an MWC would be exempt from the annual performance test for the next 2 years. However, at a minimum, each MWC must be tested every 3 years.

Under the guidelines, compliance with the opacity limit would be determined using Method 9 for visible emissions. As stated in section 60.11, for the purposes of determining initial compliance, the minimum total time of observations would be 3 hours (30 six-minute averages). A transmissometer would be installed to monitor continuously the opacity and to alert MWC owners and operators of any occurrences of excess emissions requiring corrective action. Opacity data would be recorded and reduced to 6-minute averages using Method 9.

MWC Acid Gases

The proposed emission guidelines for MWC acid gases include provisions for both SO_2 and HCl emissions.

Sulfur Dioxide.—Continuous monitoring of SO_2 emissions would be required for all existing MWC's at large and regional MWC plants to demonstrate continuous compliance with the emission guidelines. Installation and operation of continuous emission monitoring systems (CEMS) at the inlet and outlet of the SO_2 control device would be required for MWC's to demonstrate compliance with the percent reduction or outlet concentration requirement. Those MWC's that elect to demonstrate continuous compliance solely with the 30 ppmv SO_2 emission limit may install and operate CEMS only at the outlet of the control device. Data collected by the CEMS would be used to determine compliance with the SO_2 percent reduction requirements and emission limits.

Compliance with the SO_2 percent reduction guideline and emission levels would be determined using a 24-hour daily (block) average based on CEMS. All valid data in each 24-hour period must be used to determine compliance. The first 24-hour average percent reduction and emission values calculated after initial start-up would serve as the initial performance test required under section 60.8.

Hydrogen Chloride.—Although EPA is requiring SO_2 monitoring as an indication of performance of control of MWC acid gases, the Agency is also proposing to require periodic monitoring of HCl to corroborate SO_2 monitoring as an indicator of HCl emission control. An initial performance test for all existing MWC's at large and regional MWC plants would be required under the guidelines to demonstrate compliance with the proposed HCl emission levels. Compliance with the HCl percent reduction requirements and emission limits would be conducted in accordance with Method 26. Following the initial performance test, an annual performance test would be required for all MWC's at large and regional MWC plants. However, if three performance tests in a row indicate compliance with the HCl guideline, an MWC may skip the annual performance test for the next 2 years. At a minimum, each MWC at a large or regional MWC plant must be tested every 3 years.

Guidelines for CEMS

When establishing guidelines that require the use of CEMS for determining compliance, it is necessary to consider that monitors undergo periods of downtime and, thus, are not available 100 percent of the time. Well-maintained CEMS have little downtime. However, minimum data requirements would be established that limit the amount of data permitted to be lost before use of an alternative monitoring method is required. These minimum data requirements would provide the owner or operator with time to maintain and calibrate the CEMS, correct minor malfunctions, and, if necessary, arrange for an alternative monitoring method. The minimum data requirements also would prevent the possibility of a designated facility operating for unreasonably long periods without collecting emission data.

Under the guidelines, CEMS data would be collected during 75 percent of the MWC operating hours per day for 75 percent of the operating days per month. These requirements apply to all CEMS needed to determine compliance with the guidelines (SO_2 , opacity, CO , O_2 , or CO_2). Collection of this amount of data has been determined to be achievable using a well-operated and properly maintained CEMS. However, this requirement is separate from the compliance test requirements where all valid data would be used to determine compliance even where more than 75 percent of the data is available (e.g., no valid data may be deleted from the calculations to determine compliance).

From an enforcement point of view, not operating CEMS is equivalent to not conducting a required performance test.

In order to ensure that CEMS provide accurate data, daily calibration drift checks and quarterly accuracy audits would be required to be performed on each CEMS. These quality assurance checks would be performed in accordance with 40 CFR part 60, Appendix F, Procedure 1, "Quality Assurance Requirements for Gas Continuous Emission Monitoring Systems Used for Compliance Determination." Appendix F, Procedure 1 applies to all CEMS used for continuous compliance determination under 40 CFR Part 60, Subpart Ca.

Combustor Operating Practice Guidelines

As part of GCP, to minimize reduction in MWC organic emissions from the combustor, CO emission limits and specifications for MWC load level and flue gas temperature at the PM control device inlet are proposed.

Carbon Monoxide.—The CO emission guidelines are specified for each common type of MWC. Each MWC would be required to install a CEM at the combustor outlet to monitor continuous compliance with the applicable CO emission limit. Compliance would be determined using 4-hour block averages. All valid data would be used to compute each average.

Operating Load.—An operating load guideline level of 100 percent of full demonstrated load is specified for all MWC's that generate steam. The full load level would be defined during the initial compliance test, but could be raised if an MWC owner or operator can demonstrate during a subsequent performance test that all other applicable guidelines for MWC organics, MWC metals, MWC acid gases, and the CO emission limit can be met while operating at a higher load.

All MWC's subject to load limits would be required to install monitors to continuously measure steam flow, and compliance would be determined by calculating 1-hour averages. This requirement would not apply to MWC's that do not generate steam.

Temperature. Temperature would be continuously monitored at the inlet to the PM control device to determine compliance with the 230°C (450 °F) temperature limit. A block 4-hour average would be used to determine compliance.

Operator Certification and Training

Operator certification and site-specific training of MWC operating personnel would also be required by the

proposed guidelines. There are no test methods pertinent to operator training, but all MWC plants would have to keep records of certification and training as described in section IV.I.

I. Reporting and Recordkeeping Guidelines

The proposed guidelines would require owners and operators of all designated facilities to submit notification of the anticipated date of demonstration of the initial performance test and performance evaluation of the CEMS.

After the initial performance test has been completed, the proposed guidelines would require the submission of quarterly compliance reports for the combustor operating parameters that are continuously monitored (CO, load level, and flue gas temperature) for all MWC's. In addition, quarterly compliance reports for SO₂ would be submitted for all MWC's at large and regional MWC plants. Quarterly excess emission reports for opacity must also be submitted for all MWC's. The proposed guidelines would also require that annual compliance reports for dioxins/furans and PM be submitted for all MWC's. Annual compliance reports for HCl would also be submitted for all MWC's at large and regional MWC plants. However, if three performance tests in a row indicate compliance with the dioxin/furan, PM, or HCl emission limits, an MWC would be exempt from the annual tests for that pollutant and a simplified annual report may be submitted for the next 2 years.

These quarterly and annual reports would include, as applicable for the period covered by the report: (1) Any period where emissions exceeded guidelines, or where values of monitored operating parameters were in violation of the guidelines; (2) results of all annual performance tests; (3) all 24-hour average SO₂ emission rates and percent reduction values (except for MWC's at small MWC plants) and 4-hour block average CO emission rates calculated during the reporting period; and (4) identification of any periods for which data were excluded from these calculations. In addition, each quarterly report would include the results of the daily CEMS drift tests and quarterly accuracy determinations as required under Appendix F, Procedure 1.

If the minimum amount of data were not obtained for a 24-hour average period, reasons for failure to obtain sufficient data (e.g., CEMS malfunction), and a description of corrective action taken would also be included, along with all information used to calculate the 24-hour average values. Also, if the

minimum amount of data (75 percent of the operating hours per day and 75 percent of operating days per month) were not obtained, this must be included in the quarterly reports and reasons specified.

The proposed guidelines would also require that certain types of records be maintained. Records to be maintained include all data outputs of the CEMS; all quarterly and annual reports submitted under this rulemaking; and all records required under Appendix F, Procedure 1. The required operating manual must be updated annually and be kept readily accessible. Records of operator certification and training of MWC operating personnel are required. All required records would be maintained for 2 years following the date of such records, after which they could be discarded.

The reporting and recordkeeping requirements in the proposed guidelines are necessary to provide enforcement personnel with the data and information necessary to ensure that existing MWC's achieve continued compliance with the proposed guidelines. At the same time, these requirements would not impose an unreasonable burden on MWC owners or operators.

J. Malfunction Provision

The MWC guidelines being proposed today apply at all times, except during periods of startup, shutdown, and malfunction. A special provision is being added to these proposed guidelines which places a limit of 3 hours per occurrence on the time that a plant can claim an exemption from the guidelines due to start-up, shut-down, or malfunction. This provision does not change the definitions of start-up, shut-down, and malfunction in the General Provisions nor does it change any of the requirements in the General Provisions. Malfunction is defined as "any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner. Failures that are 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" (40 CFR 60.2). As specified in 40 CFR 60.7, records must be maintained of the occurrence and duration of any start-up, shut-down, or malfunction, any emission levels occurring during such times, the nature and cause of any malfunction, and corrective action taken or preventive measures adopted. These records must support a determination, on a case-by-case basis, that a period of

emissions above the allowable limit should be considered as start-up, shut-down, or malfunction. The compliance provisions in 40 CFR 60.8 also specify that "at all times, including periods of start-up, shut-down, and malfunction," owners or operators shall operate and maintain the designated facility and air pollution controls to minimize emissions.

Most MWC's are base-loaded and operate either continuously or on a Monday through Friday schedule, so the time spent to start up and shut down these MWC's is minimal, with only one start-up and shut-down per week. Furthermore, the proposed MWC guidelines apply only while MSW is being combusted. Since most MWC's fire fuel oil or natural gas during warm-up and then switch to firing MSW once the MWC is at operating temperature, the proposed MWC guidelines usually would not apply during warm-up, but would become applicable as soon as MSW is introduced into the MWC. Similarly, shutdowns would not take more than 3 hours while MSW is being fired.

Due to the configuration of most control systems, maintenance can be performed on line to repair most malfunctions. In some cases, such as replacing a rotary atomizer or spray nozzle, the load must be reduced while maintenance is being performed, but the time spent operating at reduced load would be short. For DSI/ESP or DSI/FF systems (which are likely to be used by many plants under the proposed guidelines) most repairs to the DSI as well as to the ESP or FF system can also be performed on-line, but some ESP malfunctions may require a shutdown. If

any malfunction would take more than 3 hours to repair, the MWC would shut down to complete the repair.

K. Compliance Times and Enforcement Considerations

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.

As an example, a typical large MWC plant with two MWC's (each with 910 Mg/day [1,000 tons/day capacity]) would have to install dry sorbent injection equipment to reduce both HCl and SO₂ emissions by 50 percent. Assuming ESP's are already in place that reduce PM emissions to 69 mg/dscm (0.030 gr/dscf), downtime is expected to be 3 months per MWC. Total compliance time is expected to be about 19 months based on 7 months for front-end engineering and 12 months from the time the contract is awarded until startup. If significant space limitations exist, an additional 6 months (or a total of 25 months) could be required. Compliance times, therefore, should normally be under 3 years. Thus, a compliance time of 3 years is included in the emission guidelines.

V. Rationale for Guidelines for Materials Separation

A. Background

Currently, the U.S. generates about 150 million Mg (160 million tons) of municipal solid waste (MSW) per year, and under current waste management practices, this amount is expected to grow steadily through the year 2000. Much of the waste stream is attributed to disposable products that are used for a short time and thrown away. These products include "convenience" packaging suited to a fast-paced lifestyle, such as fast food containers and microwavable food packaging. Figure 3 shows the percent contribution (on a mass basis) of each of the major classes of waste materials to the total MSW stream. As shown in Figure 3, more than 40 percent of the solid waste stream consists of paper and paper products discarded in houses, offices, and factories. Yard waste makes up another 18 percent of the total. The other major components are metals (8.7 percent), glass (8.2 percent), plastics (6.5 percent), and food wastes (7.9 percent). At present, about 80 percent of the total MSW is landfilled, about 10 percent is combusted in municipal waste combustors (MWC's), and about 10 percent is recycled. The "Agenda for Action" indicates that by 1992, 25 percent of the MSW stream should be diverted by source reduction and recycling. Also, the percent landfilled should decrease from 80 percent to 55 percent, and the amount of MSW combusted in MWC's should increase from 10 percent to 20 percent.

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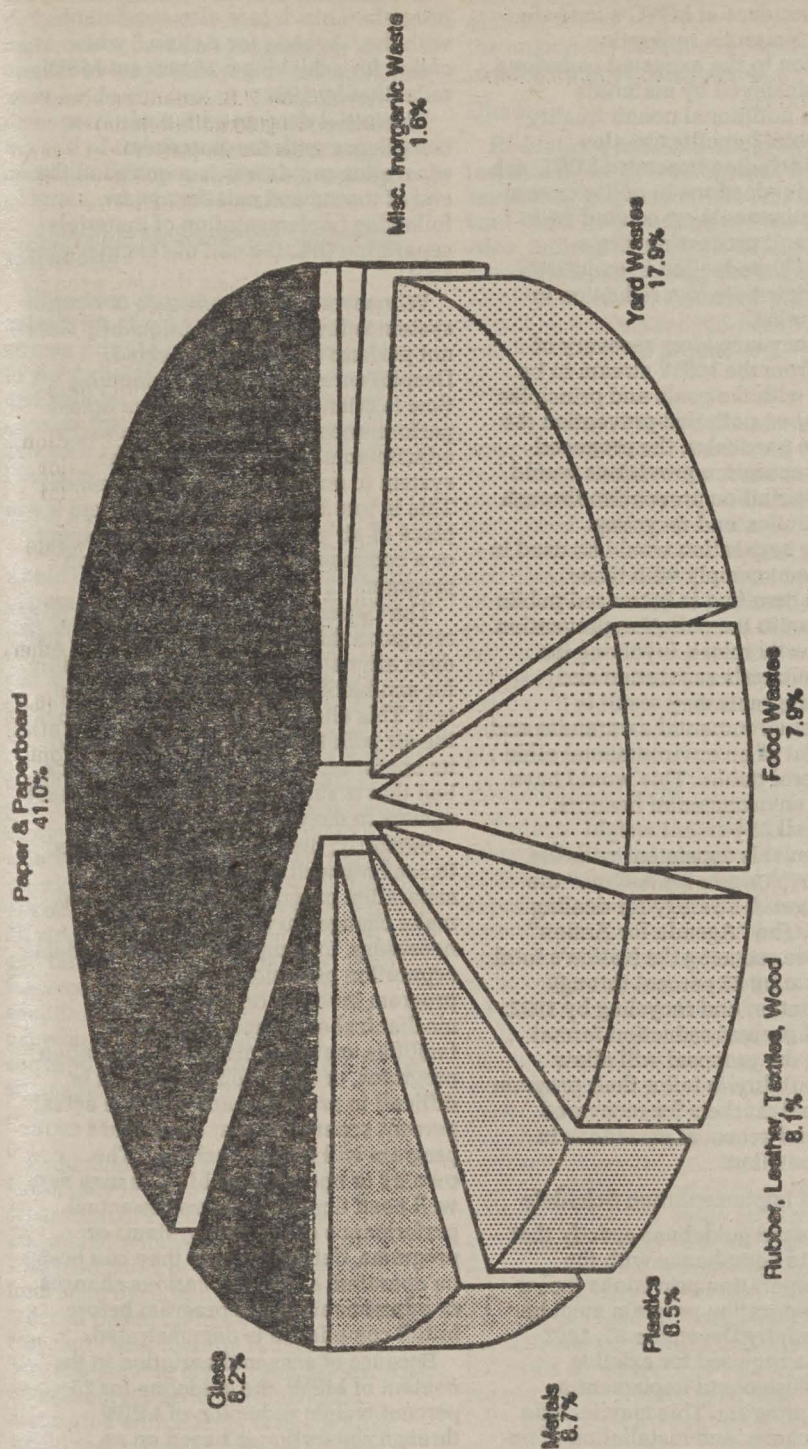


Figure 3. Gross discharges, by weight, of MSW materials.

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B. Selection of Regulatory Alternative for Materials Separation Selection of Alternative

As discussed in this proposal, materials separation refers to the separation and removal of certain components from MSW prior to combustion in an MWC. In many cases, materials separated from MSW can be recycled, thereby preserving natural resources. Recycling these materials would also reduce the amount of waste to be combusted or landfilled, and could provide funds (\$) to offset separation costs. By reducing the amount of waste to be combusted, overall MWC emissions can be reduced. In addition, emissions of specific constituents of MWC emissions can be reduced by separating certain classes of waste materials. Materials separation technology is applicable to all types of MWC technology including, but not limited to, mass burn MWC's, refuse derived fuel-fired (RDF) MWC's, and modular MWC's.

The proposed guidelines would require that all MWC's achieve an overall 25 percent or greater reduction (annual average by weight) of MSW through separation for recovery of one or more of the following materials: paper and paperboard; ferrous metals (including white goods); nonferrous metals; glass; plastics; household batteries; and yard wastes. In calculating the 25 percent weight reduction, a maximum credit of up to 10 percent would be allowed for yard waste separation. The remainder of the 25 percent would come from the other listed materials.

The proposed guidelines would also prohibit the combustion of large lead-acid vehicle batteries (wet lead-acid batteries weighing more than 5 kg [11 lbs] that are manufactured for use in motor vehicles, vessels, or aircraft, or any other use). A program to remove household batteries prior to combustion would also be required.

Separation of the materials discussed above may be achieved by mechanical or manual separation at the MWC, or off-site mechanical or manual separations, or by community source reduction or materials separation (recycling) programs, or a combination thereof.

Processing of MSW to remove these types of materials prior to combustion yields benefits in terms of reduced emissions potential for all components of MWC emissions including: MWC organics, MWC metals, and MWC acid gases. Emissions of nitrogen oxide (NO_x) would also be reduced. In addition, MWC steam generation efficiency and

MWC operating availability have been shown to increase at MWC's that are practicing materials separation.

In addition to the expected emissions reduction achieved by materials separation, additional nonair quality environmental benefits are also expected, including improved MWC ash quality and reductions in pollution and energy requirements associated with extracting and processing virgin materials. The reduction in emissions will also contribute to a reduction in global warming.

The Agency considers recovery of materials from the MSW stream to be consistent with the goals and principles of its policy on pollution prevention (54 FR 3845). In particular, the proposed materials separation provisions would encourage pollution prevention through source reduction and recycling. Community separation would be used in many areas to comply with these provisions, resulting in increased public participation in the pollution prevention program. Furthermore, involving the public in materials separation and recycling programs may result in increased environmental awareness and development of an environmental ethic by the general public. This would have long-range environmental benefits.

The overall 25 percent weight reduction level is consistent with the goals of the "Agenda for Action," the Agency's overall strategy for dealing with MSW. The "Agenda for Action" goals include reducing the Nation's total MSW stream by 25 percent through source reduction and recycling by 1992. The overall percent reduction format included in the proposal will allow MWC's flexibility to tailor their program to fit regional markets for recovered materials and seasonal variations in MSW composition.

Selection of Implementation Schedule

The proposed guidelines specify that MWC's be in compliance with the materials separation provisions (i.e., a materials separation program must be implemented) by December 31, 1992. Time will be required for existing MWC's to design and implement a separation program. This may include design, purchase, and installation of on-site separation equipment, and/or negotiations and development of contracts with third parties to implement off-site community separation programs. Putting a program in place to achieve the separation requirements is a relatively complex process which could take up to 2 years, and the December 31, 1992, date provides this amount of time after promulgation of the guidelines to design

and implement a materials separation program. This date is also consistent with the "Agenda for Action," which called for achieving a 25 percent MSW reduction by 1992.

The initial demonstration of compliance with the materials separation provisions is required at the end of the second calendar year following implementation of materials separation (i.e., the end of calendar year 1994).

Whenever any new process or control system is first started, it frequently does not perform exactly as expected. Despite careful design and planning, time is often needed to observe actual performance and make the necessary adjustments or refinements to the system to achieve design performance. This is true whether the new system is a piece of air pollution control equipment or a community materials separation program.

The General Provisions in 40 CFR 60.8 recognize this fact by allowing up to 180 days after start up of an affected facility for conducting the initial performance test. This allows time to test and adjust the air pollution control hardware and its operation before conducting a stack test that is submitted to the enforcement agency to demonstrate compliance.

Similarly, time is likely to be needed to see how well a specific materials separation program is performing and make changes in the program, if necessary, to comply with the materials separation provisions. Whether the program involves on-site or off-site mechanical or manual processing facilities, curbside materials separation programs, or some combination, it is difficult to predict in advance the actual percent separation that a specific program will initially achieve. The owners or operators of MWC's may very well need time to measure the actual performance of the new systems or programs, determine how they can best be operated, and make various changes or adjustments to the program before initial compliance is demonstrated.

Because of seasonal variation in the content of MSW, the guideline for 25 percent weight reduction of MSW through separation is based on an annual average. Therefore, MWC owners and operators will not know the percent separation their new system or program is achieving on an annual average basis until the end of the first year of operation; a few months of operation may not be descriptive of annual performance. In order to allow them time to adjust or fine-tune their materials separation program to ensure compliance, the materials separation

provisions provided the time necessary to determine the performance of the materials separation program on an annual average basis before compliance must be demonstrated. Compliance demonstration is, therefore, required at the end of the second calendar year of operation of the materials separation program, which is December 1994.

C. Rationale for Materials Separation Guidelines

Recovery of each of the targeted categories of materials from the waste stream prior to combustion is expected to yield specific air emissions, energy, and collateral benefits. The Agency expects that separation of the specified categories of material would yield the following benefits:

Paper and Paperboard

Reductions in MWC metal emissions would result from reduced combustion of paper impregnated with lead-based inks and mercury-based fungicides. Also reduction in carbon dioxide (CO₂) concentration would result due to the decreased mass of paper combusted and the increased amount of forest due to reduced timber demand for virgin paper production. A reduction in MWC acid gas emissions would result from reduced combustion of paper impregnated with chlorine-based bleach (i.e., hydrogen chloride [HCl]) and reduced combustion of sulfur-laden paperboard (i.e., sulfur dioxide [SO₂]). Indirect reduction in CO₂ and other emissions would also result from reduced energy consumption resulting from increased paper and paperboard recycling and the corresponding reduction in virgin paper and paperboard production.

Ferrous Metals

Reductions in MWC metal emissions (especially lead) would result from separation of ferrous materials assembled with lead solder or plated with lead, zinc, or cadmium. Emissions from coke oven batteries would be reduced based on increased use of recycled steel, thereby reducing benzene-soluble organic emissions. Also an indirect reduction in emissions associated with energy consumption would result from increased ferrous metal recycling and the corresponding reduction in virgin steel production.

Nonferrous Metals

Since nonferrous metals (aluminum cans in particular) are readily recyclable, not only would MWC emissions be reduced through separation, but reductions in energy consumption would also result from increased aluminum recycling and the

corresponding reduction in primary aluminum smelting. Also, reductions in the amount of litter along roadsides and in public places could result.

Glass

Reductions in MWC metal emissions (especially lead) would result from separating glass materials containing lead (such as television picture tubes). Also, indirect reductions in emissions associated with energy consumption would result from increased glass recycling and the reduction of virgin materials in glass production.

Plastics

Reductions in MWC metal emissions (especially cadmium and lead) would result from reduced combustion of plastics, which contain such metals as stabilizers and/or in pigments. Potential reductions in emissions of acid gases and chlorinated MWC organics could result from decreased combustion of polyvinyl chloride plastics. Also, reductions in CO₂ emissions and energy consumption would result from increased plastics recycling and the corresponding reduction in virgin plastics production.

Household Batteries

Reductions in mercury emissions and other MWC metal emissions (including cadmium and nickel) would result from separating household batteries prior to combustion. Add-on control systems typically achieve a lower percent removal of mercury than other metals. As described in section IV, mercury emission data are highly variable and the mechanisms of mercury emissions and controls are not currently understood. A task force is being formed to investigate mercury emissions and controls. However, much of the mercury oxide in MSW is contained in household batteries. Mercury oxide batteries are the type of battery with the highest mercury content, containing about 35 percent mercury, by weight. Common alkaline manganese batteries contain 7 percent mercury, and small silver oxide batteries contain about 1 percent mercury. The widely-used zinc carbon batteries may also contain small amounts of mercury. Therefore, in lieu of a mercury emission guideline, it is proposed that a program be established to remove household batteries from MSW.

Although the Agency is proposing inclusion of a program to remove household batteries, it is recognized that very little information is available on the economic impacts or environmental benefits of such a program. The Agency solicits comments on whether the

program should be required or not, what type of program should be required, what problems will be faced in implementing a program, and how effective a program would be in removing batteries and reducing mercury emissions. The Agency intends to include on the task force representatives from owners and operators of MWC's, State and local governments, and household battery manufacturers.

Lead-acid Vehicle Batteries

Removal of lead-acid vehicle batteries would result in a direct reduction in MWC metal emissions (especially lead). Also a reduction in MWC acid gas emissions (especially sulfuric acid), and reduction in MWC emissions associated with combustion of plastic lead-acid battery casings would be achieved. Indirect reductions in emissions will also result from the reduced demand for lead from primary lead smelters.

Yard Waste

Reductions in NO_x emissions and increased combustion stability would result from a decrease in the nitrogen content and moisture of the MSW. Emissions of MWC organics would be reduced due to improved combustion stability since yard waste often has a high moisture content and exhibits inconsistent combustibility. Also, energy consumption would be reduced due to a decreased need for auxiliary fuel.

The overall 25 percent MSW reduction and vehicle battery and household battery removal can be achieved by demonstrated technologies, including mechanical and/or manual methods or deposit/return programs for removal of each of the specified materials. The EPA's estimated costs of compliance assume that some manual separation at the MWC will be necessary.

Additional information supporting the above conclusions is contained in the docket.

The goal of the materials separation requirements is to encourage removal of multiple materials to achieve reductions in MWC emissions. The typical yard waste content of MSW is 18 percent (by weight), but some communities will have over 25 percent yard wastes. In calculating the 25 percent overall MSW reduction, a maximum credit of 10 percent would be given for yard waste separation to ensure the goal of the materials separation requirements is met.

The EPA believes that materials separation, used in conjunction with good combustion practices, and add-on

controls, will result in further reductions of emissions from MWC's. It is simply common sense, and the Agency's expectation, that reductions in the amount of pollution-generating materials combusted in an MWC will reduce the amount of pollutants in its air emissions. In addition, materials separation should improve the combustion efficiency of MWC's, and thus reduce MWC emissions, by removing noncombustibles like metals, glass, and water-saturated yard wastes from the feed stream to the unit. In fact, there are a number of studies (which are part of the record for this rulemaking) documenting significant reductions in MWC emissions as a result of application of materials separation technologies.

The Agency is, at this time, unable to reliably quantify the emission reductions attributable to materials separation when an MWC is equipped with highly efficient at-the-stack air pollution control devices. Not only are the limited existing test data insufficient to make this quantification, but other difficulties exist as well. First, the composition of waste received at MWC's varies depending on the types of waste generated in the service area and the season of the year. Therefore, the proportion of each separable material in the waste feed will vary among MWC's. Because of this variability, and economic factors, MWC's will choose different ways of accomplishing materials separation, and the percent reduction of specific materials will vary among MWC's. While MWC emissions as a whole will be reduced, it is difficult to predict the specific reduction in each component of MWC emissions (e.g., MWC metals, MWC organics, and MWC acid gases). Second, because of the substantial removals achieved by air pollution control devices, the remaining pollution being measured is small, and it becomes increasingly difficult to measure and interpret reliably with available test methods. In some cases, normal variability in the amount of metals, organics, and acid gas precursors in the incoming feed could make it difficult to interpret emission reductions attributable to materials separation. That is, it will not be possible to determine which reduction is attributable to variable waste feed and which to materials separation.

The processing of MSW to remove specified types of materials prior to combustion will also produce benefits associated with reduced quantities of ash to be landfilled and reduced levels of toxic materials in the ash. The proposed requirement for an overall 25

percent MSW reduction and the prohibitions on the combustion of vehicle batteries and household batteries will yield an appreciable tonnage reduction in the quantities of MWC residues (both bottom ash and flyash) disposed of in landfills. It is expected that the 25 percent MSW reduction coupled with the prohibitions on batteries would result in an approximate reduction of 80 percent in ferrous and nonferrous metals, and glass. This would reduce the tonnage of ash requiring disposal by 30 percent. With respect to ash quality or toxicity, the entire range of air toxics in ash is of concern with regards to fugitive emissions associated with the handling, storage, and transportation of ash. The principal toxic components of ash with respect to groundwater contamination are lead and cadmium. The requirement for materials separation and related prohibitions will produce ashes characterized by substantially lower metals content (especially lead, cadmium, and mercury) and thus, lower toxicity. As with air emissions, the Agency is, however, unable at this time to reliably quantify the actual improvement in ash quality (lower toxicity) to be produced by these requirements.

The Agency believes that the long-term viability of markets for recovered materials would be significantly enhanced by ensuring a stable supply of recovered materials. The Agency believes that a stable market supply would result from the proposed guidelines. Such stable supplies would tend to encourage long-term contracts with materials recovery firms and further the development of alternative end-uses. This same principle was recognized by the Congress in enacting the 1976 Resource Conservation and Recovery Act (RCRA) when it provided that State solid waste management plans shall not preclude States of local governments from entering into long-term contracts for supplying solid waste to resource recovery facilities, operating such facilities, and securing long-term markets for recovered materials and energy [RCRA Section 4003(a)(5)]. See also H. Rep. No. 94-1491, 94th Cong. 2d Sess. 10 (1976) ("Resource recovery facilities cannot be built unless they are guaranteed a supply of discarded material"). The Agency is also aware that the economics of materials recovery is in many cases driven more by avoided landfill or MWC disposal cost than by potential revenues from sales of recovered materials.

D. Materials Separation Methods

Separation of materials from MSW is accomplished in two ways: household separation (including deposit/return programs) and centralized processing. Household separation is the separation of recyclable materials from the waste by the generator (i.e., household or business); it is presently the primary method of separation in the U.S. At the household level, separation is accomplished by placing waste items (e.g., glass, paper, aluminum, etc.) in segregated containers. These containers are either picked up at the curbside or taken to local recycling bins or buyback centers. Deposit/return systems are also used to encourage separation and recycling of beverage bottles and cans. The homeowners would return the items to the point of purchase. Household separation of yard waste can be accomplished either by backyard composting or by segregating it for separate curbside pick-up where it is transported to a community composting site. Separation of lead-acid vehicle batteries could be achieved by a deposit/return system where the batteries are returned to the battery recycler, battery retailer, service station, or other recycling center. The separation of household batteries could be achieved through a deposit/return system and/or a prohibition on household disposal of batteries with MSW and implementation of separate community collections for batteries. The success of community programs depends on many factors including the level of planning, community participation rate (which may vary depending on whether the program is voluntary or mandatory), and local market demand for separated materials.

An increasing amount of MSW separation is accomplished at centralized processing facilities which operate at MSW transfer stations, landfills, or MWC's. At centralized processing facilities, recyclable items are removed from the waste stream by mechanical separation systems, manual handpicking, or a combination of both. A wide variety of automated processes may be used to separate the various components of MSW.

Ferrous metals are generally removed magnetically, except for white goods (appliances such as stoves, refrigerators, and air conditioners) which are visually identified and removed as waste is unloaded. Household batteries generally use ferrous metal (e.g., steel) casings and can be removed with the ferrous metal fraction. Nonferrous metals are separated by eddy current

(electromagnetic) separation, electrostatic separation (which separates conductors such as metals and paper from nonconductors such as plastic and glass), or by a variety of wet and dry methods which separate metals according to density. Methods for glass removal include wet and dry density methods, pulverization/screening, and optical sorting (by automatic photocells). Mechanical systems currently processing MSW in the U.S. achieve about 80 to 90 percent ferrous metal recovery, 60 to 70 percent aluminum recovery, and 70 to 80 percent glass recovery. Some fractions of yard waste can be removed mechanically. For example, grass clippings and other heavy materials may be gravity separated after screening out larger items. However, the product is not pure, and may contain broken glass and other contaminants. Mechanical systems can separate some paper and plastics from the waste stream using air classification or electrostatic separation, but these systems normally do not separate the various types of paper and plastic into specific material types (e.g., paper grade or plastic resin type). In many cases some manual sorting is performed along with mechanical separation to increase separation efficiency and to remove residual contaminants from the separated fractions.

Currently there are no fully-automated mechanical systems for removing lead-acid vehicle batteries from MSW. At centralized processing facilities, a specialized metal detector, which selectively detects large lead objects, is available and can be used to identify and locate the batteries in the waste traveling on a conveyor belt, and then the battery can be manually removed.

E. Legal Authority to Issue Materials Separation Guidelines

In this rule, the EPA's proposed determination of the "best technological system of continuous emission reduction", which Section 111 standards of performance must reflect, includes determinations for the precombustion, combustion, and post-combustion stages of MWC operation. Best demonstrated technology for precombustion would include a requirement that new and existing MWC's remove noncombustible, toxic, recyclable, and compostable materials from their feed materials prior to combustion (referred to as "materials separation" in this preamble). The EPA believes that it possesses legal authority to require precombustion materials separation pursuant to section 111. Such requirements are necessary to address the "nonair quality health and

environmental impacts and energy requirements" that Congress requires the Agency to take into account in making a best demonstrated technology determination. Clean Air Act (CAA) section 111(a)(1)(C). The EPA construes this language as requiring it to consider not only the adverse impacts on other environmental media and energy use of Section 111 standards, but also that EPA may consider the nonair health and environmental benefits and energy benefits that can result. Consideration of nonair and energy impacts are an important part of determining what constitutes a "best" technology. (See H. Rep. No. 95-564, 95th Cong. 1st Sess. 128, 129 (Conf. Rep.); H. Rep. No. 95-294, 95th Cong. 1st Sess. 187.)

As noted above, EPA believes that there will be a reduction in MWC air emissions of toxic gases and other pollutants harmful to health as a result of materials separation. These reductions include not only criteria pollutants, but toxics such as lead, mercury, and cadmium. Moreover, as noted in detail in section V.C. above, the Agency also expects the nonair health and environmental benefits from materials separation to be very great. Materials separation will improve MWC ash quality by removing noncombustibles from the unit's fuel stream, thus allowing better thermal destruction in the combustor and so keeping pollutants out of the combustion residues (ash). Materials separation should facilitate growth of markets for recycling by assuring adequate supplies of feed materials for recycling facilities. Recycling of separated materials will reduce the amount of waste ultimately disposed, saving critically scarce landfill capacity and reserving it for wastes for which land disposal is the best management alternative. Recycling of separated materials will also lessen the demand for raw materials, resulting in overall conservation of resources, and other environmental benefits. For example, recycling of newsprint and other paper products reduces the demand for raw timber, which preserves existing forests, a consideration in combatting global warming. Reducing demand for raw materials can also require fewer imports of raw materials. See Section 1002(c)(3) of RCRA where Congress found that "the recovery and conservation of such materials [separated from solid waste] can reduce the dependence of the United States on foreign resources and reduce the deficit in its balance of payments." Congress went on to find that "millions of tons of recoverable materials which could be used are needlessly buried each year,"

and that "methods are available to separate usable materials from solid waste." RCRA section 1002(c)(1)(2). The EPA further anticipates that there will be energy savings associated with increased utilization of recycling. For example, the recycling processes of secondary aluminum, lead, and glass are much less energy-intensive than the corresponding processes that use virgin raw materials. In short, the removal of recyclables and other materials from MWC feed streams advances the national policy "to promote the protection of human health and the environment and to conserve valuable material and energy resources by promoting a national research and development program for * * * new and improved methods of collection, separation, and recovery, and recycling of solid wastes * * * ." RCRA section 1003(a)(9).

Congress authorized EPA to consider nonair quality environmental and energy benefits such as these as an important component of a Section 111 best technology determination. These significant nonair quality environmental and energy benefits cannot be assured without including a materials separation requirement as part of the standard of performance of MWC's. The EPA believes that Congressional intent would be best effectuated by reading the CAA as authorizing EPA to require removal of toxics and compostable and recyclable portions of the MWC feed stream prior to combustion. The statutory language does not prohibit such a standard (indeed, it would be incongruous for it to do so, given the statutory requirement to include nonair and energy considerations in the best technology determination), and appears broad enough to encompass the materials separation requirement.

Thus, a "standard of performance," which EPA establishes for new and existing sources pursuant to section 111, is defined to include not only conventional emission limitations measured at the stack, but also other forms of emission restriction, including operating requirements and precombustion fuel conditioning requirements. See CAA section 302(1) (a "standard of performance" includes "any requirement relating to the operation or maintenance of a source to assure continuous emission reduction.") (emphasis added). Standards of performance must reflect the degree of "emission limitation" achievable, and an "emission limitation" is defined to include "any requirement relating to the operation or maintenance of a source to assure continuous emission reduction."

CAA Section 302(k). Under these provisions, removal of noncombustibles, toxics, recyclables, and compostables may be a "means of operating" an MWC in order to assure continuous emission reduction, and thus can be adopted as part of the section 111 standard of performance.

Other sections of the statute also support the EPA's interpretation that a Section 111 standard of performance may include requirements expressed as other than traditional at-the-stack emission limits where necessary to achieve important air and nonair quality environmental and energy benefits. Section 111(a)(7)(B), for example, authorizes EPA to include "precombustion cleaning or treatment of fuels" as part of new source performance standards. See also H. Rep. No. 95-294 at 189.

(There may doubtlessly be many pretreatment techniques and/or process modifications capable of achieving comparable or improved degrees of emissions control in fossil-fired boilers as well as in most fuel-burn[ing] industrial sources * * *. To this end, the Administrator should take into consideration all of the processing steps performed on a material from its natural state through to final usage in determining the requirements under this section for a technological continuous emission reduction system.) (emphasis supplied)

Separating noncombustibles like metals and glass from the feed stream to an energy-recovering MWC is indeed a type of precombustion cleaning of fuel, and consequently furthers the Congressional intent that EPA consider such measures as part of the section 111 standards of performance.

Some persons commenting on draft versions of this proposal suggested that the materials separation requirement could only be authorized as a "design, equipment, work practice, or operational standard" pursuant to CAA section 111(h). They went on to maintain that section 111(h) does not give EPA the authority to require removal of certain constituents from the MWC feed stream. The EPA questions whether the proposed materials separation requirement is a "work practice or operational standard." Certainly, the proposed requirement does not have the degree of mandated operating specificity that Congress sought to avoid in limiting the scope of work practice standards. The proposal does not require an MWC to carry out the proposed materials separation requirement in any particular way (by using particular types of equipment, for example). Rather, the proposal merely describes a minimal level of precombustion feed conditioning which can be achieved in many different

ways (for instance, by relying on a variety of different community source separation programs, or by separating certain recyclables at the MWC while a community separates others).

Even assuming that the proposed materials separation requirement were considered to be a "work practice standard," however, EPA believes that it would be within the Agency's section 111(h) authority. The EPA may promulgate a work practice standard when "it is not feasible to prescribe or enforce a standard of performance." CAA section 111(h)(1). One statutory example of when it is not feasible to prescribe or enforce a standard of performance is when "the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations." CAA section 111(h)(2). The legislative history indicates that Congress intended EPA to have authority to promulgate work practice standards when it finds that it is not feasible to develop or measure numerical concentration limits at the stack. See S. Rep. No. 95-127, 95th Cong., 1st Sess. 43, 44 (even though asbestos is capable of measurement, a work practice standard for asbestos was acceptable because of the impossibility of developing a numerical emissions standard).

In this case, EPA is presently unable to measure reliably the reductions in MWC emissions attributable to the removal of noncombustibles, recyclables, and compostables from MWC feed, and so is unable to reliably correlate at-the-stack measurements to materials separation technology. Thus, EPA is unable to develop numerical emissions standards reflecting the performance of materials separation technology. Since stack measurements and numerical standards would be technically impractical, EPA would be empowered to promulgate a "work practice" standard. The EPA also believes that it would be economically and technically impracticable to monitor separately each of the toxics that are in the MWC feed stream (which potentially include each toxic in consumer use in an industrialized society) in order to document the toxics removal achieved by materials separation. The EPA requests comment on these issues.

More fundamentally, EPA also questions whether it is "feasible" to prescribe or enforce a numerical standard of performance within the meaning of section 111(h) where prescribing solely a top-of-stack numerical limitation would preclude obtaining significant nonair environmental and energy benefits

which Congress has directed EPA to consider. The Agency solicits comment on how to interpret the interplay of these statutory provisions. The EPA also requests comment on the related question of how nonair quality and energy considerations are to be taken into account in assessing section 111(h)(3) equivalency demonstrations.

Several interested parties have also argued that the Agency is without authority to promulgate a work practice or operational standard if it also establishes a numerical at-the-stack emission limit for a pollutant. The EPA's current view is that this argument is not persuasive. The statute contains no express command preventing the Agency from adopting a fuel pretreatment or work practice standard as well as a numerical emission limit. Nor does the legislative history state that Congress meant to forbid such a two-part standard of performance. Under these circumstances, EPA may adopt reasonable interpretations of the statutory language that effectuate statutory goals, see *Chemical Manufacturers Association v. Natural Resources Defense Council*, 470 U.S. 1102, 1108 (1985), particularly where the interpretation assures important nonair and energy benefits and also assured an additional reduction in a pollutant regulated by a numerical standard.

F. Cost Impacts of the Proposed Guidelines

In the long run, the monetary benefits of separated materials are expected to outweigh the costs, resulting in no net annualized cost increase. However, the initial costs of materials separation at individual MWC plants will be highly variable. Depending on whether local markets are established for resale of materials, and other site-specific factors, the disposal cost at typical existing MWC plants could vary from a net annualized cost of about \$17/Mg (\$15/ton) of MSW combusted to a net credit (savings) of \$19/Mg (\$17/ton) of MSW combusted. Net annualized costs for a small MWC plant (180 Mg/day [200 tons/day] capacity) could range from a cost of \$900,000/yr if no separated materials can be sold to a savings of \$1.0 million/yr if all separated materials are sold; and for a regional plant (2,050 Mg/day [2,250 tons/day]) costs could range from \$9.5 million/yr to a savings of \$11.4 million/yr. Even at the higher cost, the materials separation provisions are acceptable. Higher costs would only be temporary and would decrease over time as markets for separated materials are established.

The estimated costs include annualized capital costs for materials separation equipment and annual operating and maintenance costs. Other costs and credits considered include: credits for reduced landfilling of ash; cost of lost energy revenues (since less steam and electrical energy will be produced by the MWC if less MSW is combusted); and materials sales revenues. At the lower end of the cost ranges, credits are taken for 100 percent sale of the following separated materials: glass, ferrous metals, aluminum, and high density polyethylene and polyethylene terephthalate plastics, while it is assumed the MWC pays a recycler to accept separated paper. At the higher end of the cost ranges, it is assumed that separated materials cannot be sold and must be landfilled. The no-sale assumption is a worst-case assumption. Markets for separated materials are already established in many locations. The proposed guidelines for materials separation and other Federal, State, and local actions will promote stable supplies of separated materials and will encourage development and stabilization of markets. Additionally, the flexibility provided sources by the form of the 25 percent materials separation requirement would allow sources to focus on the recycling of materials with the highest market value. Thus, the Agency believes that there will not be a significant cost for materials separation over the long run.

Thus, despite the range of net costs and credits estimated for individual plants, the national net annualized cost of materials separation is estimated to be negligible (\$0/Mg of MSW) or a net savings over the long run. While no severe economic impacts on households or government units are expected to result from the proposed materials separation guidelines, States would be allowed flexibility in implementing the guidelines, and may consider site-specific difficulties when establishing State regulations. (Also, see "Materials Separation—Combustion Permit" in Section H, "Compliance Provisions".)

G. Overall Agency Strategy to Promote Municipal Solid Waste (MSW) Reduction and Recycling

As discussed in Section IV.A. of this notice, in February 1988, EPA created an MSW Task Force to specifically address the problem of increasing waste generation and decreasing management capacity. The Task Force was given the assignment of assessing the solid waste problem, examining alternatives for solving it, and developing a well-coordinated strategy of action for

improving the Nation's management of MSW.

In developing the strategy, the Task Force held public meetings and solicited comments from the public and interested environmental groups, trade organizations, and government organizations. The Task Force's recommendations are presented in the report, "The Solid Waste Dilemma: An Agenda for Action" (EPA/530-SW-88-052), and information supporting the recommendations can be found in a supplemental document entitled, "Background Document for Solid Waste Dilemma: An Agenda for Action" (EPA/530-SW-88-054A).

As stated in the "Agenda for Action," EPA "recommends using 'integrated waste management' systems to solve municipal solid waste generation and management problems at the local, regional, and national levels. * * * A key element of integrated waste management is the hierarchy, which favors source reduction (including reuse) to first decrease the volume and toxicity and increase the useful life of products in order to reduce the volume and toxicity of waste. Recycling (including composting) is the preferred waste management option to further reduce potential risks to human health and the environment, divert waste from landfills and combustors, conserve energy, and slow the depletion of nonrenewable natural resources." In the "Agenda for Action," EPA set a near-term "goal of managing 25 percent of our Nation's municipal solid waste through source reduction recycling by 1992." Furthermore, EPA expects the percentage of MSW reduction and recycling to continue to increase after 1992. A number of cities are already achieving 25 percent materials separation. Source reduction and recycling help prevent many of the problems associated with MSW, including the difficulty of siting new landfills and MWC's to handle the large volumes of waste being generated. Preventing generation of wastes and diverting waste components from landfills and MWC's into reuse, recycling, or composting helps to alleviate siting problems and potential risks to human health and the environment attributable to improper management. Waste reduction and recycling also conserve natural resources by reducing the amount of virgin materials needed to produce new products. As the Congress found in promulgating RCRA in 1976, "Methods are available to separate usable materials from solid waste; and the recovery and conservation of such

materials can reduce the dependence of the United States on foreign resources and reduce the deficit in its balance of payments." 42 U.S.C. 6902(c) (2) and (3). Thus, planning and implementing these activities now yields benefits in managing wastes and conserving natural resources in the years to come. The "Agenda for Action" strategy for implementing the Agency's national waste management goals are briefly summarized below.

The "Agenda for Action's" recommendations for recycling include fostering the implementation of existing Federal procurement guidelines (as well as evaluating guidelines for additional commodities), and creating an interagency working group to develop pilot and full-scale projects for separating recyclables in Federal agencies. Markets for secondary materials and recycled goods must be stimulated and stabilized; thus EPA will conduct market development studies for different commodities, will examine economic and regulatory incentives for using secondary or recycled materials, and will foster the formation of regional marketing councils for the exchange of market information. A National Recycling Council will be formed with members from all sectors of waste management to track recycling issues and problems and to recommend actions. Finally, EPA will study how to foster the recycling of lead-acid batteries, including examining the current incentives and disincentives associated with liability. Today's proposed guidelines, which prevent the combustion of lead-acid batteries will encourage their recycle. Also, in keeping with the "Agenda for Action," industry should step up its efforts in fostering the recycling of plastics and paper. State and local governments should encourage separation of recyclable materials, conduct waste exchanges, and provide incentives for stable markets for recycled goods.

During the development of this proposed rule, EPA contacted members of the MWC industry, State and local government organizations, and the environmental community in an effort to obtain their views and ideas regarding materials separation requirements as part of best demonstrated technology under section 111. By today's action, the Agency is affirming its current position that materials separation is part of best demonstrated technology. However, during these discussions, a number of ideas and suggestions were discussed with respect to alternative approaches and strategies for incorporating materials separation as best

demonstrated technology which the Agency wishes to discuss in an interactive policy forum. This forum will be scheduled to take place in early February 1990 during the public comment period for today's proposed rulemaking. The Agency anticipates that this forum will result in a series of suggestions and recommendations for Agency consideration during the development of the final rule.

While today's proposed materials separation guidelines apply only to MSW being combusted in MWC's, as other related Federal standards or guidelines are developed, the appropriateness of including materials separation provisions will be considered.

The EPA requests comments or recommendations on other actions that could be initiated by EPA to promote recycling and source reduction through the EPA's regulatory programs for MWC's.

H. Compliance Provisions

Methodology Overview

A number of alternative compliance methods were considered in developing the methods for determining compliance with the materials separation provisions. As proposed, compliance with the percent reduction requirement would be determined by comparing the amount of material recovered with the amount of incoming waste. The MWC would be required to weigh all MSW received and combusted and to weigh the materials separated for recovery, and keep monthly records. At the end of each calendar year (January through December), the annual average percent reduction of MSW (by weight) would be calculated from the monthly totals. The weights of vehicle and household batteries separated would also be recorded. The monthly recordkeeping and annual calculations to demonstrate compliance were determined to be reasonable because this approach would provide assurance that the separation provisions continue to be met on an ongoing basis. Furthermore, centralized MSW processing facilities and communities that are currently practicing separation generally keep such records. Therefore, the added reporting and recordkeeping burden of the proposal would be minimal. The alternative of not including an annual compliance demonstration in the guidelines was considered, but not selected for proposal.

In calculating compliance with the 25 percent or greater MSW weight reduction, a maximum credit of 10 percent would be given for yard waste

separation, even if the separated yard waste weighs more than 10 percent of the weight of the MSW. The remainder of the required 25 percent MSW reduction would have to be achieved by separation of one or more of the other specified materials.

In calculating the weight of ferrous metals separated, white goods such as stoves, refrigerators, and air conditioners could be included; however, whole automobiles and other vehicles could not be included. Additionally, in calculating the weight of MSW received and combusted and the weight of separated materials, construction and demolition wastes would not be included.

See section I, "Reporting and Recordkeeping" for information on the schedules for compliance demonstration. Also, see "Materials Separation—Combustion Permit" in this section for a discussion of combustion permit provisions.

Materials Separation Plan

A description of the separation procedures (whether on-site or off-site) would be submitted with the initial demonstration of compliance. Off-site materials separation programs will generally be more complex to monitor than on-site programs.

If an off-site source reduction or separation program is used to comply in whole or in part with the materials separation requirements, the adequacy of the separation program and associated reporting procedures would be reviewed for approval on a site-specific basis. The off-site plan should provide a specific description of the program, including program elements related to the control of MSW flow, legal requirements and sanctions, and recordkeeping.

The plan should include a description of all procedures used to ensure control of the MSW flow. The following topics should be addressed, as applicable:

- The boundaries of the MSW service area(s) and any portions of the area(s) for which the MSW is delivered to landfills;
- The ownership of waste from the time it is deposited at curbside to the time it is delivered to the MWC, landfill, materials recovery facility, recycling facility, or other treatment or disposal facility;
- Materials separation methods and destination of the MSW and each separated material (e.g., materials recovery or recycling facility, broker, MWC, landfill);
- Contractual arrangements, if applicable, between the MWC and the off-site party responsible for separation,

and contractual arrangements between other involved parties, such as contracts between municipalities and private haulers of MSW;

- Any economic incentives for household participation in separation such as deposit/return systems on beverage bottles and cans or on batteries;
- Any economic incentives for active MSW hauler participation in the separation program (e.g., differential fees for curbside deposit of waste at a recycling center versus an MWC);
- Any curbside separation requirements; and
- Provisions for separate collection of recoverable materials, and collection schedules (e.g., schedules for separate curbside collection of yard waste, glass, cans, white goods, etc.; location of community bins for drop-off of such materials).

The plan should also describe any legal requirements or sanctions that may be part of the off-site separation program. For example, copies of any local or State regulations requiring homeowners to separate yard wastes or other specified recoverable materials should be included. Copies of legislation (e.g., bottle bills) instituting deposit/return systems should also be included. Any penalties or sanctions for not following separation program requirements that can be applied to residences, private waste haulers, or other parties should be described.

The plan should also specify method(s) of demonstrating compliance with the materials separation provisions in the guidelines and should describe recordkeeping procedures. The following topics should be addressed as applicable:

- Method(s) for determining the amount (by weight) of the recoverable materials specified in the guidelines, vehicle batteries, and/or household batteries (as applicable) that are separated on a monthly and annual average basis. Methods could include actual measurements using scales or calculational procedures;
- Method(s) for determining the amount (by weight) of MSW combusted (excluding construction and demolition waste) on a monthly and annual average basis. Methods could include actual measurement using scales or calculational procedures;
- Location(s) where weight determinations are made and which party is responsible (e.g., MWC, off-site materials separation facility, transfer station, recycling facility, landfill);
- Recordkeeping procedures including type and frequency of information

recorded, who is responsible for keeping records, location of records;

- Auditing procedures and frequency of audits; and
- Schedule and procedures for reporting monthly and annual weights of separated materials and other information to the MWC and the State regulatory agency or EPA.

Contractual Arrangements

In addition to developing a separation plan and submitting annual demonstrations of compliance, the proposed guidelines also allow the MWC owner or operator to enter into a contract with the governing body of any community or any other party whose action is required to maintain compliance.

Under section 111 of the CAA, the owner or operator, which in the case of today's proposed guidelines is the owner or operator of the MWC, is responsible for demonstrating compliance with the guidelines. As discussed previously, in some cases, the owner or operator of the MWC may depend on another party to comply with some or all of the materials separation requirements at an "off-site" location. This does not prevent the owner or operator of the MWC from demonstrating compliance with these requirements by obtaining the necessary records from the off-site separator which show the weight of materials separated from the MSW and either the weight of MSW received by the off-site separator or the weight of processed MSW shipped by the off-site separator to the MWC. By this means, the owner or operator of the MWC can monitor compliance with the materials separation requirements and based on this information take whatever steps are necessary to ensure continued compliance with these requirements. It does, however, make it more difficult and impose an additional administrative burden on the owner or operator of the MWC than if compliance with the materials separation requirements is achieved "on-site" at the MWC.

To minimize this administrative burden on the owner or operator of the MWC, in cases where the owner or operator of the MWC is depending on another party to demonstrate compliance with some or all of the materials separation requirements, today's proposal includes provisions and would allow other parties responsible for materials separation to become "co-operators" with the owner or operator of the MWC for purposes of demonstrating compliance with the materials separation requirements. These provisions apply only to the materials separation requirements and

do not apply to other requirements or emission limits in today's guidelines. In addition, these provisions do not require parties performing off-site separation to enter into this relationship, they only provide the opportunity for this relationship where desired by both the owner or operator of the MWC and the other party performing off-site separation.

Materials Separation—Combustion Permit

The EPA is also proposing that best demonstrated technology for combustible MSW or RDF include a combustion permit for some of the separated materials under limited circumstances. In cases where a recycling market is shown to be unavailable for the separated combustible material, and the owner or operator of the MWC cannot recover or recycle other materials in the MSW or RDF, an application could be made for a combustion permit. A recycling market would be considered to be unavailable if, after separating the combustible material and searching for 120 days, an owner or operator could demonstrate either that no recycler will accept the material, or that the price the recycler is charging (including transportation costs) is equal to or exceeds the cost of landfilling (including transportation costs). The materials separation requirement would remain in force whether or not a combustion permit was granted. That is, materials would be separated whether or not a combustion permit were issued. For the material(s) covered by the combustion permit, records would be maintained of the amount of material(s) separated (prior to combustion), and that would be the amount of separated (and combusted) material(s) credited toward the overall 25 percent MSW reduction requirement contained in the definition of "processed MSW" in the guideline. The amount of other separated materials (not covered by the combustion permit) would have to be sufficient in combination with the separated (combusted) materials to achieve the overall 25 percent MSW reduction requirement (annual average). The combustion permit could be granted for a maximum of 1 year (without prejudice to filing petitions at later dates if recycling markets for combustibles continue to be unavailable).

The reason for this part of the proposal is that a large part of the reason EPA considers materials separation to be part of best demonstrated technology is to obtain environmental benefits from actually recycling the separated materials. If separated combustible materials

actually prove to be unrecyclable after the owner or operator spends reasonable time and efforts to find a recycling market and the materials separation requirement cannot be satisfied by separating other materials, then the nonair environmental benefits from separating the material would no longer be demonstrated. Under such circumstances, it would not make sense to continue to preclude combustion of the separated materials, and to force their landfilling. The EPA believes it is preferable to burn the combustible materials in an MWC than to landfill them. Not only is landfilling a disfavored waste management option (see RCRA section 1002(b)(8)), but it is sound policy to recover the energy value of the combustibles rather than burying them (see CAA section 111(a)(1)(C) and RCRA section 1002(c)(1)). (The same is not necessarily true for noncombustible recoverables. If these are burned, the incinerator ash will contain the metals and other noncombustibles which will end up being land disposed in any case. This is why the proposal is limited only to combustible recoverables.)

The Agency is proposing that the test for unavailability of a recycling market for a particular material turn on a comparison of the cost of landfilling versus the cost of recycling. This test appears to be the relevant comparison because once combustion is precluded, these are the two principal management options for the separated material. If a material can be recycled for less expense than landfilling, it would be economically rational (as well as environmentally preferable) to recycle the material, even if the recycler has to be paid to take the material.

The EPA is also proposing that the owner or operator would demonstrate that recycling markets are unavailable. This demonstration would include documentation of the recyclers that the owner or operator of the MWC has contacted, and a documentation of the costs of recycling versus the costs of landfilling. The EPA is proposing that a market be unavailable for at least 120 days before an exception from the separation requirements could be considered because market fluctuations can be a short-term phenomenon and because owners or operators appear to be able to store combustibles for greater than this amount of time while seeking recycling markets. A petition would be approved by the State before the combustibles could be burned and the duration of the exception would not exceed 1 year. (If markets continue to be unavailable after 1 year, another petition could be made.) Both of these

conditions appear necessary to EPA to ensure maximum effort to comply with the materials separation requirement and to actually recycle separated combustible materials.

Permits may be renewed for an additional year if the Regional Administrator determines it is appropriate and the conditions specified in § 60.56a(h)(1) continue to be met.

Comments are also specifically solicited on whether, under certain circumstances, the requirement to separate materials for which a combustion permit has been granted under 40 CFR § 60.56a(h) should be dropped. The Agency specifically solicits comments on what criteria could be used to determine whether a source or community would not have to separate materials for which they receive a permit to burn the waste.

The following example illustrates how EPA envisions the exception would operate:

A community operating an MWC separates newspapers from the MSW burned in its MWC. During a 4-month period, the community is unable to recycle the newspapers because the best arrangement they can make involves paying a recycler \$40 per ton to take the newspapers (including transportation cost). (Other recyclers will not take the newspapers for any price.) The cost of landfilling the newspapers is \$30 per ton (including transportation cost). Newspapers comprise 8 percent of the materials that are separated from the MSW and the community can demonstrate that it is unable to separate 8 percent of recoverables other than newspapers (in order to achieve an overall 25 percent materials separation). Under these circumstances, the State agency could grant the combustion permit for newspaper for up to 1 year. Upon grant of the permit, the MWC could burn newspapers and would achieve credit for the newspaper separation based on the weight of newspaper separated, just as if they had been recycled.

Enforcement Guidance

Following adoption of standards or guidelines, the Agency frequently develops enforcement guidance for use in enforcement actions to ensure consistent and uniform enforcement of the standards or guidelines. This enforcement guidance outlines the steps the Agency will likely follow, depending on the merits of the situation in question, in taking enforcement actions when violations of the guidelines and associated State standards occur. In this enforcement guidance, the Agency balances the seriousness of the violation

against the potential impacts associated with various remedies. Thus, in the case of today's proposed guidelines, the Agency would consider the impacts of any remedy to a violation on waste management in a community, particularly the potential for waste not to be collected or to be diverted to a less desirable disposal alternative than combustion.

One of the primary objectives of an enforcement action is to prevent further noncompliance, and this is often achieved by negotiating a settlement agreement with the noncomplying source that ensures that the source will come into compliance with the State standards developed pursuant of the EPA's guidelines. In the case of today's proposed guidelines, this could involve working with the owners or operators of the source to identify those actions necessary to achieve compliance and the time required to implement such actions.

If, as an example, the owner or operator of the MWC failed to comply with the materials separation requirements in today's guidelines and associated State standards, and the owner or operator is dependent on another party to provide processed waste, a review of the reason for noncompliance may indicate that the materials separation system utilized by this other party needs to be altered in some manner to ensure achieving the 25 percent separation requirement. This could necessitate installation of additional separation equipment or changes in local waste management practices, such as purchase of additional trucks and hiring of additional personnel for waste collection, or the adoption of local ordinances with financial incentives or fines to ensure more intensive curbside separation efforts.

Such changes would require time to implement. One remedy to a violation of the materials separation requirements might well be a consent agreement between the enforcement agency and the owner or operator of the MWC and/or other party responsible for separation, where the other party has agreed to be a co-operator for purposes of compliance with the materials separation requirements. The consent decree might permit the MWC to burn unprocessed waste for a limited period of time if the necessary additional equipment or changes to the waste management system are made to ensure compliance with the materials separation requirements at the end of a specified period of time.

Of course, in cases of continued and repeated noncompliance, enforcement actions seeking shutdown of the MWC

may be taken. In any event, the Agency solicits comments on enforcement guidance that might be developed following promulgation of today's guidelines and on possible remedies that might be sought in response to various violations.

I. Reporting and Recordkeeping Guidelines

At the time of submittal of the initial compliance demonstration for materials separation (i.e., at the end of calendar year 1994), an MWC facility would be required to submit a description of the procedures for separating materials for recovery to achieve the overall MSW reduction requirement and a description of the procedures for ensuring that lead-acid vehicle batteries would not be combusted at the designated facility. The facility would also submit a description of the collection program for household batteries. If an off-site separation program is used, the plan describing the program and compliance methods would be submitted for approval at the time of submittal of the initial compliance demonstration.

The proposed guidelines would require all designated facilities to submit annual compliance reports to show the overall percent reduction of MSW achieved by separation of the specific materials. The annual percent reduction would be calculated for each calendar year (January through December) from the monthly total weight of MSW received and the weight of materials separated for recovery each month, including any credits for a community source reduction or separation program. The first annual report submitted at the end of calendar year 1993 would not be used to determine compliance with the materials separation requirements, but would be used to review progress made toward the materials separation requirements. The initial compliance demonstration with the materials separation requirements would not be calculated and reported until the end of calendar year 1994. The annual percentage MSW reduction would be calculated and reported at the end of all following years.

The proposed guidelines would also require that certain types of records be maintained, beginning in January 1993. Records to be maintained include: the amount (by weight) of MSW received on a monthly basis at the designated facility; the amount (by weight) of MSW combusted on a monthly basis in the designated facility; the amount of materials (by type and weight) on a monthly basis that is separated for

recovery; the amounts (by weight) of vehicle batteries and household batteries on a monthly basis that are separated for recovery; the estimated amount (by type and weight) of materials reduced or separated for recovery on a monthly basis through an off-site or community source reduction or materials separation (recycling) program; and the calculations of the annual average percentage reduction in MSW achieved for each calendar year (January through December).

J. Solicitation of Comments on Materials Separation Guidelines

The EPA welcomes comments on all aspects of the proposed materials separation provisions, and has specifically identified several topics on which comments and information are requested.

First, the Agency solicits comments on the proposed 25 percent materials reduction level and associated air emission and other environmental benefits expected to result from materials separation. The EPA requests information on potential separation techniques and on whether a higher or lower percent reduction is more reasonable.

In particular, during development of the proposed guidelines, it was suggested by some that 15 percent MSW reduction would be more reasonable, however others have suggested that 40 percent would be preferable. Those who support a lower percent reduction (e.g., 15 percent) should provide information on specific difficulties in achieving the 25 percent reduction as defined in the proposal, and describe their basis for stating that 15 percent (or some other number) is more reasonable than 25 percent. Those supporting a higher percent reduction (e.g., 40 percent) should provide specific information showing the 40 percent (or another number above 25 percent) is achievable using demonstrated technologies, and is reasonable.

Comments are requested on the proposed prohibition on combustion of vehicle batteries and the plan to remove household batteries, and the practicality of on-site or off-site separation programs for battery removal.

The EPA is aware that different areas have different MSW disposal problems. Accordingly, comments are solicited on the following questions. Should the 25 percent MSW reduction be uniformly applied to all areas of the country, or should there be different requirements for urban areas, residential areas, metropolitan areas, and rural areas? Should the stringency of the materials separation requirements vary for

different MWC's depending on the type of area, but still be designed to achieve an overall 25 percent reduction on a national basis? How would the areas be defined?

Another approach to separation that was considered, but not selected for proposal, was specification of a percent reduction (by weight) for each individual recoverable material in MSW (e.g., a certain percent of the paper in MSW must be separated for recovery, a certain percent of ferrous metals, etc.). For reasons stated previously, the overall 25 percent weight reduction was chosen for proposal. However, comments are requested on the material-specific percent reduction approach. Commenters should include the reasons they favor or do not favor this approach, and submit information on the percent separation achievable for specific materials. Supporters of a material-specific percent reduction approach are also asked to suggest methods of demonstrating compliance. It would be more difficult to demonstrate compliance with material-specific percent reductions because the weight of each material (e.g., paper, plastics, etc.) in the unseparated MSW would need to be known in order to determine the percent of the material that was separated. The content of unprocessed MSW is variable depending on factors such as climate, type and number of residences, and type and number of commercial businesses that produce MSW in the community. There is also seasonal variation in MSW content. Commenters should address how the owner or operator of the MWC could determine the weight of each specific material in the unprocessed MSW.

The Agency further solicits comments on whether other types of materials should be included in the list of recoverable materials that can be separated. The Agency is aware of arguments that recovering and stockpiling recovered materials, such as batteries, may create a separate environmental hazard.

The Agency is aware of arguments that separation and recovery of materials from the MSW stream may result in the landfilling of some separated materials, and could potentially increase the amount of waste disposed of in landfills. The Agency is also aware, however, that once separated, there is an economic incentive to recycle the separated materials which ranges up to the cost of alternative disposal at a landfill. Since landfill costs are substantial, this economic incentive to recycle is also substantial. The Agency solicits comment on this issue. In particular, the

Agency is interested in receiving comments concerning the relative multimedia environmental impacts of MSW disposal by landfilling versus combustion.

Suggestions are also requested on ways to implement the materials separation guidelines to minimize the burden for MWC owners or operators and the communities they serve. For example, what compliance schedule is most reasonable? (An alternative approach that would phase in separation requirements is discussed in the next section.)

There are several implementation issues associated with off-site separation programs. The proposed guidelines would allow off-site source reduction or source separation programs to be used to comply, in whole or in part, with the materials separation requirements. For example, if the MWC service area collected yard waste, paper, glass, aluminum cans, and/or other materials separately and did not combust these collected materials, credit toward the 25 percent MSW reduction would be given. The prohibition on combustion of lead-acid vehicle batteries could also be achieved through off-site programs. In these cases, MWC's would be required to submit a plan describing the community program and the means of verifying compliance. Section H describes the type of information that should be included in such plans. Comment is requested on how to structure such plans, how to determine compliance where community programs are used, what type of measurement methods could be used, and what types of records should be kept. Comments are specifically requested on how to give credit for source reduction programs (e.g., where commercial businesses or households reduce the amount of waste generated) and for backyard composting of yard waste at the household level.

Finally, EPA requests comments concerning the contractual provisions previously discussed in Section H. The proposed guidelines allow the MWC and parties performing off-site separation to enter into a contractual agreement designating the party performing off-site separation as a co-operator of the MWC regarding compliance with the materials separation requirements. In this way, where off-site materials separation programs are used, enforcement actions for noncompliance with the materials separation provisions could be taken against the off-site MSW processor responsible for the violation. The EPA requests comment on the feasibility of

such contract provisions, and on other approaches for the enforcement of materials separation provisions.

K. Solicitation of Comments on Alternative Phase-in of Materials Separation Guidelines

The "Agenda for Action" requires a 25 percent MSW reduction through source reduction and recycling by 1992, but also calls for increasing the percent reduction level to higher levels after 1992. The proposed MWC guidelines would also establish a 25 percent reduction level. However, greater percent removals may be achievable. As markets for separated materials strengthen and expand, higher percent separation levels will become more feasible technically and economically. The Agency solicits comments on whether materials separation guidelines for MWC's should require phasing-in of more stringent requirements over time.

One alternative that was considered and rejected was a three-step phase-in of the materials separation requirements. This approach would be similar to the proposed guidelines in that all MWC's would be prohibited from combusting MSW unless the MSW had been processed to separate materials for recovery achieving a specified percent overall reduction (by weight) of the MSW. However, the percent reduction of MSW would be less than 25 percent through 1992; after 1992 it would be 25 percent, consistent with the "Agenda for Action," and after some later date (e.g., 1995) a higher percent reduction (e.g., 40 percent) would be required. After consideration, it was determined that there is no need to specify a reduction level lower than 25 percent prior to 1992. If these emission guidelines are promulgated in December 1990, as currently scheduled, it is expected that State plans would be submitted within 9 months (by September 1991). Retrofit of materials separation systems could begin in 1991, but would probably not be complete until 1992. Thus, specifying a different percent reduction before 1992 would be of little use.

The proposed guidelines, therefore, start with the requirement for a 25 percent reduction of MSW. The Agency requests comments on whether the guidelines should become effective at a different date from the 1992 proposed, and on whether higher performance levels should be established in subsequent years and if they should be phased-in with one or two steps. Specifically, comments are requested on the desirability of increasing the 25 percent separation level to 40 percent by December 1995.

L. Spokane and Huntington Remands

The Administrator has recently denied two appeals involving (in part) the issue of whether materials separation is part of the best available control technology (BACT) in the prevention of significant deterioration (PSD) permits issued to MWC's. Spokane Regional Waste-to-Energy Project, PSD Appeal No. 88-12 (June 9, 1989) and Huntington Mass-Burn Incinerator, PSD Appeal No. 89-2 (August 2, 1989). The EPA denied both appeals, concluding that the petitioners had failed to show that materials separation was part of BACT for the facilities at issue.

The EPA does not view these petition denials as precluding inclusion of materials separation as part of the Section 111 NSPS and guidelines for existing sources. In the first place, all that was at issue in these appeals was whether petitioners had met their burden of showing that the PSD permit determination not to include a separation requirement was clearly erroneous. Spokane Appeal at p. 3. The EPA is under no such burden in the present rulemaking. Further points of distinction are that the Agency was not asked to review the relation of materials separation to all MWC emissions and thus did not consider certain types of pollutant emission reductions (for example, petitioners made no specific assertions regarding the overall life cycle benefits of materials separation, and also did not consider the nonair quality environmental benefits of materials separation in detail, an important factor in making section 111 determinations). Furthermore, although BACT determinations can have national precedential effect, EPA believes that a proposed decision of national import to require MWC's to perform materials separation can be more appropriately made in the context of a national rulemaking even if the Administrator declines to do so in deciding an individual PSD appeal.

The Administrator further stated that in denying these appeals that petitioners had failed to show that materials separation technologies were "available" (within the meaning of the definition of BACT contained in section 169(3) of the CAA) for MWC's because petitioners had failed to show that use of materials separation in combination with other air pollution control technology would lead to a demonstrable reduction in emissions of regulated pollutants. Spokane Appeal at p. 22. The EPA has included as part of the record of this proposed rulemaking a series of studies (most of which were

not presented to EPA by petitioners in the respective PSD appeals) showing reduction in emissions of MWC emissions through use of materials separation. Although these studies do not deal with situations where materials separation was used along with the best demonstrated technology-type of air pollution control technology, it is the Agency's engineering judgment that a reduction of pollutant input into an MWC will result in the MWC emitting fewer of these pollutants. Given that separation technologies are demonstrated for all of the types of materials considered in today's guidelines, that materials separation results in documented reduction in MWC emissions regulated under the proposal, and the Agency's judgment that these reductions would continue even if the MWC is also equipped with at-the-stack air pollution control technology, the Agency believes that materials separation is a demonstrated technology for existing MWC's under section 111.

VI. Combined Impacts of the Proposed Guidelines

The impacts of the proposed municipal waste combustor (MWC) emissions guidelines (based on good combustion practices [GCP] and particulate matter [PM] or acid gas/PM control systems), and the proposed materials separation guidelines are additive. The combined national emission impacts of these two types of guidelines are summarized in table 13.

TABLE 13.—COMBINED NATIONAL EMISSION REDUCTIONS FOR THE SELECTED REGULATORY ALTERNATIVE

Pollutant	Annual total emission reduction
MWC emissions	
MWC organics:	
Dioxins/Furans	190 kg/yr
MWC metals:	
PM	8,300 Mg/yr
MWC acid gases:	
SO ₂	37,000 Mg/yr
HCl	86,000 Mg/yr
Materials separation	Additional reductions in MWC emissions

As shown in Table 14, the combined national total annualized cost for the two proposed guidelines would be about \$320 million/year, and the combined unit cost would be about \$10.90/Mg (\$9.90/ton) of municipal solid waste (MSW) combusted.

As discussed in section V, in most cases the materials separation guidelines would not result in increased

waste disposal costs, and, therefore, no severe economic impacts on households or government units are anticipated. In some cases the materials separation guidelines would result in net benefits (reduced costs) for households and government units.

TABLE 14.—COMBINED NATIONAL CONTROL COSTS FOR THE SELECTED REGULATORY ALTERNATIVE

Guideline	Total annualized cost (\$10 ⁶ /yr)	Annualized cost per Mg MSW (\$/Mg)
MWC emissions.....	320	10.90
Materials separation.....	0	0
Combined total.....	320	10.90

VII. Considerations for Prevention of Significant Deterioration

Today's rulemaking under section 111(d) would establish a new classification of pollutants subject to regulation under the Act: "MWC emissions." The components of MWC emissions are MWC metals, MWC organics, and MWC acid gases. A consequence of this action is that prevention of significant deterioration (PSD) rules will now apply to all subject major stationary sources that have significant increases in this pollutant. Absent any significance levels in the regulations to exempt *de minimis* emission increases, review of PSD would be triggered by an increase in MWC emissions (see, e.g., 40 CFR 52.21(b)(23)(ii)).

In order to maintain a manageable review process which focuses resources on environmental priorities, EPA is proposing in today's Federal Register significance thresholds for these pollutants in a manner similar to those promulgated on August 7, 1980, for other regulated pollutants. At that time, EPA established emissions thresholds, expressed in tons per year, below which emissions would be considered *de minimis* and not be made subject to review. The Agency established these thresholds for 15 pollutants—the six criteria pollutants plus the four pollutants addressed at that time by national emission standards for hazardous air pollutants (NESHAP) and the five addressed in the new source performance standards (NSPS) (see, e.g., 40 CFR 52.21(b)(23)(i)).

The current significance levels were established in 1980 as simple indicators of what emission levels could appropriately be considered *de minimis*. These emission levels have proven to be reasonable in implementing the PSD

program. For noncriteria pollutants, the significance numbers were based on a percentage of the emissions of a well-controlled facility of modest size. For NESHAP pollutants, this level was 10 percent of allowable emissions from the subject facility; for NSPS, it was 20 percent. Projected impacts from emissions at this rate were compared to available health and welfare data to assure avoiding appreciable adverse effects.

For the purpose of establishing what amount of MWC emissions would be significant, a 225 Mg/day (250 tons/day) capacity MWC plant was evaluated. This capacity level was chosen since it is typical of many of the moderately sized MWC plants and represents that threshold capacity where a 90 Mg/year (100 tons/year) emission rate would qualify an MWC plant as being major under PSD. An MWC of this size typically would have the potential after controls to emit 90 Mg/year (100 tons/year) of MWC emissions. Because MWC emissions have carcinogenic components, EPA believes that a significance threshold of no higher than 10 percent of that emission rate is appropriate. Thus, the Agency proposes a significance emission level of 9 Mg/year (10 tons/year) of MWC emissions as a trigger for PSD review.

The August 1980 Federal Register also provided exemptions from the otherwise required PSD air quality monitoring data analyses for these sources which could demonstrate that their maximum expected air quality impact could be less than the values indicated in, e.g., 40 CFR 52.21(i)(8)(i) (45 FR 52676, 52709). Those air quality values were generally set at levels reflecting five times the lowest detectable ambient concentrations that could be measured by available monitoring equipment. The MWC emissions being regulated today present a somewhat different situation in that no ambient monitoring methods exist to measure these MWC-specific classifications of pollutants. For this reason, the Administrator will not at this time require PSD permit applicants to monitor specifically for MWC emissions. Applicants for MWC permits will, of course, continue to be responsible for performing appropriate monitoring for other regulated pollutants.

The EPA recognizes that the determination of significance thresholds for review of increases in MWC emissions is important. Comment on the proposed threshold and the approach to defining it is therefore solicited and will be carefully reviewed.

In addition to those PSD concerns related to the newly regulated

pollutants, the Agency is aware of other potential PSD issues caused by the Section 111(d) guidelines. More specifically, it is possible that the installation of pollution controls to comply with the guideline levels of performance may trigger PSD review. For example, installing and operating combustion-related controls to reduce emissions of dioxins and furans could result in a physical change or a change in the method of operation at the MWC plant and may increase NO_x emissions in significant amounts, thereby resulting in a major modification for PSD purposes. Similarly, the addition of controls might subject a complying MWC to PSD review where the new potential emissions of the MWC would be significantly larger in amount than the actual emissions of the MWC prior to section 111(d) compliance.

The EPA in general does not believe that the intent of Congress in Part C of the Act was to have sources that are attempting to comply with Section 111(d) requirements trigger PSD review. As such, the Agency solicits comments on whether and to what extent a source should trigger PSD by installing and operating emission reduction systems for the purpose of achieving the guideline limits of performance. Comments on this issue should provide useful input to the Administrator in deciding whether to modify the current PSD rules and to resolve this issue.

VIII. Administrative Requirements

A. Public Hearing

Three public hearings are planned. Each will discuss the proposed guidelines in accordance with section 307(d)(5) of the Clean Air Act (CAA). Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations should be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearings. Written statements should be mailed to the Air Docket Section at the address given in the ADDRESSES section of this preamble.

A verbatim transcript of the hearings and written statements will be available for public inspection and copying during normal working hours at the EPA's Air Docket Section in Washington, DC (see ADDRESSES section of this preamble).

B. Docket

The docket is an organized and complete file of all the information

submitted to or otherwise considered in the development of this proposed rulemaking. The principal purposes of the docket are: (1) to allow interested parties to identify and locate documents so that they can effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review (except for interagency review materials [Section 307(d)(7)(A)]). The docket number for this rulemaking is A-89-08.

C. Clean Air Act Procedural Requirements

1. Administrator Listing—section 111. As prescribed by Section 111 of the CAA, as amended, establishment of emission guidelines for MWC's is based on the Administrator's determination (52 FR 25399, dated July 7, 1987) that these sources contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare.

2. Periodic Review—section 111. The guidelines will be reviewed 4 years from the date of promulgation as required by the CAA. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements.

3. External Participation—section 117. In accordance with Section 117 of the CAA, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed guidelines, including economic and technological issues.

4. Economic Impact Assessment—section 317. Section 317 of the CAA requires the Administrator to prepare an economic impact assessment for any emission guidelines promulgated under section 111(d) of the Act. An economic impact assessment was prepared for the proposed guidelines and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed guidelines to ensure that the proposed guidelines would represent the best system of emission reduction considering costs. Portions of the economic impact assessment are included in the background information documents (BID's) and additional information is included in the docket.

List of Subjects in 40 CFR Part 60

Air pollution control, Incorporation by reference, Intergovernmental relations,

Reporting and recordkeeping, Municipal waste combustors, Municipal solid waste.

Dated: November 30, 1989.

William K. Reilly,
Administrator.

PART 60—GUIDELINES AND COMPLIANCE TIMES FOR EXISTING STATIONARY SOURCES

For the reasons set out in the preamble, title 40, chapter I, of the Code of Federal Regulations is proposed to be amended as follows:

1. The authority citation for part 60 continues to read as follows:

Authority: 42 U.S.C. 7401, 7411, 7414, 7416 and 7601.

2. Subpart C of part 60 is amended by revising § 60.30 to read as follows:

§ 60.30 Scope.

The following subparts contain emission guidelines and compliance times for the control of certain designated pollutants in accordance with section 111(d) of the Act and subpart B.

(a) Subpart Ca—Municipal Waste Combustors.

(b) Subpart Cb—Sulfuric Acid Production Plants.

3. Part 60 is further amended by adding subpart Ca to read as follows:

Subpart Ca—Emissions Guidelines and Compliance Times for Municipal Waste Combustors

Sec.

60.30a Scope.

60.31a Definitions.

60.32a Designated facilities.

60.33a Emission guidelines for MWC metals.

60.34a Emission guidelines for MWC organics.

60.35a Emission guidelines for MWC acid gases.

60.36a Emission guidelines for MWC operating practices.

60.37a MWC operator certification and training.

60.38a Compliance and performance testing and compliance times.

60.39a Reporting and recordkeeping guidelines.

Subpart Ca—Emissions Guidelines and Compliance Times for Municipal Waste Combustors

§ 60.30a Scope.

This subpart contains emission guidelines and compliance times for the control of certain designated pollutants from certain municipal waste combustors (MWC's) in accordance with Section 111(d) of the Act and Subpart B.

§ 60.31a Definitions.

Terms used but not defined in this subpart have the meaning given them in the Act and subparts A, B and Ea of this part.

"MWC plant" means one or more MWC units at the same location for which construction, modification, or reconstruction is commenced before December 20, 1989.

"MWC plant capacity" means the aggregate MWC unit capacity of all MWC units at an MWC plant for which construction, modification, or reconstruction is commenced before December 20, 1989.

"Regional MWC" means an MWC plant with an MWC plant capacity greater than 2,000 megagrams per day (2,200 tons per day) of MSW.

§ 60.32a Designated facilities.

(a) The designated facility to which the guidelines apply is each MWC unit for which construction, modification, or reconstruction is commenced before December 20, 1989.

(b) Physical or operational changes made to an existing MWC unit to comply with an emission guideline are not considered a modification or reconstruction and would not bring an existing MWC unit under the provisions at subpart Ea [see § 60.50a(b)].

§ 60.33a Emission guidelines for MWC metals.

For approval, a State plan shall include the emission guidelines for MWC metals listed below, except as provided for under § 60.24. The emission guidelines for MWC metals expressed as particulate matter contained in gases discharged to the atmosphere from any designated facility are as follows:

MWC plant capacity	Guideline emission level mg/dscm (gr/dscf)	Opacity (percent)
Regional	34 (0.015)	10 (6-min.)
Large	69 (0.030)	10 (6-min.)
Small	69 (0.030)	10 (6-min.)

Note: All emission levels corrected to 7 percent O₂.

§ 60.34a Emission guidelines for MWC organics.

For approval, a State plan shall include the emission guidelines for MWC organics listed below, except as provided for under § 60.24. The emission guidelines for the concentration of the dioxin/furan component of MWC organics discharged into the atmosphere from any designated facility are as follows:

MWC plant capacity	Guideline, ng/normal m ³	Emission level (gr/billion dscf)
Regional (including regional RDF)	[5-30]	(12-123)
Large (except RDF)	125	(50)
Large RDF	250	(100)
Small (except RDF)	500	(200)
Small RDF	1,000	(400)

Note: All levels corrected to 7 percent O₂.

§ 60.35a Emission guidelines for MWC acid gases.

For approval, a State plan shall include the emission guidelines for MWC acid gases for MWC's located at large and regional MWC plants listed below, except as provided for under § 60.24. The emission guidelines for MWC acid gases expressed as sulfur dioxide and hydrogen chloride contained in gases discharged to the atmosphere from any designated facility are as follows:

MWC plant capacity	Guideline emission level (% reduction or ppmv)	
	SO ₂	HCl
Regional	85% or 30 ppmv	95% or 25 ppmv
Large	50% or 30 ppmv	50% or 25 ppmv

Note: All ppmv levels corrected to 7 percent O₂.

Either the applicable percent reduction or the ppmv guideline, whichever is less stringent, is the guideline limit for a designated facility.

§ 60.36a Emission guidelines for MWC operating practices.

For approval, a State plan shall include the requirements for MWC operating practices listed in § 60.56a of Subpart Ea including the materials separation requirement under § 60.56a, except as provided for under § 60.24.

§ 60.37a MWC operator certification and training.

For approval, a State plan shall include the requirements listed in § 60.57a of Subpart Ea, except as provided for under § 60.24.

§ 60.38a Compliance and performance testing and compliance times.

(a) For approval, a State plan shall include, for small, large, and regional MWC's, the compliance and performance testing methods listed in § 60.58a for small MWC plants, as applicable, except as provided for under § 60.24.

(b) Except as provided for under paragraph (c) of this section, planning, awarding of contracts, and installation

of equipment capable of attaining the level of the emission guidelines established under this subpart are expected to be accomplished within 36 months after the effective date of State emission standards for MWC units.

(c) Planning, awarding of contracts, and installation of equipment and procedures capable of attaining the level of materials separation specified in the emission guidelines under 60.36a are expected to be accomplished by no later than December 31, 1992. The initial demonstration of compliance with the materials separation provisions in § 60.36a is expected to be accomplished at the end of calendar year 1994.

§ 60.39a Reporting and recordkeeping guidelines.

For approval, a State plan shall include the reporting and recordkeeping provisions listed in § 60.59a, as applicable, except as provided for under § 60.24.

4. Subpart C of part 60 is amended by removing §§ 60.32, 60.33, and 60.34; and Subpart Cb is added as follows:

Subpart Cb—Emission Guidelines and Compliance Times for Sulfuric Acid Production Units

§ 60.30b Designated facilities.

(a) Sulfuric acids production units. The designated facility to which §§ 60.31b and 60.32b apply is each existing "sulfuric acid production unit" as defined in § 60.81(a) of subpart H.

§ 60.31b Emission guidelines.

(a) Sulfuric acid production units. The emission guideline for designated facilities is 0.25 gram sulfuric acid mist (as measured by Method 8, of Appendix A) per kilogram of sulfuric acid produced (0.05 lb/ton), the production being expressed as 100 percent H₂SO₄.

60.32b Compliance times.

(a) Sulfuric acid production units. Planning, awarding of contracts, and installation of equipment capable of attaining the level of the emission guideline established under § 60.33(a) can be accomplished within 17 months after the effective date of a State emission standard for sulfuric acid mist. [FR Doc. 89-28719 Filed 12-19-89; 6:45 am]

BILLING CODE 6560-50-M

40 CFR Parts 51, 52, and 60

[AD-FRL-3646-1]

RIN 2060-AC26

Standards of Performance for New Stationary Sources; Municipal Waste Combustors

AGENCY: Environmental Protection Agency (EPA).

ACTION: Proposed rule and notice of public hearing.

SUMMARY: This proposal would add Subpart Ea to 40 CFR part 60. Subpart Ea would limit emissions from new, modified, and reconstructed municipal waste combustors (MWC's). The proposed standards implement Section 111(b) of the Clean Air Act (CAA) and are based on the Administrator's determinations that emissions from MWC's cause, or contribute significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare. The intent of the proposed standards is to require new MWC's to control emissions to the level achievable by applying the best demonstrated system of continuous emission reduction, considering costs, nonair quality health and environmental impacts, and energy requirements.

These are proposed rather than final standards, and comments are requested. The EPA will consider all comments and new information received during the public comment period, and will make changes to the standards, where appropriate, based on these comments.

If requested, a public hearing will be held to provide interested parties an opportunity for oral presentations of data, views, or arguments concerning the proposed emission guidelines.

DATES: Comments must be received on or before March 1, 1990.

Public Hearings. Public hearings will be 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. All hearings will start at 9:00 a.m. Persons wishing to present oral testimony at the public hearings must call Ms. Ann Eleanor at (919) 541-5578 before January 15, 1990, for the Boston hearing; January 18, 1990, for the Detroit hearing; and January 23, 1990, for the Seattle hearing. Each speaker will be allowed up to 10 minutes, and each group or organization will be allowed a maximum of 20 minutes to speak. If no one requests to speak at a hearing before these dates, the hearing may be cancelled. Persons interested in attending the hearings should also call Ms. Ann Eleanor at (919) 541-5578 to verify that a hearing will be held.

ADDRESSES: Comments. Comments should be submitted (in duplicate if possible) to: Air Docket (LE-131), Attention Docket No. A-89-08, Room M1500, U.S. Environmental Protection Agency, 401 M Street, SW., Washington DC 20460.

Public Hearing. The three scheduled public hearings, if requested, will be held at the following locations:

1. Presidents Ballroom, Hyatt Regency, 575 Memorial Drive, Cambridge, Massachusetts.
2. Cobo Hall, Cobo Convention Center, One Washington Boulevard, Detroit, Michigan.
3. Rainier Room, Seattle Center, 305 Harrison Street, Seattle, Washington.

Persons interested in attending a hearing or wishing to present oral testimony should notify Ms. Ann Eleanor, Standards Development Branch (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone number (919) 541-5578.

Background Information Documents. The background information documents (BID's) for the proposed standards consist of seven documents. See **SUPPLEMENTARY INFORMATION** for a listing of these documents. Persons wishing to review the BID's should contact their respective trade, professional, or environmental organization.

Docket. Docket No. A-89-08, containing supporting information used in developing the proposed standards, is available for public inspection and copying between 8:30 a.m. and 3:30 p.m., Monday through Friday, at the EPA's Air Docket, Room M1500, U.S. Environmental Protection Agency, 401 M Street, SW., Washington, DC 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. Walter Stevenson [(919) 541-5264] or Mr. Fred Porter [(919) 541-5251], Standards Development Branch, Emission Standards Division (MD-13), U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

SUPPLEMENTARY INFORMATION: The BID's for the proposed standards consist of seven documents as follows:

1. "Municipal Waste Combustors—Background Information for Proposed Standards: 111(b) Model Plant Description and Costs of Control", (EPA-450/3-89-27b, August 1989);
2. "Municipal Waste Combustors—Background Information for Proposed Standards: Post-Combustion Technology Performance", (EPA-450/3-89-27c, August 1989);
3. "Municipal Waste Combustion Assessment, Combustion Control at New Facilities", (EPA-600/8-89-057, August 1989);
4. "Municipal Waste Combustion Assessment, Technical Basis for Good Combustion Practice", (EPA-600/8-89-063, August 1989);
5. "Municipal Waste Combustors—Background Information for Proposed

Standards: Cost Procedures", (EPA-450/3-89-27a, August 1989);

6. "Economic Impact of Air Pollutant Emission Standards for New MWC's", (EPA-450/3-89-006, August 1989); and
7. "Municipal Waste Combustors—Background Information for Proposed Standards: Control of NO_x Emissions", EPA-450/3-89-27d, August 1989.

These reports are being provided at no cost to the public through interested trade, professional, and environmental organizations upon request. However, because of the number and size of volumes involved and the associated printing and distribution costs, only a limited number of sets were printed. The reports are being provided to trade groups, and professional and environmental organizations, with the understanding that they will allow members access to their document sets. Persons wishing to review the BID's should contact their respective organization. If the organization does not have the BID's, a set will be provided to the organization for the use of their membership.

The following outline is provided to aid in locating information in the preamble to the proposed regulation.

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I. Introduction

A. Summary of Regulatory Decision

Several studies were performed to determine whether municipal waste combustor (MWC) emissions should be regulated and, if so, under what sections of the Clean Air Act (CAA). As set forth in the advance notice of proposed rulemaking (ANPRM) (52 FR 25399, July 7, 1987), the Agency has decided to regulate air emissions from MWC's under section 111. This notice, therefore, proposes standards of performance for new MWC's under section 111(b) of the CAA. A separate regulatory action in today's Federal Register proposes emission guidelines for existing MWC's under section 111(d). Today's proposals address only air emissions from MWC's. The Agency has developed an overall agenda to address other municipal solid waste (MSW) disposal issues, and

today's air emission standards are just one component.

B. New Source Performance Standards (NSPS)—General Goals

New source performance standards (NSPS or "standards") implement section 111(b) of the CAA. New source performance standards are issued for categories of sources which cause, or contribute significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare. They apply to new stationary sources of emissions, i.e., sources whose construction, modification, or reconstruction begins after a standard is proposed. An NSPS requires these sources to control emissions to the level achievable by "best demonstrated technology" considering costs and any nonair quality health and environmental impacts and energy requirements. The control technology used to achieve the standards is not specified. Only the emission limits achievable by the "best demonstrated technology" are included in the standards. Any control technology that will comply with the emission limits can be used.

C. NSPS Decision Summary

An NSPS is the end product of a series of decisions related to certain key elements for the source category being considered for regulation. The elements in this "decision" are generally the following:

1. Identification of source category to be regulated—usually an emission source category, but can be a process or group of processes within an industry.
2. Definition of affected facility—the piece or pieces of equipment that comprise the sources to which the standards apply.
3. Selection of pollutant(s) to be regulated—the particular substance(s) emitted by the affected facility that the standards control.
4. Identification of "best demonstrated technology"—the technology on which the standards will be based, i.e.,

... 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. [Section 111(a)(1)]

5. Selection of format for the standards—the form in which the standards are expressed, i.e., as pollutant concentration emission limits, as a percent reduction in emissions, or as equipment or work practice standards.

6. Development of actual standards—generally emission limits based on what the best demonstrated technology can achieve. Only in unusual cases do standards require that a specific technology be used. In general, the source owner or operator may select any method for complying with the standards.

7. Other considerations—in addition to emission limits, NSPS usually include: standards for visible emissions, modification/reconstruction provisions, monitoring requirements, performance test methods and compliance procedures, and reporting and recordkeeping requirements.

D. Overview of This Preamble

This preamble will:

1. Summarize the important features of this proposed NSPS by discussing the conclusions reached with respect to each of the elements in the decision summary.
2. Describe the environmental, energy, and economic impacts of this NSPS.
3. Present a rationale for each of the decisions in the decision summary.
4. Present a regulatory flexibility analysis.
5. Discuss administrative requirements relevant to this action.

II. Summary of the Standards

A. Source Category To Be Regulated

The proposed standards would limit air emissions from new, modified, or

reconstructed municipal waste combustors (MWC's). Emission guidelines for existing MWC's are being proposed elsewhere in today's Federal Register. An MSW is defined as any combustion facility used for burning municipal solid waste (MWC). The MSW burned in the MWC's is refuse, more than 50 percent of which is waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustible materials, and noncombustible materials such as glass, metal, and rock. The MSW definition includes household wastes as well as municipal-type wastes from institutional, commercial, municipal, and some industrial sources, but does not include industrial process wastes, or medical wastes. The MSW also includes refuse-derived fuel (RDF), which is solid waste that is shredded and classified by size before combustion.

B. Pollutants To Be Regulated

Two pollutants would be regulated under the proposed standards: (1) "MWC emissions" and (2) nitrogen oxides (NO_x). *MWC Emissions:* Constituents of MWC emissions represent a broad range of pollutants that can generally be categorized into three subclasses: MWC organics (including dioxins/furans), MWC metals (including trace metals which are condensable on particulate matter [PM]), and MWC acid gases (sulfur dioxide [SO₂] and hydrogen chloride [HCl]). The composite pollutant, "MWC emissions", is designated for regulation under section 111(b) which applies to new sources (the subject of this notice). Under section 111(d), "MWC emissions" would be regulated at existing MWC's (emission guidelines). Emission guidelines proposed under section 111(d) are published in a separate notice in today's Federal Register. As shown in Table 1, the proposed standards would establish emission limits and operating standards to control MWC emissions.

TABLE 1.—SUMMARY OF REGULATED POLLUTANT AND STANDARDS

Pollutant regulated	Pollutant subclasses	Proposed standards
1. MWC Emissions ("designated" for control under Section 111)	MWC Organics	• Dioxin/furan emission limit • Combustor operational standards: —CO Limit —Load —Flue Gas Temperature —MWC Operator Training
	MWC Metals	• PM emission limit • Opacity limit
	MWC Acid Gases	• HCl emission limit • SO₂ emission limit
2. NO _x (criteria pollutant)	NO _x	• NO_x emission limit

*Materials separation requirements are also proposed. These requirements would result in additional reduction of MWC emissions.

NO_x Emissions: The second pollutant to be regulated under these proposed standards is NO_x. Nitrogen oxide emissions would be regulated under Section 111(b). Consequently, as shown in Table 1, the proposed standards would establish an emission limit for NO_x emissions from new MWC's.

C. Best Demonstrated Technology

MWC Emissions: The proposed standards for MWC's located at large MWC plants (those plants that have an aggregate capacity to combust greater than 225 megagrams/day [Mg/day] [250 tons/day] of MSW) are based on the conclusion that the best demonstrated technology for reducing MWC emissions includes: good combustion practices (GCP) for MWC organics control and a spray dryer (SD) followed by a fabric filter (FF) to achieve additional control of MWC organics as well as MWC metals and PM, and MWC acid gas. This combination of controls can achieve the following emission limits (corrected to 7 percent oxygen [O₂] on a dry basis):

1. MWC organics control: dioxin/furan control to a level in the range of 5 to 30 nanograms per normal cubic meter (ng/Nm³) (2 to 12 grains per billion dry standard cubic feet [gr/billion dscf]) total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans (the precise level within this range will be determined between proposal and promulgation);

2. MWC metals control: PM control to 34 milligrams per dry standard cubic meter (mg/dscm) (0.015 grains per dry standard cubic foot [gr/dscf]); and

3. MWC acid gas control: (a) HCl emissions reduction of 95 percent or an HCl emission limit of 25 parts per million by volume (ppmv), and (b) SO₂ emissions reduction of 85 percent or an SO₂ emission limit of 30 ppmv.

The proposed standards for MWC's located at small MWC plants (those plants that have an aggregate capacity to combust 225 Mg/day [250 tons/day] or less of MSW) are based on the conclusion that the best demonstrated technology for reducing MWC emissions includes: GCP for MWC organics control and dry sorbent injection (DSI) followed by an electrostatic precipitator (ESP) or FF to achieve additional control of MWC organics as well as MWC metals and PM, and MWC acid gas. This combination of controls can achieve the following emission limits (corrected to 7 percent O₂ on a dry basis):

1. MWC organics control: dioxin/furan control to 75 ng/Nm³ (30 gr/billion dscf) total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans for all types of MWC's except RDF combustors. For RDF's the

dioxin/furan limit would be 250 ng/Nm³ (100 gr/billion dscf);

2. MWC metals control: PM control to 34 mg/dscm (0.015 gr/dscf); and

3. MWC acid gas control: (a) HCl emissions reduction of 80 percent or an HCl emission limit of 25 ppmv, and (b) SO₂ emissions reduction of 50 percent or an SO₂ emission limit of 30 ppmv.

The EPA is also including materials separation requirements (i.e., separation of certain materials from MSW prior to combustion) in the proposed standards as part of best demonstrated technology. The proposed materials separation standards would apply to all MWC's. The proposed standards would require MSW to be processed before combustion to achieve an overall 25 percent or greater reduction (by weight) of MSW through separating for recovery some or all of the following materials: paper and paperboard; ferrous metals; nonferrous metals; glass; plastics; household batteries; and yard wastes. However, a maximum of 10 percent of the overall weight reduction could be attributed to yard waste; the other 15 or more percent would come from the other specified materials. Additionally, the standards would preclude the combustion in MWC's of lead-acid vehicle batteries weighing more than 5 kg (11 lb), and a program to remove household batteries prior to combustion would be required.

NO_x Emissions: The proposed standards for NO_x emissions from MWC's located at large MWC plants (plants with the aggregate capacity to combust greater than 225 Mg/day [250 tons/day] of MSW) are based on the conclusion that selective noncatalytic reduction (SNCR) or achievement of NO_x emission levels comparable to the use of SNCR represents best demonstrated technology for reducing NO_x emissions. This technology can achieve a NO_x emission limit in the range of 120 to 200 ppmv (corrected to 7 percent O₂ on a dry basis), on a 24-hour average basis. The precise limit will be determined between proposal and promulgation. Control of NO_x is not required for small MWC's.

D. Format For The Standards

MWC Emissions: Since it is not possible to establish or measure stack levels of "MWC emission" as a whole, standards are set for a subset of pollutants that will ensure control of the three subclasses of MWC emissions (MWC organics, MWC metals, and MWC acid gases). The proposed standards for MWC emissions would control MWC organics by establishing a dioxin/furan emission limit. Emissions for dioxins/furans would be calculated

as a concentration (ng/Nm³) (gr/billion dscf) at 7 percent O₂. The proposed standards would control MWC metals by establishing an emission limit for PM and an opacity limit. Emissions for PM would be calculated as a concentration (gr/dscf) at 7 percent O₂. Since MWC metals are associated with PM in the flue gas and are removed by PM control devices, achieving the specified levels of PM control would result in greater than 97 percent control of the full range of MWC metals (except mercury, for which a lower percent control would be achieved). This approach is more practical than setting limits for each individual metal. The opacity standard allows continuous monitoring, since there are no systems for continuous monitoring of PM mass emissions (gr/dscf). The proposed standards for MWC acid gases (HCl and SO₂) would establish both a percent reduction requirement and a concentration limit. The MWC owner/operator may comply with either of these two methods for acid gas compliance. The concentration limits for SO₂ and HCl are calculated as ppmv (at 7 percent O₂).

In addition to controlling stack emissions, the proposed standards would establish combustor operating standards for MWC's. These operating standards are part of GCP and would ensure that MWC organic (dioxin/furan) control is achieved on a continuous basis. They include limits on combustor carbon monoxide (CO) level, maximum MWC load level, and flue gas temperature at the PM control device inlet.

The proposed standards would also require certification of the chief facility operator and shift supervisors by the American Society of Mechanical Engineers (ASME), and development of a training manual to be used for training other MWC personnel. Training is an integral part of the implementation of GCP.

The proposed standards would also require that all MWC's incorporate materials separation procedures to process MSW prior to combustion. All MWC's would be required to process MSW to achieve an overall 25 percent or greater reduction by weight (annual average) of MSW through separating for recovery some or all of the following materials: paper and paperboard; ferrous metals; nonferrous metals; glass; plastics; household batteries; and yard wastes. In calculating the 25 percent overall weight reduction, a maximum credit of 10 percent would be allowed for yard waste separation. In addition, all MWC's would be prohibited from combusting lead-acid vehicle batteries

weighing more than 5 kg (11 lbs) and all household batteries. The materials separation requirements could be achieved by on-site mechanical separation, on-site manual separation, an off-site community source reduction or material separation (recycling) program, or a combination thereof.

NO_x Emissions: The proposed standards establish maximum emission limits for NO_x emissions from MWC's. The emission limit is calculated as a concentration (ppmv) at 7 percent O₂ on a dry basis.

E. Proposed Standards

The proposed standard is subdivided into two sets of requirements, one for MWC's located at large MWC plants and one for MWC's located at small MWC plants. The aggregate capacity of all new MWC's at one site would be added together to define aggregate MWC plant capacity. If the aggregate capacity of all new, modified, and reconstructed MWC's at one site is above 225 Mg/day (250 tons/day), then all new, modified, or reconstructed MWC's at the plant would be subject to the large MWC plant standard. Municipal waste combustors whose construction commenced prior to proposal of this standard are considered to be existing MWC's and would not be covered by the proposed standards and are not considered in calculating aggregate capacity for new MWC's. (See the separate notice in today's Federal Register that proposes emission guidelines for existing MWC's.)

MWC Emissions: The proposed standards for control of each subclass of MWC emissions are summarized below. Stack standards are discussed first, followed by combustor operational standards.

MWC Organics. The proposed standards for MWC organics would require MWC's at large MWC plants to meet a dioxin/furan emission limit in the range of 5 to 30 ng/Nm³ (2 to 12 gr/billion dscf). The precise limit within this range will be determined between proposal and promulgation. The MWC's located at small MWC plants would have to meet a dioxin/furan emission limit of 75 ng/Nm³ (30 gr/billion dscf) at 7 percent O₂ unless they use RDF-type MWC's. At small plants, RDF-type MWC's would have to comply with a limit of 250 ng/Nm³ (100 gr/billion dscf). These limits would apply to total tetra-through octa-chlorinated dibenzo-p-dioxins and dibenzofurans.

MWC Metals. The proposed standard for MWC metals would require all MWC's to meet a PM emission limit of 34 mg/dscm (0.015 gr/dscf) at 7 percent O₂. This PM limit would ensure good

control of metals, and would be a more practical approach than setting individual limits for every metal. Municipal waste combustors would also be required to meet an opacity limit of 10 percent (6-minute average, measured continuously).

MWC Acid Gases. The proposed MWC acid gas standards establish limits for HCl and SO₂. All MWC's located at large MWC plants would be required to achieve a 95 percent reduction in HCl emissions or a 25 ppmv HCl emission limit measured during a compliance test and annual performance tests. Large MWC plants would also be required to achieve an 85 percent reduction in SO₂ emissions or a 30 ppmv SO₂ emission limit on a daily (block) 24-hour average basis, measured continuously.

The proposed standards for MWC acid gases would require all MWC's located at small MWC plants to achieve either an 80 percent reduction in HCl emissions or a 25 ppmv HCl emission limit measured during the compliance test and subsequent performance tests. Small MWC plants would also be required to achieve either a 50 percent reduction in SO₂ emissions or a 30 ppmv SO₂ emission limit on a daily (block) 24-hour average basis, measured continuously.

Combustion Control. The standards would also specify MWC operating parameters, which are part of GCP, and would ensure that MWC organics emissions are minimized on a continuous basis. These operating parameters would include CO emission limits, combustor load levels, and flue gas temperatures.

For modular starved air and modular excess air types of MWC's, the CO emission limit would be 50 ppmv (at 7 percent O₂ on a block 4-hour average basis). For mass burn waterwall, mass burn refractory, and fluidized bed types of MWC's, the CO emission limit would be 100 ppmv (at 7 percent O₂ on a block 4-hour average basis). For mass burn rotary waterwall, RDF, and coal/RDF co-fired MWC's, the CO emission limit would be 150 ppmv (at 7 percent O₂ on a block 4-hour average basis).

Municipal waste combustors would not be allowed to operate above 100 percent of the maximum capacity, as measured during a compliance test (1-hour average basis). Municipal waste combustors that do not generate steam would be exempt from maximum load level requirements because these types of MWC's cannot feasibly measure load level.

The proposed standards would require all MWC's to maintain a flue gas temperature of 230° C (450° F) or less (4-

hour block average) at the PM control device inlet to minimize dioxin/furan formation.

ASME Certification and Operator Training. As part of GCP, the proposed standard would require certification of the MWC shift supervisor and MWC chief facility operator by ASME. In addition, the proposed standard would require each MWC owner or operator to develop a site-specific training manual to be reviewed by all employees associated with the operation of the MWC. The manual and training would be updated annually.

Materials Separation: The proposed standards would require all MWC's to incorporate materials separation procedures to process MSW prior to combustion. All MWC's would be required to process MSW to achieve a 25 percent or greater reduction in MSW by weight (annual average) through separation for recovery of some or all of the following materials: paper and paperboard; ferrous metals (including "white goods", or household appliances); nonferrous metals; glass; plastics; household batteries; and yard wastes. In calculating the 25 percent weight reduction, a maximum credit of 10 percent would be allowed for yard waste separation. In addition, all MWC's would be prohibited from combusting wet lead-acid vehicle batteries weighing more than 5 kg (11 lbs), and a program to remove household batteries prior to combustion would be required. The materials separation requirements could be achieved by on-site mechanical separation, on-site manual separation, a community source reduction or material separation (recycling) program, or a combination thereof. A materials separation system or program capable of achieving these requirements must be implemented at initial start-up for MWC's that commence construction after promulgation of this standard. For MWC's that commence construction between proposal and promulgation, the materials separation program would be implemented on December 31, 1992, or at initial start-up, whichever is later.

NO_x Emissions: The proposed standards for NO_x emissions would require all MWC's located at MWC plants with the capacity to combust greater than 225 Mg/day (250 tons/day) of MSW to meet a NO_x emission limit in the range of 120 to 200 ppmv (corrected to 7 percent O₂) on a 24-hour daily (block) average basis. The precise limit will be determined between proposal and promulgation. Different limits may be set for different subcategories of MWC technologies, and a percent

reduction format may also be considered.

F. Performance Testing and Monitoring Requirements

MWC Emissions: Testing and monitoring requirements are being proposed to ensure control of each subclass of MWC emissions. All emission limits are corrected to 7 percent O₂ on a dry basis. However, an MWC owner or operator may request to correct to an equivalent percent carbon dioxide (CO₂). In these cases, the correlation between O₂ and CO₂ would be established during the compliance test.

MWC Organic Emissions: The proposed MWC organic emissions standard would require performance tests to be conducted in accordance with Method 23 to determine compliance with the dioxin/furan emission limit. Method 23 is also proposed today in a separate notice of this Federal Register. An annual retest would be required for all MWC's. However, at small MWC plants, if three annual performance tests in a row indicate compliance with the dioxin/furan emission limit, small MWC's may skip the annual performance test for the next 2 years. If the next test (after skipping 2 years) shows compliance with the limits, another 2-year period may be skipped. At a minimum, an MWC performance test must be performed by small MWC plants every 3 years. Municipal waste combustors at large MWC plants must test every year.

MWC Metals: Performance tests to determine compliance with the PM emission limits (which ensure metals control) would be based on Method 5. Method 1 would be used for selecting the sampling points, and Method 3 would be used for gas analysis. Method 9 (a 6-minute average of 24 observations) would be used to determine compliance with the opacity standard. Subsequent annual performance tests for PM would be required for all MWC's. However, as with dioxin/furan emissions, if three performance tests in a row indicate compliance with the PM limit, small MWC's may skip the annual performance test for the next 2 years. At a minimum, an MWC performance test must be performed by small MWC's every 3 years. Large MWC's must test every year.

MWC Acid Gases: The proposed MWC acid gas standards would require continuous monitoring of SO₂ emissions for all MWC's. Compliance with the percent reduction requirement or the emission limit would be determined on a daily (block) 24-hour basis as measured

by the continuous emissions monitoring system (CEMS). Calculations to determine compliance would be made in accordance with Method 19. Quality assurance would be maintained in accordance with Appendix F.

The proposed MWC acid gas standards for HCl would require performance tests to be conducted in accordance with Method 26 to determine compliance with the HCl percent reduction requirements or emission limits. Method 26 is proposed in a separate notice in today's Federal Register. Subsequent annual performance tests would be required for all MWC's. However, at small MWC plants, if three performance tests in a row indicate compliance with the HCl limit, the MWC's may skip the annual performance test for the next 2 years. At a minimum, an MWC performance test must be performed by small MWC's every 3 years. Large MWC's must test every year.

Operating Standards: Continuous monitoring of certain MWC operating parameters would be required to ensure GCP are implemented on a continuous basis. These parameters are flue gas CO level, MWC load level, and flue gas temperature at the PM control device inlet. Compliance with the CO limit would be determined on a block 4-hour average basis as measured by a CEMS. Calculations to determine compliance would be made in accordance with Method 10. Quality assurance would be maintained in accordance with Appendix F. Load level (percent of full load) would be measured using steam flowrate, and a 1-hour average used to determine compliance. Compliance with the temperature standard is determined through continuous monitoring and a 4-hour averaging period.

Requirements for CEMS: A minimum data requirement applicable to all CEMS is also proposed. Data must be collected for a minimum of 75 percent of the MWC operating hours per day for 75 percent of the operating days per month.

Materials Separation: The proposed standards would require that all MWC's document that materials separation procedures are in place which meet: (1) the 25 percent overall separation requirement, (2) the lead-acid vehicle battery removal requirement, and (3) the household battery removal requirement. If an off-site or community program is used to comply in whole or in part with the requirements, a plan describing the separation program and the methods to be used to measure compliance would be submitted to EPA or the State agency for approval.

Compliance with the 25 percent overall MSW reduction requirement

would be determined annually.

Compliance would be based on an average of 12 monthly measurements of the total weight of MSW received, the weight of MSW combusted, and the weight of materials separated for recovery during each month. Demonstration of compliance with the annual average percent MSW reduction would not be required until the end of the second complete calendar year (January through December) after the initial start-up of the MWC. A report of the percent reduction achieved would be submitted at the end of the first calendar year, but would not be used to determine compliance. For MWC's that commence construction between proposal and promulgation, initial demonstration of compliance is required at the end of calendar year 1994 or at the end of the second calendar year after initial start-up, whichever is later.

Separation procedures could include mechanical separation, manual sorting, or curbside separation programs. If an off-site source reduction or materials separation (recycling) program is used to meet the materials separation requirements, the MWC and the party responsible for off-site separation may enter into a contractual relationship. The contractual relationship could designate the MWC and the off-site separator as co-operators of the MWC regarding compliance with the materials separation requirements. The contract could also specify the responsibilities of each party and the actions the off-site separator would take to meet the requirements for the 25 percent MSW reduction and/or removal of vehicle batteries and/or household batteries, as applicable.

The proposed materials separation requirements would also include a combustion permit provision that would be renewable on an annual basis. The permit would be available for MWC's that separate combustible material (e.g., paper, plastics) for recycle but for which there are no markets for the separated material. When a permit had been issued, the separated material could be combusted in the MWC. As proposed, application for the combustion permit must be made to EPA.

NO_x Emissions: The proposed NO_x standards would require continuous monitoring of NO_x emissions for all MWC's located at MWC plants with aggregate capacities to combust greater than 225 Mg/day (250 tons/day) of MSW. An initial compliance test for NO_x would be required during the first 24 consecutive unit operating hours at full load. Compliance with the emission limit would be determined on a daily

(block) 24-hour average basis as measured by the CEMS. Calculations to determine compliance would be made in accordance with Method 19. Quality assurance would be maintained in accordance with Appendix F. The proposed minimum data requirements for CEMS would also apply.

G. Reporting and Recordkeeping

The proposed standard would require all MWC owners or operators to submit a notification of the intent to construct and to initiate operation of a new, modified, or reconstructed MWC, as well as the results of the initial performance test and performance evaluation of the CEMS.

The proposed standards also require quarterly reports of CEMS drift tests and accuracy determinations in accordance with Appendix F, and reports of any periods when the minimum data requirements for CEMS were not met.

Records of all data, including results of emission tests and CEMS data, must be maintained for 2 years and made available to enforcement personnel upon request.

MWC Emissions: Quarterly continuous compliance reports for SO₂ and combustor operating parameters (CO, load, and temperature) would be required under the proposed standards. Quarterly excess emission reports would be required for opacity. Annual compliance reports for dioxins/furans, PM, and HCl would also be required under the proposed standards. However, if small MWC's have met the criteria allowing them to skip the annual compliance tests for dioxins/furans, PM, or HCl, they would submit a simplified annual report.

Materials Separation: Annual compliance reports for materials separation would be required under the proposed standards. The first report would be submitted at the end of the first calendar year after start-up of an MWC, but would not be used to determine compliance. This interim report would be used to observe progress made toward the materials separation requirements. Reports submitted beginning the end of the second calendar year after start-up (or the end of 1994 for MWC's that commence construction between proposal and promulgation) would be used to determine compliance. Records of the weight of MSW received at the MWC, the weight combusted, and the weight of each material separated for recovery (on a monthly basis) would also be kept. Additionally, records would be maintained of the weights of vehicle batteries and household batteries removal.

NO_x Emissions: Quarterly compliance reports for NO_x would also be required under the proposed standards.

III. Impacts of the Standards

A. Air

MWC Emissions: In the fifth year after adoption, the standards would reduce nationwide emissions of dioxins/furans from municipal waste combustors (MWC's) by about 15 kilograms/year (kg/year) (34 lbs/year) compared with projected emission levels under the regulatory baseline. This represents a reduction of over 90 percent. Emissions of particulate matter (PM) would be decreased by about 6,000 Mg/year (6,600 tons/year) compared with projected emission levels under the regulatory baseline. Overall MWC metal emission reductions of about 99 percent for all metals except mercury would be achieved by the air pollution control system. Nationwide emissions of SO₂ would be decreased by about 36,000 Mg/year (39,000 tons/year) compared with projected emission levels under the regulatory baseline. Nationwide emissions of HCl would be decreased by about 47,000 Mg/year (52,000 tons/year) compared with projected emission levels under the regulatory baseline. This represents a reduction of over 90 percent in MWC acid gas emissions.

Materials Separation: The proposed requirements for materials separation would reduce the overall amount of waste combusted by about 25 percent and would reduce overall MWC emissions; however, the amount of emissions reduction cannot be accurately predicted since there are little data relating materials separation to MWC emissions when materials separation occurs in conjunction with at-the-stack air pollution control. Additional reductions in emissions of MWC organics, MWC metals and mercury, MWC acid gases, and NO_x are expected.

NO_x Emissions: In the fifth year after this new source performance standard (NSPS) becomes applicable, nationwide emissions of NO_x would be reduced by about 12,000 Mg/year (13,000 tons/year) compared with projected emission levels under the regulatory baseline. This is roughly a 40 percent reduction.

B. Water and Solid Waste

MWC Emissions: Under the proposed standards for MWC emissions, no significant water pollution impacts are projected because none of the emission control technologies that were considered in developing these standards would produce a wastewater stream.

No significant solid waste impacts are projected from these proposed standards for MWC emissions. 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 proposed standards would increase the net amount of MWC ash generated by roughly 9 percent or 330,000 Mg/year (363,000 tons/year) relative to baseline. However, 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. Even with the increased ash, combustion would still reduce the volume of waste by about 90 percent.

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. The EPA is required, under the Resource Conservation and Recovery Act (RCRA) Section 4010(c), to develop criteria for sanitary landfills that receive household hazardous waste and small quantity generated hazardous waste, which criteria are to protect human health and the environment, taking into account the practicable capability of such facilities. These criteria may ultimately be Federally enforceable if States do not adopt adequate programs to implement them. RCRA Section 4005(c). The EPA has proposed criteria for all MSW landfills pursuant to these provisions. These criteria would require such controls as groundwater monitoring, closure, financial responsibility, and corrective action standards for existing MSW landfills, and also would require risk-based performance standards for new landfills or lateral expansions of existing MSW landfills. 53 FR 33314 (August 30, 1988). Pending legislation, although at an early stage of the legislative process, would require even more stringent controls and, in some bills, a whole separate regulatory system for MWC ash. The EPA thus believes that ash disposal will ultimately be adequately addressed by waste disposal management standards so that considerations of ash quality need not play a significant role in this rulemaking. However, to the extent that future EPA or Congressional action increases the stringency of controls and thereby cost of MWC ash disposal, the increased cost of ash disposal will be

considered as part of this rulemaking. The EPA solicits comment regarding the effect of potential future MWC ash disposal standards on this rule.

Materials Separation: The proposed materials separation standards would encourage source reduction and recycling of materials, thereby reducing the volume of solid waste and ash to be disposed of in MWC's or landfills. Any national strategy adopted by Congress and implemented at the State and local level would be credited toward the material separation requirement in this rule.

NO_x Emissions: Under the proposed standards for NO_x, no significant water pollution impacts are projected because none of the NO_x emission control technologies that were considered in developing these standards would produce a wastewater stream.

No significant solid waste impacts are projected from these proposed NO_x standards. The NO_x emission control technologies considered in developing these standards do not affect ash quality or quantity.

C. Energy Impacts

MWC Emissions: An MWC regulated under the proposed standard for MWC emissions would require additional energy to operate the control equipment used to comply with the standards. Total national usage of energy would increase by about 210,000 megawatt hours per year (MW-hrs/year). The majority of MWC's that would be affected by the proposed standards are cogeneration MWC's that combust municipal solid waste (MSW) and produce steam that is used to generate electricity for sale. For example, a typical large mass burn MWC would generate about 410,000 MW-hrs/year of electricity. Although these MWC's would require additional energy to operate control equipment, the additional energy use would only be about 11,000 MW-hrs/year at a typical large MWC, which has a very small impact on overall energy generated at the plant (a net reduction in energy generation of 2.8 percent). No other energy impacts would be associated with these proposed standards for MWC emissions.

Materials Separation: A small additional amount of energy would be used if mechanical materials separation procedures are practiced at the MWC plant. However, on a national basis, positive energy benefits are expected as a result of the materials separation requirements. The recycling of separated materials reduces overall energy use since the combined extraction and

development of equivalent virgin raw materials is relatively energy-intensive.

NO_x Emissions: An MWC regulated under the proposed standards for NO_x would require a small amount of additional energy to operate the NO_x control equipment used to comply with the standard. For example, a large mass burn MWC would require about 3,200 MW-hrs/year of electrical energy for selective noncatalytic reduction (SNCR) NO_x control. The combined additional electrical energy requirement for control of both MWC emissions and NO_x would equate to a reduction in energy generation of only 3.3 percent. No other energy impacts would be associated with these proposed NO_x standards.

D. Control Costs

The total annualized costs of control in the fifth year after proposal of the standards would be about \$190 million/year, and the overall national average annualized cost per unit of MSW combusted would be \$12.90/Mg (\$11.70/ton) of MSW combusted. This includes the costs of control for MWC emissions, materials separation, and NO_x control. For perspective, typical costs incurred by the general public for disposal of MSW range from \$40 to over \$100/Mg (\$36 to over \$90/ton) of MSW, including collection, transportation, combustion, and ash disposal.

Cost increases for typical large MWC plants would range from about \$10 to \$22/Mg (\$9 to \$20/ton) of MSW combusted. Cost increases for typical small MWC plants would range from \$9 to \$47/Mg (\$8 to \$43/ton) of MSW combusted. The MWC's located at small MWC plants would not be required to control NO_x emissions. The portion of the national cost and model plant impacts attributable to each standard are summarized below.

MWC Emissions: During the fifth year of applicability of the proposed standards, the overall average projected increase in nationwide annualized costs for controlling MWC emissions would be about \$10.90/Mg (\$9.90/ton) of MSW combusted. The nationwide projected increase in capital costs for controlling MWC emissions would be about \$500 million.

On a per plant basis, the annual disposal cost for a typical large MWC would increase by between \$8 and \$19/Mg (\$7 and \$15/ton) of MSW combusted, depending on the size and design of the MWC. The annual disposal cost for a typical small MWC would increase by between \$9 and \$47/Mg (\$8 and \$43/ton) of MSW combusted, depending on the size and design of the MWC.

Materials Separation: Over the long term, the proposed materials separation requirements are not expected to result in an increase in national annualized costs. While some costs will be initially incurred to purchase and operate materials separation systems, as markets develop and stabilize, these costs will be offset by credits for sale of separated materials, reduced landfill disposal cost (due to reduced amounts of MWC ash generated and disposed of in landfills), and other monetary benefits described in section V.

Annual disposal cost increases or decreases for materials separation could occur at individual plants depending on materials sales assumptions. At typical large MWC plants materials separation costs could vary from a net cost of about \$20/Mg (\$18/ton) of MSW combusted without materials sales to a net savings of about \$20/Mg (\$18/ton) of MSW combusted when markets for separated materials develop and the materials are sold. For a typical small MWC plant, annual costs for materials separation could range from a net cost of about \$11/Mg (\$10/ton) to a net savings of about \$25/Mg (\$23/ton) of MSW.

NO_x Emissions: During the fifth year of applicability of the proposed NO_x standards, the overall average projected increase in nationwide annualized costs for controlling NO_x emissions would be about \$2.00/Mg (\$1.80/ton) of MSW processed. By the fifth year of applicability of the proposed standards, the nationwide projected increase in capital costs for controlling NO_x emissions would be about \$97 million.

Under the proposed standards, the cost of NO_x controls for a typical large MWC could increase the cost of disposing of MSW through combustion by between \$1.70 and \$3.60/Mg (\$1.50 and \$3.30/ton) of MSW processed, depending on the size and design of the combustor.

E. Economic Effects

MWC Emissions: The economic effects of the proposed standards for MWC emissions on individual households are not projected to be severe.

Under the proposed standards for MWC emissions, over 90 percent of the MWC service areas examined are projected to have household impacts of less than \$30/year. Likewise, the increase in waste disposal costs from the proposed standards would not result in severe economic impacts on any city or county government units. Furthermore, the proposed standards would not noticeably affect the mix of

MWC types or the amount of MSW combusted.

Materials Separation: The costs of materials separation, when added to the cost of the other MWC emissions controls, would not cause severe impacts on households or government units. Costs may increase slightly in the short term in some instances where local markets for separated materials are not yet well developed. Also, households will experience some inconvenience in those areas which adopt a curbside program. However, as markets develop and stabilize, EPA believes the sale of materials for recovery will offset MSW disposal costs for households and government units. In general, materials separation standards and other Agency programs to encourage reuse will reduce the amount of MSW that must be disposed of, thereby reducing the overall costs of MSW disposal.

NO_x Emissions: The costs to control NO_x emissions are much lower than the costs to control MWC emissions and would not cause combined impacts on households or government units to become severe.

IV. Rationale for the Standards for MWC Emissions

A. Background

The regulatory interest in municipal waste combustors (MWC's) can be traced to the 1971 new source performance standard (NSPS) for particulate matter (PM) emissions from municipal incinerators larger than 45 Mg/day (50 tons/day) capacity under section 111(b) of the Clean Air Act (CAA) (40 CFR part 60, subpart E). Similarly, in 1986 a PM standard was promulgated for industrial-commercial-institutional steam generating units larger than 29 MW (100 million Btu/hour) heat input capacity combusting a number of fuels including municipal solid waste (MSW) (40 CFR part 60, subpart Db). The 1986 PM standard was more restrictive than the 1971 standard. New MWC's that are equipped with steam generating units and process roughly 225 Mg/day (250 tons/day) or more of municipal waste per MWC (which is approximately equivalent to 100 million Btu/hour) are subject to the 1986 NSPS. The subpart E and Db standards, however, were developed to control emissions of PM and do not address control of toxic organics or health concerns specific to toxic organics or other components of MWC emissions.

In section 102 of the 1984 Hazardous and Solid Waste Amendments to the Resource Conservation and Recovery

Act (RCRA), Congress directed EPA to prepare a report on the magnitude of dioxin risks from MWC's and to identify ways in which dioxin emissions could be minimized. In addition, during 1984 and 1985, the EPA's Office of Air and Radiation (OAR), in the course of assessing candidate air toxics, identified MWC's as a potential source category of concern. In June 1985, the Administrator announced the National Air Toxics Strategy, which included the commitment to regulate source categories of widespread national concern and give high priority to those that emit multiple pollutants such as MWC's. In addition to the above-mentioned regulatory activities, on August 5, 1988, the Natural Resources Defense Council (NRDC) and the States of New York, Rhode Island, and Connecticut petitioned the Administrator of EPA to regulate air emissions from MWC's under sections 111 and 112 of the CAA.

In response to the Congressional directive, and as part of the OAR's air programs, EPA prepared a Report to Congress that was issued in June 1987. This nine-volume report presented a compilation of the available information on MWC's including industry characteristics, emission data, health risks, control technologies, and costs of control. It provided the technical basis for the 1987 decision to regulate air emissions from MWC's.

On July 7, 1987, an advanced notice of proposed rulemaking (ANPRM) was published in the *Federal Register* (52 FR 25339) where EPA announced its preliminary determination to regulate new and existing MWC's under Sections 111(b) and 111(d) of the CAA, respectively. The schedule announced in the *Federal Register* for these actions called for proposal of NSPS for new MWC's and issuance of draft 111(d) emission guidelines for existing MWC's by November 1989 and promulgation by December 1990. The Administrator determined that MWC's would be regulated under Sections 111(b) and 111(d) 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 pollutant under Section 112, (3) Section 112 could not be used to address particular constituents or subgroups of emissions including lead and hydrogen chloride (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 the EPA guidelines.) Some States already have adopted or are developing their own MWC regulations.

In a concurrent action, the EPA's Office of Air Quality Planning and Standards (OAQPS) issued operational guidance to State and local agencies for best available control technology (BACT) determinations for permitting of new and modified MWC's pursuant to the prevention of significant deterioration (PSD) and new source review (NSR) provisions of the Act. The purpose of the guidance was to resolve questions over the selection of appropriate controls to satisfy minimum legal requirements and thereby facilitate the permitting process for new MWC's.

An Agency MSW Task Force was formed in 1988 to address the full range of problems associated with MSW. Today's air emission standards are only one component of the plan developed by the MSW Task Force entitled, "The Solid Waste Dilemma: An Agenda for Action" (EPA/530-SW-88-052). Other ongoing and planned activities include regulations for new and existing NSW landfills proposed under RCRA, Subtitle D (53 FR 33314, August 30, 1988). Standards to control air emissions from municipal landfills are currently being developed. In addition, as stated in the "Agenda for Action," EPA encourages the use of recycling programs and source reduction activities to reach the goal of achieving a nationwide waste reduction of 25 percent by 1992. The Agency has also encouraged the development of State and local planning strategies to manage waste.

Today's proposal would apply to all facilities that combust municipal-type solid wastes or mixtures containing municipal-type solid wastes. Certain types of waste combustors would not be covered by this NSPS for MWC's because they do not combust MSW. These other types of combustors are regulated elsewhere. For example, hazardous wastes such as industrial sludges and chemical wastes are not covered under this NSPS for MWC's. However, hazardous waste combustion is regulated under RCRA authority (40 CFR 264 and 265 subpart O). The combustion of sewage sludge is regulated by an NSPS (40 CFR 60 subpart O) and also by regulations being developed under the Clean Water Act (40 CFR 503 Subchapter O). Medical waste combustion or combustion of infectious wastes from hospitals are not covered by today's proposal, but are

being investigated for regulation under a separate standard.

B. Selection of Source Category

As mentioned above, PM emissions from MWC's are presently regulated under Subparts E and Db. In addition, NSR and PSD permits for new MWC's are subject to EPA operational guidance. However, because of the increasing trend toward combustion of MSW in the U.S., the complex mixture of MWC emissions, and potential public health impacts, a more comprehensive approach to MWC's is necessary. Greater emphasis is being placed on controlling the entire range of emissions from MWC's. This new approach has been adopted for several reasons.

The number of new MWC's and amount of waste combusted is expected to grow significantly in the future due to increasing restrictions and limited space availability for landfilling. Municipal waste combustors reduce landfill requirements and extend landfill life, although they do not replace landfills. While 80 percent of the Nation's MSW is currently disposed of in roughly 6,000 landfills, many of these facilities are nearing capacity and the 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.

Because of the difficulty in siting new landfills in many areas, it is expected that construction will commence on over 60 MWC plants (over 150 individual MWC's) in the next 5 years alone. This equates to a new MWC capacity of about 50,000 Mg/day (54,000 tons/day) in the next 5 years. This is a substantial increase compared to the roughly 210 MWC plants (450 individual MWC's) with a capacity of 95,000 Mg/day (105,000 tons/day) that are currently operating or under construction. Many of the new MWC's will be located at large MWC plants and some will be located in heavily populated areas.

On a national basis, MWC's, if not adequately controlled, could be a major source of emissions. Without the standards proposed today, emissions of all pollutants from MWC's would increase by over 100,000 Mg (110,000 tons) per year by 1994. This includes increases of over 7,500 Mg (8,300 tons) of PM, 91,000 Mg (100,000 tons) of MWC acid gases (sulfur dioxide [SO₂] and HCl combined), and almost 5,600 Mg (6,200 tons) of carbon monoxide (CO).

Municipal waste combustors are also significant sources of air pollution at the individual plant level. For example, in the absence of regulation, a typical 90 Mg/day (100 ton/day) modular MWC

plant would emit about 24 Mg/year (26 tons/year) of PM, about 170 Mg/year (190 tons/year) of MWC acid gases (SO₂ and HCl), about 8 Mg/year (9 tons/year) of CO, and about 40 g (0.09 lbs) per year of dioxins/furans. A typical large mass burn MWC plant with a design capacity of about 2,000 Mg/day (2,200 tons/day) would emit about 330 Mg/year (360 tons/year) of PM, about 3,900 Mg/year (4,300 tons/year) of MWC acid gases (SO₂ and HCl), about 170 Mg/year (190 tons/year) of CO, and about 600 g/year (1.3 lbs/year) of dioxins/furans.

Finally, due to their nature and magnitude, emissions from MWC's, if not adequately controlled, can pose health risks to the public. Both MWC organics and MWC metals include carcinogens. Ranges of cancer risk estimates for MWC emissions were published in the 1987 ANPRM (52 FR 25339). A recent review of risks using data and information gathered to support development of NSPS, found that cancer risks for MWC's are likely at the lower end of the ranges cited in the ANPRM, although there remain significant uncertainties in the risk assessment. Therefore, there is no reason to review the 1987 decision to regulate MWC's under Section 111 of the CAA.

In addition to cancer risks, HCl emissions are also of concern because short-term modeling has shown that, in the absence of further regulation, ambient HCl exposures near some MWC plants may exceed the short-term interim health effects level for HCl. The long-term interim welfare effects (materials damage) ambient concentration of 3 micrograms per dry standard cubic meter (ug/dscm) (1.3 gr/million dscf) (annual average) may also be exceeded by some model plants.

For the above reasons, MWC's have been determined to be a major source of air pollution which may reasonably be anticipated to endanger public health and welfare. As a result, MWC's have been selected for regulation.

On August 5, 1986, the NRDC and the States of New York and Florida (collectively "Petitioners") filed administrative petitions with the Agency requesting that EPA list specified pollutants emitted from MWC's as "hazardous" under Section 112(b)(1)(A) of the CAA; that EPA establish national emission standards under Section 112(b)(1)(B) for such hazardous pollutants; and that EPA regulate, under Section 111, nonhazardous pollutants emitted from MWC's. The EPA reiterates its tentative conclusion, first advanced in the July 7, 1987, ANPRM, that regulation of MWC's under Section 111 is the most appropriate means of

controlling risks to human health and the environment posed by emissions from these sources. In the 1987 ANPRM, EPA stated that regulation under Section 111 was most appropriate due to the need to control the range of pollutants found in MWC emissions, and the inappropriateness of controlling many of the components of MWC emissions under Section 112, given that many of the components do not meet the criteria for listing and regulation under Section 112. (52 FR 25406). The EPA also indicated that uncertainties in assessing risks posed by emissions of chlorinated dioxins and dibenzofurans emitted by these sources made Section 112 a less appropriate regulatory vehicle.

Further study reinforces all of these conclusions. In particular, the EPA's best estimate is that risks posed by dioxin and furan emissions from MWC's are in the low end of the range EPA estimated in the 1987 ANPRM. Thus, EPA continues to believe that the best regulatory approach is to use its Section 111 regulatory authorities. Accordingly, the Administrator is hereby proposing to deny the administrative petition filed by Petitioners to the extent they seek to have emissions from MWC's regulated under Section 112.

C. Modification or Reconstruction of Existing MWC's

Only those MWC's for which construction, modification, or reconstruction is commenced after today's date would be affected by the proposed standards. "Construction" is defined by 40 CFR 60.2 to mean "fabrication, erection or installation of an affected facility." *Sierra Pacific Power Co. v. EPA*, 647 F.2d 60 (9th Cir. 1981). The affected facility for this standard is the MWC as defined in the proposed standards [Section 60.51a]. "Commenced" is defined by 40 CFR 60.2 to mean "that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification." The phrase "contractual obligation" means a contractual obligation that cannot be cancelled without incurring significant liability. *Potomac Electric Power Co. v. EPA*, 650 F.2d 509, 513-515 (4th Cir. 1981).

If an existing MWC (which commenced construction before today's date) is modified for the purpose of meeting the requirements of the proposed guidelines for existing MWC's (40 CFR part 60, Subpart Ca), which are proposed elsewhere in today's Federal

Register or State regulations developed to implement these guidelines, then the MWC would not be considered "modified" or "reconstructed" and would not be subject to this NSPS. A special provision to clarify this has been included in the proposed NSPS and 111(d) emission guidelines. However, if the existing facility is modified or reconstructed in ways not required to meet the emission guidelines, for example if MWC capacity is increased, then the MWC may be considered modified or reconstructed and subject to the NSPS.

In general, "modification" refers to "any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies . . ." as described in the general NSPS provisions (40 CFR 60.14). "Reconstruction" generally includes "the replacement of components of an existing facility to such an extent that: (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new facility, and (2) it is technologically feasible to meet the applicable standards . . ." (40 CFR 60.15); however, reconstruction is determined on a case-by-case basis. As mentioned above, cases where such an expenditure is required to meet the 111(d) emission guidelines in 40 CFR part 60, Subpart Ca, would not be considered a modification or reconstruction under this NSPS.

D. Selection of Designated Pollutant

The collection of compounds emitted by MWC's, referred to as "MWC emissions", has been selected as the designated pollutant for regulation under Section 111(b) of the CAA. This approach was selected because of the large number of compounds emitted by MWC's that create potential health problems.

Emissions from MWC's are a complex mixture of numerous pollutants that affect public health. There are three general subclasses of pollutants within MWC emissions. These are MWC organics, MWC metals, and MWC acid gases. Organic emissions from MWC's, in particular dioxin/furans, are potentially carcinogenic. Emissions of MWC metals contain various metals that have carcinogenic and noncarcinogenic health impacts. The great majority of MWC metal emissions are condensed on PM emissions. These include cadmium, chromium, lead, beryllium, and arsenic. Emissions of MWC acid gases (specifically HCl and SO₂) pose several health- and welfare-

related problems. Of specific concern are emissions of HCl where short-term ambient exposure levels around some MWC's may exceed short-term health effects levels. Also, long-term ambient concentrations may exceed welfare-effects levels for materials damage. Furthermore, MWC acid gases are precursors in the formation of acid deposition (acid rain), which adversely affects vegetation, surface water quality, and aquatic life. In combination, these effects support a health-based designation of MWC emissions under Section 111, although there are also welfare considerations.

The EPA has determined that it is unnecessary to measure MWC emissions as an entity and that it makes far more sense to develop standards for certain component parts of MWC emissions. However, MWC emissions contain 100 or more components (many diverse metals and organics, for example). Although it is theoretically possible to measure all of the components, such a task would be extremely burdensome, expensive, and quite impractical. The standards that EPA is proposing provide a high level of control for total MWC emissions, and do so in a way that avoids the administrative burden and expense associated with monitoring and measuring all components of MWC emissions.

E. Selection of Affected Facilities

For the proposed NSPS, the affected facility, an MWC, is defined as any combustion device used to burn MSW (including refuse-derived fuel [RDF]). The proposed standards would apply to incinerators (with and without heat recovery) and all types of MSW-fired steam generating units.

An MWC would be covered by this regulation if it burns MSW (including RDF) or a mixture of wastes or fuels containing MSW. The MSW is defined as refuse, more than 50 percent of which is municipal-type waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustibles, and noncombustible materials such as glass, metal, and rock. The MSW burned in the MWC's includes municipal-type waste from households as well as institutional, commercial, municipal, and industrial sources. These wastes can be characterized in a number of ways. Household wastes include municipal-type wastes generated by single- and multiple-family dwelling units (including garbage, trash, and yard wastes). Wastes from multiple-family units are usually collected in large containers and removed by commercial haulers. These

wastes are also covered by today's standards. Institutional wastes include mixtures of municipal-type wastes generated by schools and colleges, and similar public buildings. Nonpathogenic wastes from medical institutions, such as hospitals and nursing homes (e.g., wastes from their cafeterias and administrative offices), are also covered by these standards. Commercial MSW includes municipal-type waste mixtures generated by retail stores, shopping centers, office buildings, restaurants, hotels, airports, wholesalers, and other commercial establishments. The standards also cover municipal-type wastes generated by municipal public works or industries—such as mixtures containing corrugated boxes and other parking materials, brush and tree trimmings, cafeteria wastes, and paper towels. These standards do not cover any hazardous or nonhazardous industrial process wastes. They also do not cover infectious hospital wastes. It should be noted that MSW can be mixed with and combusted with sewage sludge from publicly owned treatment works, and such combustion would be covered by the proposed standards. However, combustion of sewage sludge alone would not be covered.

Municipal solid waste also includes RDF. To produce RDF, the solid waste is shredded and classified by size prior to combustion.

As noted in the preceding paragraph, a source burning any amount of MSW would be classified as an MWC for purposes of this regulation and, consequently, would have to meet the standards for MWC's. If a unit were classified under more than one set of standards (for example, a boiler burning MSW which also burns fossil fuel), it would have to meet both sets of standards, and the more stringent set of standards in the event of an overlap. The EPA believes this requirement is appropriate given that the source has chosen to burn MSW and, therefore, it should have to meet the demonstrated standards for burning that material. The EPA realizes, however, that this reading would discourage burning small amounts of MSW in units other than dedicated MWC's, and solicits comments on whether this is a desirable result. Commenters advocating some type of *de minimis* feed exception in the MSW definition should justify their choice of the cutoff.

The proposed standard is subdivided into two sets of requirements, one for MWC's located at large MWC plants and one for MWC's located at small MWC plants. For purposes of determining if an MWC is subject to the

small plant or large plant requirements under the NSPS, the capacity of all new MWC's constructed after today's date at the same location would be aggregated (i.e., added together). All new MWC's at the plant would then be subject to the large or small plant requirements depending on whether this aggregate capacity were greater than or less than 225 Mg/day (250 tons/day). Municipal waste combustor capacity is defined as the maximum design charging rate for each MWC, as measured in Mg/day (tons/day) of MSW combusted. Municipal waste combustors constructed prior to proposal of today's NSPS but located at the same MWC plant would not be added to MWC plant capacity for the purpose of determining whether a new MWC is subject to the large or small plant requirements under the NSPS.

For example, if five new 80 Mg/day (90 ton/day) modular MWC's were constructed simultaneously at the same location they would be subject to the same requirements as a single 400 Mg/day (450 ton/day) MWC.

Total capacity of new MWC plants is usually planned in advance, but MWC's may be built at different times so that planned capacity is not reached immediately. If, for example, two 200 Mg/day (220 tons/day) MWC's are built at the same location but at different times, when the first 200 Mg/day (220 tons/day) MWC is constructed after today's date, the new MWC aggregate plant capacity would be 200 Mg/day (220 tons/day). This capacity is less than the 225 Mg/day (250 tons/day) definition of a large MWC plant, so the new MWC would be subject to the standards for MWC's at small MWC plants. However, when the second 200 Mg/day (220 tons/day) MWC is built later at that same location, then the new MWC aggregate plant capacity would be 400 Mg/day (450 tons/day), and both MWC's would become subject to the standards for large plants, just as if one 400 Mg/day (450 tons/day) MWC had been built. This aggregation ensures that new MWC capacity at MWC plants is subject to the same standards from plant to plant, whether this new capacity is built in stages or is built at one time. As another example, if a new 200 Mg/day (220 tons/day) MWC is built at an existing plant of one 200 Mg/day (220 tons/day) MWC, the new MWC aggregate capacity would be 200 Mg/day (220 tons/day), and the new MWC would be subject to the standards for new MWC's at small MWC plants.

The EPA is proposing this approach to determining new MWC size classification because the Agency

believes that the total plant capacity is known at the time of initial construction, even if some of that capacity is constructed years in the future.

As mentioned above, the proposed capacity aggregation provision applies to all new MWC's constructed at the same location. For the purpose of the proposed standards, "same location" refers to the same or contiguous property that is under common ownership or control. Properties are considered contiguous if they are directly adjoining or are separated only by a street, road, highway, or other public right-of-way. Properties are considered under the same ownership or control if owned or operated by the same entity, a parent entity, a subsidiary, or subdivision, or any combination. Included are properties owned or leased by a business, government, or quasi-governmental entity (e.g., a public utility district or regional waste disposal authority).

The proposed capacity aggregation provision is included in the standards because of the common practice within the MWC industry of constructing multiple MWC's at the same location. Because multiple small MWC's can have the same emission impacts as a single large MWC, EPA believes it would be reasonable to apply the proposed standards to all new MWC's otherwise subject to this subpart at the same location, regardless of the exact timing of their construction. The EPA solicits comment on the proposed definition of affected facility and the aggregation provision for new MWC's constructed at the same location.

F. Selection of Best Demonstrated Technology

Types of Combustors: There are three main types of technologies used to combust MSW: mass burn, modular, and RDF. A fourth type, employing fluidized-bed combustion (FBC) technology, is less common and can be considered a subset of RDF technology. Although these are the main types of MWC technologies, there are variations within these categories, and there are designs that incorporate features of more than one type.

Mass burn MWC's are field-erected MWC's covering a wide size range with individual MWC's ranging in size from 45 to 900 Mg/day (50 to 1,000 tons/day) of MSW combusted. There are typically two or three MWC's per plant, and plant capacities range from about 90 to 2,700 Mg/day (100 to 3,000 tons/day) of MSW. The technology is called mass burn because the waste is combusted without any preprocessing other than removal of items too large to go through the feed

system. Typical mass burn MWC's use hydraulic rams or pusher grate sections to push the refuse from the fuel chute onto the grate. Additional grates or rams are used to move the waste through the MWC and to promote complete combustion by agitation of the thick fuel bed. Most mass burn MWC's are constructed of waterwalls, which is a method used for cooling the combustion chamber and recovering heat.

Modular MWC's also burn waste without preprocessing, but are usually shop-fabricated, small MWC's ranging in size from 5 to 110 Mg/day (5 to 120 tons/day) of MSW. Plants typically have one to four MWC's (although a few have more), and plant capacities typically range from about 14 to 360 Mg/day (15 to 400 tons/day) of MSW.

To allow shop fabrication size restrictions while also providing sufficient flue gas residence time to complete combustion, modular MWC's employ two or more combustion chambers. Depending on the design, combustion air is supplied to the primary chamber either in excess of the stoichiometric amount required for complete combustion (modular excess-air MWC) or at substoichiometric levels (modular starved-air MWC). In the excess-air designs, excess air (above stoichiometric levels) is introduced into the primary chamber. Additional air needed to promote mixing and complete burnout may be added in the secondary chamber. In this design, the secondary chamber provides additional residence time for mixing and for completing combustion. This design is functionally similar to larger mass burn MWC's. In the starved-air designs, sufficient air is supplied to the primary combustion chamber to volatilize combustible materials in the waste while minimizing entrainment of fuel particles and ash in the flue gas. The incomplete combustion products and particulates then pass into the secondary combustion chamber where additional air is added to complete combustion. Most modular MWC's have refractory-lined combustion chambers. Although many existing modular MWC's do not have heat recovery, the majority of new modular MWC's are expected to recover energy with waste heat boilers.

The third class of MWC burns pretreated and shredded municipal waste, broadly referred to as RDF. The degree of pretreatment used in RDF production can vary from simple removal of bulky items accompanied by shredding of the remaining waste to extensive pretreatment to produce a finely divided fuel containing relatively little noncombustible material. The RDF

is generally fed with a stoker onto a moving grate. Some RDF MWC's are designed to combust only RDF, while others combust a mixture of RDF and other fuels such as wood or coal. In addition, a few boilers initially designed to combust pulverized coal may add some RDF as a supplemental fuel. Most RDF MWC's are medium to large size MWC's ranging in size from 270 to 900 Mg/day (300 to 1,000 tons/day) capacity. Plants typically have two to four MWC's, and RDF plant sizes range from 550 to 3,600 Mg/day (600 to 4,000 tons/day) capacity. Virtually all new RDF MWC's are constructed of waterwalls and employ heat recovery.

The last class of MWC's is FBC MWC's. In FBC, the waste burns in a turbulent bed of heated noncombustible material (generally sand or limestone). There are two basic types of FBC systems: bubbling-bed combustors and circulating-bed MWC's. Both burn RDF, sometimes mixed with other fuels. With bubbling-bed MWC's, most of the fluidized solids are maintained near the bottom of the MWC by using relatively low fluidization velocities. This helps prevent the entrainment of solids from the bed into the flue gas. Circulating-bed MWC's operate at relatively high fluidization velocities to promote entrainment of solids into the upper section of the MWC. Combustion occurs in both the bed and upper section of the MWC. The entrained fraction of the bed material enters a cyclone separator which recycles most of the unburned waste and inert particles to the lower bed. Typical FBC MWC sizes for planned units are 180 to 450 Mg/day (200 to 500 tons/day), and plant sizes range from 270 to 900 Mg/day (300 to 1,000 tons/day) capacity. As with other RDF MWC's, new FBC MWC's employ heat recovery.

Emission Control Technologies for MWC Emissions: There are basically three methods of controlling emissions from MWC's. One method involves separation of materials prior to combustion, and exclusion of certain materials from combustion. A second method is to alter the combustion process to reduce emissions of MWC organics [referred to as good combustion practices (GCP)]. The third method is adding pollution control equipment after the MWC to control emissions of MWC metals and MWC acid gases, and to obtain additional MWC organics control. The use of GCP and add-on air pollution control devices (APCD's) is discussed below. Materials separation is described in Section V of this preamble.

Good Combustion Practices: Good combustion practices include the proper

design, construction, operation, and maintenance of an MWC. Municipal waste combustor organic emissions may originate from the feed waste or fuel, reactions occurring in the combustion chamber, or reactions on the surface of PM at temperatures from 250° to 400 °C (480° to 750 °F). The use of GCP reduces MWC organic emissions, including emissions of dioxins/furans and their precursors, by promoting more thorough combustion of these pollutants.

Important factors in MWC design and operation that reduce MWC organic emissions include: maintaining uniform waste feed rates and conditions; the use of preheated air to burn wet or difficult to combust materials; maintaining adequate combustor temperature and residence time; providing proper total combustion (excess) air levels; supplying proper amounts and distributions of primary (underfire) and secondary (overfire) air; minimizing PM carryover; monitoring degree of waste burnout; and the use of auxiliary fuel during startup and shutdown.

Carbon monoxide concentration in the combustor flue gas is a good indicator of combustion efficiency and high MWC organic (i.e., dioxin/furan) emissions are associated with poor combustion. The techniques employed to minimize CO are closely related to those employed to minimize MWC organic emissions. Thus, if high levels of CO are present in combustor flue gases, it is likely that significant quantities of MWC organic emissions are also present.

Combustor load is also related to MWC organic emissions. At loads above 100 percent, PM carryover would increase and furnace residence times would decrease, contributing to increased MWC organic (i.e., dioxin/furan) emissions at high loads. The maximum load would be established for each MWC during its compliance test.

According to available information, MWC organics (i.e., dioxins/furans) form on fly ash in the presence of excess oxygen at temperatures in the range of 250 to 400 °C (480 to 750 °F), with maximum formation rates occurring at about 300 °C (570 °F). Available data indicate that cooling flue gases and operating the PM control device at temperatures of 230 °C (450 °F) or less prevents formation of MWC organics (i.e., dioxins/furans) in the flue gas. Flue gas cooling is typically accomplished by the economizer at MWC's with heat recovery capability, but could also be accomplished by other methods such as humidification.

Proper operation of combustors is key to GCP. Operation of MWC's is complex, and as mentioned above, there

are many interrelated parameters that influence emissions. Since only a few parameters such as combustor CO emissions, load, and flue gas temperature, can be specified and measured in emission standards, operator certification and training is another element of GCP. The American Society of Mechanical Engineers (ASME) has developed a certification program that consists of an initial provisional certification followed by full operator certification. To obtain provisional certification, a candidate must demonstrate that certain requirements of experience and education have been met and must pass a written examination covering the basics of municipal waste combustion. The initial provisional certificate, which is valid for 5 years, would not be specific for any particular MWC technology or jurisdiction.

After attaining a provisional certification and gaining 6 months of experience at a particular MWC facility, a chief facility operator or shift supervisor may pursue an operator certification. This certificate would be issued upon passing a site-specific oral examination on the operation, maintenance, and safety procedures at the facility. Operator certificates would be valid only for facilities of similar size and technology. They would be valid for 3 years and may be renewed upon demonstration that the operator has maintained knowledge of the particular MWC and permit requirements. New certificates would be required upon transfer to a facility of a different size or technology. The ASME certification would ensure national consistency and would allow individuals to transfer their certification from one State to another. In addition, all plant personnel who are in positions associated with the combustion process—including the control room operators, ash handlers, personnel involved with MWC maintenance, crane/load operators, and any other persons associated with MWC operation should receive training in MWC operation on a yearly basis. Such training is best provided through use of a training manual which focuses on how each subject area, or component of combustor operation, can impact combustor performance and emissions. In addition, the manual should specify remedial measures that are effective in regaining good performance during startups, shutdowns, and malfunctions of the MWC. As with any routine training program, the training manual should be revised as appropriate from time to time to reflect any changes.

The following training elements should be included in any training manual.

Introduction. This portion of the manual should include an explanation of the regulation applicable to MWC emissions and how certain MWC operating procedures (which would be discussed in detail later in the manual) would be followed in order to maintain compliance with the standards and to achieve GCP.

Basic Combustion Theory. This portion of the manual should address the interrelationships of flue gas, temperature, residence time, and fuel/air mixing and their effects on combustion performance and destruction of trace organics including dioxins/furans.

Procedures for Receiving, Handling, and Feeding Waste. This portion of the manual should address which specific types of MSW should be eliminated from the waste stream because of their physical and chemical characteristics (e.g., oversized, bulky wastes that can jam feed hoppers; explosive or hazardous wastes such as propane tanks) and materials that cannot be combusted. These wastes may contribute to upsets which result in excessive CO or MWC organic (i.e., dioxin/furan) emissions. Because the loader/crane operator can help maintain the stability of the combustion process by thoroughly mixing incoming feed material to blend wastes with high and low moisture contents and heating values, this portion of the manual also should include a discussion of the proper waste feed rates and feed uniformity, and their effect on combustion stability. Maintaining combustion stability would aid in achieving continuous reductions in MWC organic emissions.

Startup and Shutdown Procedures. Because higher levels of MWC organic emissions can occur during startup and shutdown due to low combustion temperatures and poor mixing, the training manual should set forth specific procedures for minimizing the effects of these episodes. This portion of the manual should include the requirement to fire auxiliary fuel during startup and shutdown.

Auxiliary Fuel Use. Some MWC's fire auxiliary fuel during conditions other than startup and shutdown (e.g., to maintain steam load during waste feed interruptions). Thus, this portion of the manual should address how changes in operation, such as combustion airflow rates and distributions, may be necessary when firing auxiliary fuels.

Maintaining Proper Combustion Air Supply Levels. Providing the proper

amount and distribution of underfire (or primary) air is important in maintaining proper combustor temperatures and stoichiometries and reducing emissions of organics and particulates from the combustor. This is especially important for modular MWC's with primary chambers designed to operate at substoichiometric conditions. As feed rates and waste properties change, it is sometimes necessary to adjust primary air distributions to maintain local stoichiometries. This portion of the manual should address what adjustments are needed depending on the specific MWC design type. In addition, this portion of the manual should also highlight the need for proper operation of overfire (or secondary) air because it plays a major role in the mixing process and the destruction of MWC organics. Again, secondary air design and operating practices will vary depending on the specific MWC design type. Because air preheat (used to assist in the combustion of high moisture, low heating value wastes) can affect the ability of a combustor to achieve good combustion, this portion of the manual should also instruct the operator to anticipate this potential problem and how to adjust or initiate air preheat as a corrective action.

Upset or Off-Specification Conditions. This portion of the manual should provide the operator with guidance on implementing corrective action in response to a number of periodic process upsets, including, but not limited to, low (or excessive) furnace temperatures, high CO levels, high (or low) operating load, high (or insufficient) flue gas cleaning device inlet temperatures, and poor waste burnout conditions.

Minimization of Particulate Matter Carryover. This portion of the manual should address the problem of PM carryover and instruct the operator how to minimize PM carryover within normal operating parameters. High levels of PM carryover may increase PM concentrations in the flue gas and may contribute to downstream formation of MWC organics (i.e., dioxins/furans).

Performance of GCP: Use of GCP, including exhaust gas cooling to 230 °C (450 °F), in conjunction with PM control can achieve dioxin/furan emission levels of 300 ng/Nm³ (120 gr/billion dscf) or less for new MWC's, except RDF combustors. Levels of 1,000 ng/Nm³ (400 gr/billion dscf) can be achieved at RDF combustors.

Add-on Controls: The most frequently used PM control devices for MWC's are electrostatic precipitators (ESP's) and fabric filters (FF's). Although other PM control technologies (such as cyclones,

electrified gravel beds, and venturi scrubbers) have been used, they are infrequently applied on current systems, and they are not expected to be used in future MWC systems.

In ESP's, flue gas flows between a series of high voltage discharge electrodes and grounded metal plates. Negatively charged ions formed by this high voltage field (known as a "corona") attach to PM in the flue gas, causing the charged particles to migrate toward the grounded plates. Once the charged particles are collected on the grounded plates, the resulting dust layer is removed from the plates by rapping, washing, or some other method and collected in a hopper. The most common types of ESP's used by MWC's are: (1) plate-wire units in which the discharge electrode is a bottom-weighted or rigid wire and (2) flat plate units which use flat plates rather than wires as the discharge electrode.

Fabric filters (also called baghouses) are becoming increasingly common for particulate control at MWC's, particularly when used in combination with acid gas control. Fabric filters are of two basic designs, reverse-air and pulse jet. In a reverse-air FF, flue gas flows through unsupported filter bags, leaving the particulate on the inside of the bags. The particulate builds up to form a particulate filter cake. When the pressure drop across the filter cake reaches a defined limit, flue gas flow is stopped and clean air is directed through the filter in the opposite direction, the filter bag collapses, and the filter cake falls off and is collected at the bottom of the hopper. Following cleaning, flue gas is again directed through the clean filter bags and the cycle is repeated. In a pulse jet FF, flue gas flows through supported filter bags leaving particulate on the outside of the bags. To remove the built-up particulate filter cake, a pulse of compressed air is introduced inside of the filter bag, the filter bag expands and the filter cake falls off and is collected. The pulse jet system may be cleaned while on-line or off-line.

Well-designed and operated ESP's or FF's can reduce total PM emission levels to 34 mg/dscm (0.015 gr/dscf) or less at 7 percent oxygen (O₂).

Municipal waste combustor metals emissions include arsenic, beryllium, cadmium, chromium, lead, mercury, and nickel. All of these metals, except mercury, are removed with the fine particulates collected by ESP's or FF's. Well-designed ESP's or FF's operated at 230 °C (450 °F) or less remove over 97 percent of arsenic, cadmium, and lead and about 99 percent of beryllium,

chromium, and nickel from MWC exhaust.

In general, little or no mercury control has been observed at MWC's with particulate matter controls alone (i.e., no acid gas controls).

Control of acid gases (SO_2 and HCl) can be achieved by injection of dry or slurried alkali sorbents (e.g., lime) into the flue gas.

Available acid gas control technologies include addition of dry sorbents into the flue gas duct or into the combustor, and spray drying. Acid gas controls are typically followed by an ESP or a FF. Two levels of acid gas control were considered in developing regulatory alternatives. These are dry sorbent injection (DSI)/PM control (ESP or FF) systems that provide an intermediate level of control, and spray dryer (SD)/FF systems that provide greater control. These two levels are discussed below.

Dry sorbent injection technologies have been developed primarily to control acid gas emissions. However, when DSI is combined with flue gas cooling to 150°C (300°F) or below an ESP or FF, control of MWC organics (dioxins/furans), MWC metals, and MWC acid gas emissions is achieved. If new plants apply DSI technology, it is expected that DSI/FF systems rather than DSI/ESP systems will be more commonly used, since the emission control performance of DSI/FF systems is generally better than that of DSI/ESP systems, and the costs of DSI/FF's are similar to, and in some cases lower than, the costs of DSI/ESP systems. Two primary subsets of DSI technologies exist, duct sorbent injection and furnace sorbent injection.

In duct sorbent injection, powdered sorbent is pneumatically injected into either a separate reaction vessel or a section of the flue gas duct located downstream of the combustor economizer or quench tower. The sorbent reacts with acid gases to form alkali salts. By lowering the acid content of the flue gas, downstream equipment can be operated at reduced temperatures while minimizing the potential for acid corrosion of equipment. Reaction products, fly ash, and unreacted sorbent are collected with the ESP or FF. Available sorbents include hydrated lime ($\text{Ca}(\text{OH})_2$), soda ash (NaOH), and sodium bicarbonate (NaHCO_3).

Furnace sorbent injection involves the injection of powdered alkali sorbents into the furnace section of a combustor. This can be accomplished by addition of sorbent to the overfire air, injection through separate ports, or mixing with the waste prior to feeding to the

combustor. As with duct sorbent injection, reaction products, fly ash, and unreacted sorbent are collected using an ESP or FF. Furnace sorbent injection is not expected to be widely used for new MWC's, and is mainly a retrofit option for existing MWC's that may have limited space for a duct injection system.

Dry sorbent injection/fabric filter or DSI/ESP systems can achieve either a 50 percent reduction in SO_2 emissions or an outlet SO_2 concentration of 30 ppmv at 7 percent O_2 (24-hour average basis). Either an 80 percent reduction in HCl emissions or an outlet concentration of 25 ppmv is also achievable by DSI/FF or DSI/ESP systems on new MWC's (based on duct sorbent injection). Furnace sorbent injection systems may achieve a lower percent HCl removal relative to SO_2 removal.

All types of new MWC's (except RDF's) with DSI/FF or DSI/ESP systems can meet a dioxin/furan emission limit of 75 ng/Nm^3 (30 gr/billion dscf) (at 7 percent O_2). New RDF's with DSI/FF or DSI/ESP systems can meet a dioxin/furan emission limit of 250 ng/Nm^3 (100 gr/billion dscf) (at 7 percent O_2).

A PM emission limit of 34 mg/dscm (0.015 gr/dscf) is achievable for new MWC's equipped with DSI/ESP or DSI/FF. Dry sorbent injection/ESP or FF systems achieve 97 percent or greater removal of arsenic, cadmium, and lead, and 99 percent removal of beryllium, chromium, and nickel. In addition, DSI/ESP systems typically achieve about 30 percent removal of mercury and DSI/FF systems typically achieve a higher percent removal of mercury. However, the data on mercury emissions and control levels are highly variable among MWC's.

Lime spray drying followed by a FF is a higher performance technology than current DSI/ESP or DSI/FF technology and was initially developed to control acid gas emissions. However, the system also controls emissions of MWC organics (dioxins/furans) and MWC metals. In the spray drying process, atomized lime slurry is injected into a SD vessel; the water in the slurry evaporates to cool the flue gas and the lime reacts with acid gases to form salts that can be removed by the FF. The key design and operating parameters that significantly affect SD performance are SD outlet temperature and lime-to-acid gas stoichiometric ratio. The SD outlet temperature is controlled by the amount of water in the slurry. More effective acid gas removal occurs at lower temperatures, but the temperature must be kept high enough to ensure that the slurry and reaction products are adequately dried prior to collection in

the FF. Spray dryer systems generally operate at temperatures of 150°C (300°F) or less. For MWC flue gas containing significant amounts of chlorine, a minimum SD outlet temperature of around 115°C (240°F) is required to control agglomeration of PM and sorbent by calcium chloride.

Spray dryer/FF systems on new MWC's can achieve either an 85 percent reduction in SO_2 emissions or an outlet SO_2 concentration of 30 ppmv at 7 percent O_2 (24-hour average basis). Either a 95 percent reduction in HCl emissions or an outlet HCl concentration of 25 ppmv is also achievable by SD/FF systems on new MWC's.

Spray dryer/FF systems also achieve outlet dioxin/furan concentrations in the range of 5 ng/Nm^3 (2 gr/billion dscf) to about 30 ng/Nm^3 (12 gr/billion dscf) (at 7 percent O_2). The SD/FF systems are the most effective add-on control systems for dioxins/furans, and achieve 99 percent control and low outlet emission levels, however, the exact performance level has not been specified in the proposed standards. Measured emission levels vary among MWC's, and additional test data from new MWC's with SD/FF controls are currently being collected and analyzed. The exact dioxin/furan emission level achievable by SD/FF controls will be determined prior to promulgation, and a single emission level will be included in the promulgated standards. Specific comments are solicited on what the final emission limit should be.

A PM emission limit of 34 mg/dscm (0.015 gr/dscf) is achievable by all MWC's equipped with SD/FF systems. At this PM emission level, SD/FF systems achieve 99 percent removal of all metals except mercury.

The observed removal efficiencies for mercury vary widely among MWC's with SD/FF controls showed over 70 percent mercury removal rates and outlet concentrations below 200 micrograms (μg)/dscm (85 gr/million dscf). On the other hand, compliance test data from three other MWC's with SD/FF systems indicated little or no mercury control. One of these three MWC's, however, was retested later and results indicated over 75 percent control. It has been postulated that mercury emissions may be related to nitrogen oxide (NO_x) control, and that use of ammonia injection for NO_x control may reduce mercury control in some cases. However, another possibility is that the adsorption and removal of mercury may be dependent on carbon in the fly ash. Review of data from tests of MWC's with and without NO_x control tend to

show that combustors with very good combustion and very low concentrations of organics and PM in the flue gas upstream of the SD/FF filter achieve lower mercury removal. This may be because there is little carbon in the fly ash onto which mercury can adsorb for subsequent removal by the FF. Other explanations for the observed variation in mercury control are also possible. A joint EPA/industry task force is being established to investigate mercury emissions and controls. Their finding will be considered in development of the final standards.

Spray dryer/ESP systems have been used on a few MWC's. Available data indicate that these systems may achieve less removal of MWC acid gas, MWC organic, and mercury emissions than SD/FF systems. This issue will continue to be investigated, following proposal, and comments on the performance of SD/ESP systems are requested.

A third MWC control method includes MSW materials separation, which is the separation of certain components from the waste stream prior to combustion in an MWC. This technique is less commonly used than GCP or add-on air

pollution control. Additional reductions in MWC emissions, including mercury emissions, may be achieved with application of materials separation as discussed in Section V.

Regulatory Alternatives for MWC Emissions: Five regulatory alternatives were considered in selecting MWC emissions standards for proposal. A baseline alternative is also presented which represents the level of emissions control expected in the absence of the proposed NSPS. For all new MWC's, the baseline control level would include GCP and, except for MWC's with capacities below 45 Mg/day (50 tons/day), PM control of 115 or 180 mg/dscm (0.050 or 0.080 gr/dscf) as required by Subpart Db or E, respectively.

The five regulatory alternatives considered in developing standards for MWC's represent varying levels of control for MWC organics (dioxins/furans), MWC metals (as indicated by PM), and MWC acid gases (including HCl and SO₂). These regulatory alternatives also subdivide MWC plants into two size categories. It is reasonable to categorize MWC's into large and small plants because: (1) large plants

have greater emissions potential and account for over 90 percent of planned capacity and (2) control cost increases associated with the various control technologies are noticeably greater on the bases of percent of MWC capital cost and dollars per ton of MSW combusted for small plants. Therefore, some of the regulatory alternatives require less stringent control of small plants. The proposed standards would define small MWC plants as those with aggregate capacities below 225 Mg/day (250 tons/day). The EPA requests comment on whether another size category cutoff might be more appropriate.

Table 2 presents the five regulatory alternatives in terms of control technologies that serve as the basis for selecting the alternative. Table 3 presents these five regulatory alternatives in terms of the emission limits for dioxins/furans, PM, and acid gases that could be specified in a regulation, and Table 4 presents GCP operating standards. (See Sections V and VI for discussion of materials separation and NO_x regulatory alternatives, respectively).

TABLE 2.—TECHNOLOGICAL BASIS FOR REGULATORY ALTERNATIVES FOR MWC EMISSIONS FROM NEW MWC UNITS

Regulatory alternative	Control requirements by total MWC plant capacity Mg MSW/day (tons MSW/day)	
	Small plants <225 Mg/day (<250 tons/day)	Large plants >225 Mg/day (>250 tons/day)
I.....	GCP.....	GCP
IIA.....	PM control to 0.080.....	PM control to 0.015
IIIB.....	GCP.....	GCP
IIIB.....	PM control to 0.080.....	MWC acid gas by DSI
IIIB.....	GCP.....	PM control to 0.015
IIIB.....	MWC acid gas by DSI.....	GCP
IIIB.....	PM control to 0.015.....	MWC acid gas by DSI
III.....	GCP.....	PM control to 0.015
III.....	PM control to 0.080.....	GCP
III.....	GCP.....	MWC acid gas by SD/FF
IV.....	GCP.....	PM control to 0.015
IV.....	MWC acid gas by DSI.....	GCP
IV.....	PM control to 0.015.....	MWC acid gas by SD/FF
IV.....		PM control to 0.015

TABLE 3.—POTENTIAL MWC EMISSION LIMITS ASSOCIATED WITH 111(B) REGULATORY ALTERNATIVES

Regulatory alternative	Control levels by plant capacity	
	Small plants <225 Mg/day (<250 tons/day)	Large plants <225 Mg/day (<250 tons/day)
I.....	Dioxins/furans.....	300 ng/Nm ³ (1,000 ng/Nm ³)
I.....	PM.....	0.015 gr/dscf
I.....	HCl.....	no limit
I.....	SO ₂	no limit
I.....	GCP/Operating Standards.....	See Table 4
IIA.....	Dioxins/furans.....	300 ng/Nm ³ (1,000 ng/Nm ³)
IIA.....	PM.....	0.080 gr/dscf
IIA.....	HCl.....	no limit
IIA.....	SO ₂	no limit
IIA.....	GCP/Operating Standards.....	See Table 4
IIIB.....	Dioxins/furans.....	75 ng/Nm ³ (250 ng/Nm ³)
IIIB.....	PM.....	0.015 gr/dscf
IIIB.....	HCl.....	80 percent or 25 ppmv
IIIB.....	SO ₂	50 percent or 30 ppmv
IIIB.....	GCP/Operating Standards.....	See Table 4
III.....	Dioxins/furans.....	300 ng/Nm ³ (1,000 ng/Nm ³)
III.....		5 to 30 ng/Nm ³

TABLE 3.—POTENTIAL MWC EMISSION LIMITS ASSOCIATED WITH 111(B) REGULATORY ALTERNATIVES—Continued

Regulatory alternative		Control levels by plant capacity	
		Small plants <225 Mg/day (<250 tons/day)	Large plants <225 Mg/day (<250 tons/day)
IV	PM	0.080 gr/dscf	0.015 gr/dscf
	HCl	no limit	95 percent or 25 ppmv
	SO ₂	no limit	85 percent or 30 ppmv
	GCP/Operating Standards	See Table 4	See Table 4
	Dioxins/furans	75 ng/Nm ³ (250 ng/Nm ³)	5 to 30 ng/Nm ³
	PM	0.015 gr/dscf	0.015 gr/dscf
	HCl	80 percent or 25 ppmv	95 percent or 25 ppmv
	SO ₂	50 percent or 30 ppmv	85 percent or 30 ppmv
	GCP/Operating Standards	See Table 4	See Table 4

* Emission levels in () are for RDF MWC's.

TABLE 4.—EMISSION AND OPERATING PARAMETER LIMITS FOR GCP

Pollutant or parameter	Limit
Maximum load level	100 percent of demonstrated capacity
Maximum temperature at PM control device inlet	230°C (450°F)
CO Emissions:	
Modular MWC's	50 ppmv
Mass burn waterwall	100 ppmv
Mass burn refractory	100 ppmv
Fluidized bed combustor	100 ppmv
Mass burn rotary waterwall	150 ppmv
RDF spreader stoker	150 ppmv
Coal/RDF cofired	150 ppmv
Operator certification and training	All operators certified by ASME. Training manual and training for other personnel.

Regulatory Alternative I, the least stringent nonbaseline regulatory alternative shown in Table 2, would require emission reductions to levels achievable with GCP for plants of all sizes and various levels of PM control depending on plant size. For small plants (i.e., those MWC's located at plants with aggregate capacities equal to or less than 225 Mg/day [250 tons/day] of MSW), PM emission limits correspond to a level of 180 mg/dscm (0.080 gr/dscf). This is the same level currently required under subpart E for MWC's larger than 45 Mg/day (50 tons/day) capacity. However, under Regulatory Alternative I this same level would be applied to all MWC's located at small MWC plants with no lower size cutoff. Municipal waste combustors located at large MWC plants (i.e., those with aggregate capacities of greater than 225 Mg/day [250 tons/day] of MSW) would be required to achieve PM control to 34 mg/dscm (0.015 gr/dscf). No add-on acid gas controls would be required for any plant under this alternative. Based on use of GCP and PM control, emissions of dioxins/furans would be reduced to 1,000 ng/Nm³ (400 gr/billion dscf) at RDF MWC's and to 300 ng/Nm³

(120 gr/billion dscf) at all other types of MWC's. The PM controls required would achieve significant reductions in metals emissions (with the exception of mercury), and the higher costs of acid gas controls would not be incurred.

Regulatory Alternative IIA is more stringent than Regulatory Alternative I. Municipal waste combustors at large MWC plants would be required to reduce emissions to levels achievable with moderate acid gas add-on control (based on DSI/FF or DSI/ESP control). Control requirements and emission levels for MWC's located at small MWC plants would be the same as Regulatory Alternative I. For MWC's at large MWC plants, which have greater annual emissions potential, MWC acid gas control based on DSI/FF or DSI/ESP (50 percent SO₂ and 80 percent HCl control) and PM control to 34 mg/dscm (0.015 gr/dscf) would be required, reducing dioxin/furan emissions to 250 ng/Nm³ (100 gr/billion dscf) for RDF MWC's at large plants and to 75 ng/Nm³ (30 gr/billion dscf) for all other types of MWC's at large plants. Under Regulatory Alternative IIA, small plants would be allowed a lower cost and less efficient dioxins/furans control (GCP), which would avoid the relatively greater cost impacts of add-on acid gas controls for smaller MWC plants.

Regulatory Alternative IIB would require emission reductions to levels achievable with GCP, acid gas control based on DSI/FF or DSI/ESP, and PM control to 34 mg/dscm (0.015 gr/dscf) for all MWC plants (both large and small). This alternative would result in reduction of dioxins/furans emissions as well as reductions in acid gas emissions for all MWC plants, but has higher costs for small plants than Regulatory Alternatives I or IIA.

Regulatory Alternative III is similar to regulatory Alternative IIA by not requiring acid gas control at small MWC plants; but it would require emission levels based on GCP, acid gas control based on SD/FF (85 percent SO₂ and 95 percent HCl control), and PM control to

34 mg/dscm (0.015 gr/dscf) on MWC's at large MWC plants, reducing dioxin/furan emissions to a level in the range of 5 to 30 ng/Nm³ (2 to 12 gr/billion dscf) for large plants. The exact emission limit within this range that is achievable with SD/FF control will be determined prior to promulgation. Compared to Regulatory Alternative IIB, this alternative would require more stringent control of large MWC plants, but less stringent control of small MWC plants. Municipal waste combustors at small plants would be required to achieve emission levels based on use of GCP plus PM control to 180 mg/dscm (0.080 gr/dscf), but no acid gas controls.

Regulatory Alternative IV is the most stringent alternative analyzed. Like Regulatory Alternative III, Regulatory Alternative IV is based on MWC emission levels achievable with GCP, acid gas control based on SD/FF (85 percent SO₂ and 95 percent HCl control), and PM control to 34 mg/dscm (0.015 gr/dscf) for large MWC plants. For small plants, MWC emission levels corresponding to GCP, acid gas control based on DSI/FF or DSI/ESP (50 percent SO₂ and 80 percent HCl control), and PM control to 34 mg/dscm (0.015 gr/dscf) would be required. The requirements for small MWC plants are, therefore, more stringent than under Regulatory Alternative III. Regulatory Alternative IV has the lowest emissions but the highest cost of any of the regulatory alternatives presented.

Model Plant Impacts of the Regulatory Alternatives for MWC Emissions: Table 3 shows the air pollutant emission concentration or percent reduction limits for small and large MWC plants under each regulatory alternative and Table 4 shows GCP operating requirements. In Tables 5 and 6, the ranges of individual small and large model plant emissions and emission reductions of PM, dioxins/furans, and MWC acid gases (SO₂ and HCl) under the baseline and the regulatory alternatives are presented.

These emission impacts were derived by applying the different control technologies to small and large MWC

plants as specified by the regulatory alternatives. They are expressed as ranges to represent the different types

and sizes of MWC's within the small and large MWC plant categories.

TABLE 5.—RANGE OF MWC EMISSIONS FOR INDIVIDUAL SMALL MWC PLANTS UNDER THE BASELINE AND REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	Annual emissions			
	MWC metals PM Mg/year	MWC organics dioxin/furan g/year	MWC acid gases	
			SO ₂ Mg/year	HCl Mg/year
Baseline	9-57	12-62	23-170	31-240
I	7-57	12-62	23-170	31-240
IIA	7-57	12-62	23-170	31-240
IIB	1-7	3-16	14-100	6-48
III	7-57	12-62	23-170	31-240
IV	1-7	3-16	14-100	6-48

TABLE 6.—RANGE OF MWC EMISSIONS FOR INDIVIDUAL LARGE MWC PLANTS UNDER THE BASELINE AND REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	Annual emissions			
	MWC metals PM Mg/Year	MWC organics dioxin/furan g/year	MWC acid gases	
			SO ₂ Mg/year	HCl Mg/year
Baseline	33-360	29-640	364-2,400	497-2,400
I	15-73	29-690	364-2,400	497-2,400
IIA	15-73	22-160	57-1,400	99-480
IIB	15-73	22-160	57-1,400	99-480
III	15-73	3.2-16	36-240	15-73
IV	15-73	3.2-16	36-240	15-73

As shown in Table 5, PM emissions from small MWC plants (i.e., those with capacities equal to or less than 225 Mg/day [250 tons/day]) range from 9 to 57 Mg/year (10 to 63 tons/year) at baseline. Regulatory Alternatives I, IIA, and III require small plants to achieve PM levels of 180 mg/dscm (0.080 gr/dscf). Under Regulatory Alternatives I, IIA, and III only those model plants with MWC capacities less than 45 Mg/day (50 tons/day) would be required to add additional PM controls since MWC's greater than or equal to 45 Mg/day (50 tons/day) would already be controlled to a PM level of 180 mg/dscm (0.080 gr/dscf) at baseline under subpart E. The additional PM controls required under Regulatory Alternatives I, IIA, and III for MWC's with capacities less than 45 Mg/day (50 tons/day) would result in PM reductions of about 22 percent for those very small MWC's. Under Regulatory Alternatives IIB and IV, which require all MWC plants to achieve PM emission levels of 34 mg/dscm (0.015 gr/dscf), all small plants would apply traditional controls, resulting in PM emissions ranging from 1 to 7 Mg/year (1 to 8 tons/year). These emissions represent about 90 percent reduction in PM emissions as compared to baseline emissions.

At baseline, dioxin/furan emissions at small MWC plants would range from 12

to 62 g/year (0.026 to 0.14 lbs/year). No reductions would be achieved for small plants under Regulatory Alternatives I, IIA, or III since GCP are employed at baseline and there are no MWC acid gas control requirements for small plants under these alternatives. Under Regulatory Alternatives IIB and IV, acid gas controls would be required for small plants, thereby reducing dioxin/furan emissions by 75 percent and resulting in emissions ranging from 3 to 16 g/year (0.007 to 0.035 lbs/year).

At baseline, SO₂ emissions at small MWC plants would range from 23 to 170 Mg/year (25 to 190 tons/year), and HCl emissions would range from 31 to 240 Mg/year (34 to 260 tons/year). Since MWC acid gas controls are not required for small plants under Regulatory Alternatives I, IIA, or III, no reductions in MWC acid gases would be achieved under these alternatives. Municipal waste combustor acid gas controls based on DSI technology would be required for small MWC plants under Regulatory Alternatives IIB and IV. Municipal waste combustor acid gas emissions (SO₂ and HCl combined) would be reduced by almost 70 percent. Under Regulatory Alternatives IIB and IV, SO₂ emissions at small MWC plants range from 14 to 100 Mg/year (15 to 120

tons/year), and HCl emissions range from 6 to 48 Mg/year (7 to 53 tons/year).

Table 6 shows the ranges of emission impacts for large MWC plants (i.e., those with aggregate capacities of greater than 225 Mg/day [250 tons/day]) under the baseline and the regulatory alternatives. At baseline, PM emissions at large MWC plants would range from 33 to 360 Mg/year (36 to 400 tons/year). This is an emission level equivalent to about 115 mg/dscm (0.050 gr/dscf) for most plants as required by subpart Db. Large MWC plants would be required to meet PM emission levels of 34 mg/dscm (0.015 gr/dscf) under each of the regulatory alternatives. Under Regulatory Alternatives I through IV, PM emissions would range from 15 to 73 Mg/year (16 to 80 tons/year) resulting in PM emission reductions of about 80 percent relative to baseline emissions for most large MWC plants.

Baseline emissions of dioxins/furans at large MWC plants range from 29 to 640 g/year (0.06 to 0.7 lbs/year). No dioxin/furan reductions would be achieved under Regulatory Alternative I since GCP are employed at baseline, and no acid gas controls would be required under Regulatory Alternative I. Emissions of dioxins/furans would be reduced by about 75 percent at typical large MWC plants under Regulatory

Alternatives IIA and IIB due to the requirement of acid gas controls based on DSI. Under Regulatory Alternatives IIA and IIB, dioxin/furan emissions at large MWC plants would range from 22 to 160 g/year (0.05 to 0.36 lbs/year). Under Regulatory Alternatives III and IV, which require acid gas controls based on SD/FF technology, dioxin/furan emissions would be reduced by 99 percent relative to baseline emissions for typical MWC plants. Under the two most stringent alternatives, dioxin/furan emissions at large MWC plants would range from 3.2 to 16 g/year (0.007 to 0.036 lbs/year).

At baseline, emissions of SO₂ at large MWC plants range from 360 to 2,400 Mg/year (400 to 2,700 tons/year), and emissions of HCl range from 500 to 2,400

Mg/year (550 to 2,700 tons/year). No reductions in MWC acid gases would be achieved under Regulatory Alternative I since MWC acid gas controls are not required. Under Regulatory Alternatives IIA and IB, MWC acid gas controls based on DSI technology would be required for all large MWC plants. Under Regulatory Alternatives IIA and IIB, MWC acid gas emissions would be reduced by almost 70 percent relative to baseline. Sulfur dioxide emissions would range from 57 to 1,400 Mg/year (63 to 1,600 tons/year) and HCl emissions would range from 99 to 480 Mg/year (110 to 530 tons/year). Under the most stringent alternatives, Regulatory Alternatives III and IV, large MWC plants would be required to control MWC acid gas emissions to

levels based on SD/FF technology. Under Regulatory Alternatives III and IV, SO₂ emissions would be reduced by about 90 percent relative to baseline emissions, resulting in emissions ranging from 36 to 240 Mg/year (40 to 270 tons/year). This 90 percent long-term average emission reduction level is consistent with a minimum 24-hour average percent reduction of 85 percent. Emissions of HCl would be reduced 97 percent relative to baseline emissions and would range from 15 to 73 Mg/year (16 to 80 tons/year).

Tables 7 and 8 present the ranges of increased (over baseline) capital costs, total annualized costs, and total annualized cost per Mg MSW combusted for small and large MWC plants under each regulatory alternative.

TABLE 7.—RANGES OF INDIVIDUAL SMALL PLANT CONTROL COSTS UNDER THE REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory Alternative	Capital cost (\$1,000)	Total annualized cost (\$1,000/yr)	Total annualized cost per Mg MSW combusted (\$/Mg)
Baseline	1,300–20,000	600–5,300	40–>100
I	<1–530	<1–140	<1–13
IIA	<1–530	<1–140	<1–13
IIB	1,100–1,400	510–680	9–47
III	<1–530	<1–140	<1–13
IV	1,100–1,400	510–680	9–47

TABLE 8.—RANGES OF INDIVIDUAL LARGE PLANT CONTROL COSTS UNDER THE REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	Capital cost (\$1,000)	Total annualized cost (\$1,000/yr)	Total annualized cost per Mg MSW combusted (\$/Mg)
Baseline	40,000–150,000	13,000–37,000	40–>100
I	<1–1,300	<1–280	<1
IIA	450–7,800	1,100–4,600	4–12
IIB	450–7,800	1,100–4,600	4–12
III	8,600–20,000	2,600–6,600	8–17
IV	8,600–20,000	2,600–6,600	8–17

Table 7 shows that the base cost of the MWC's and control equipment included in the baseline would range from about \$1.3 million to \$20 million. Under Regulatory Alternatives I, IIA, and III, capital costs at individual small MWC plants could increase by less than \$1,000 to \$530,000; and additional annualized cost per unit of MSW combusted would range from a negligible increase to an increase of \$13/Mg MSW (\$12/ton MSW). Under these three alternatives, most small MWC plants would incur little or no additional costs; only those with capacities less than 45 Mg/day (50 tons/day) would incur increased control costs (relative to baseline) since these MWC's must add PM controls to meet the PM level of 180 mg/dscm (0.080 gr/dscf). For these very small plants, the capital costs of control represent an increase of about

42 percent relative to baseline combustor costs. For perspective on the increase in the annual cost of MSW combusted, typical costs for MSW combustion including collection, transportation, combustion, and MWC ash disposal currently range from about \$40/Mg (\$36/ton) to over \$100/Mg (\$90/ton) of MSW collected.

Under Regulatory Alternatives IIB and IV, small plants must add acid gas controls (based on DSI), and control costs increase. For Regulatory Alternatives IIB and IV, increased capital costs (relative to baseline) at small MWC's range from \$1.1 million to \$1.4 million or a percent increase of about 6 to 110 percent. Increased annualized costs of control range from \$510,000 to \$680,000, and the increased cost per unit of waste combusted ranges

from \$9 to \$47/Mg MSW (\$8 to \$43/ton MSW).

Table 8 shows the increased costs of control (relative to baseline) for individual large MWC plants under the regulatory alternatives. Under Regulatory Alternative I, all large plants must meet a PM level of 34 mg/dscm (0.015 gr/dscf). Most plants would not achieve this level under the regulatory baseline and would have to add additional PM controls to meet this level. Under Regulatory Alternative I, increased capital costs (relative to baseline) range from negligible amounts to \$1.3 million, or an increase in capital cost of up to 2 percent. Increased annualized costs (relative to baseline) range from negligible to \$280,000, and increased cost per unit of MSW combusted is less than \$1/Mg MSW (\$1/ton MSW). Under Regulatory

Alternatives IIA and IIB, large MWC plants must add MWC acid gas controls based on DSI technology. For Regulatory Alternatives IIA and IIB, increased capital costs (relative to baseline) range from \$450,000 to \$7.8 million, increased annualized costs range from \$1.1 million to \$4.6 million, and increased cost per unit of MSW combusted ranges from \$4 to \$12/Mg MSW (\$4 to \$11/ton MSW). Control costs increase under Regulatory Alternatives III and IV for large MWC

plants since MWC acid gas controls based on SD/FF technology must be added. Under Regulatory Alternatives III and IV, increased capital costs (relative to baseline) for large MWC plants range from \$8.6 million to \$19.7 million, which is an increase of 11 to 22 percent. Increased annualized costs range from \$2.6 million to \$6.6 million, and increased cost per unit of waste combusted ranges from \$8 to \$17/Mg MSW (\$7 to \$15/ton MSW).

National Impacts of the Regulatory Alternatives for MWC Emissions: The national annual emissions (and the emission reductions relative to baseline emissions) of PM, dioxins/furans, and MWC acid gases (SO₂ and HCl) under the baseline and each of the regulatory alternatives are shown in Table 9. Acid gas (SO₂ and HCl) emissions account for the great majority of the total emission reduction for all alternatives except Regulatory Alternative I.

TABLE 9.—NATIONAL MWC EMISSIONS UNDER BASELINE AND THE REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	Annual Emissions			
	MWC metals PM Mg/year	MWC Organics Dioxin/Furan kg/year	MWC Acid Gases	
			SO ₂ Mg/year	HCl Mg/year
Baseline	7,500	15	42,000	49,000
I	2,300	15	42,000	49,000
IIA	2,300	5	24,000	13,000
IIB	1,600	4	23,000	10,000
III	2,300	1	6,800	4,900
IV	1,600	<1	5,600	2,100

As shown in Table 9, PM emissions at baseline are 7,500 Mg/year (8,300 tons/year). Reduction of 70 percent above baseline would be achieved under Regulatory Alternatives I, IIA, and III. Slightly greater PM emissions reductions (79 percent relative to the baseline) would be achieved under Regulatory Alternatives IIB and IV due to the addition of PM controls on small MWC plants. Under Regulatory Alternatives IIB and IV, national PM emissions would be reduced to 1,600 Mg/year (1,800 tons/year). All alternatives would achieve a high degree of metals control.

Baseline emissions of dioxins/furans are 15 kg/year (33 lbs/year). There would be no reductions of dioxins/furans under Regulatory Alternative I,

but increasing reductions of dioxins/furans would be achieved under Regulatory Alternatives IIA, IIB, III, and IV since MWC acid gas control requirements become more stringent with each successive alternative. Under Regulatory Alternative IV, national emissions of dioxins/furans for MWC plants would be 0.6 kg/year (1.4 lbs/year). This level represents a 96-percent reduction in dioxin/furan emissions relative to baseline emissions.

At baseline, national emissions of SO₂ and HCl are 42,000 Mg/year (46,000 tons/year), and emissions of HCl are 49,000 Mg/year (54,000 tons/year). No reductions in these MWC acid gases would be achieved under Regulatory Alternative I. Increasing reductions of

MWC acid gases would be achieved under Regulatory Alternatives IIA, IIB, III, and IV as acid gas control requirements become more stringent. Under Regulatory Alternative IV, SO₂ emissions would be reduced by 87 percent resulting in national SO₂ emissions of 5,600 Mg/year (6,200 tons/year). Emissions of HCl would be reduced by 96 percent resulting in national HCl emissions of 2,100 Mg/year (2,300 tons/year).

Table 10 shows the national total increased (over baseline) capital costs, total increased annualized cost, and overall increased annualized cost per unit of MSW combusted for each of the regulatory alternatives.

TABLE 10.—NATIONAL CONTROL COSTS UNDER THE REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	Total capital cost (\$10 ⁶)	Total annualized cost (\$10 ⁶ /yr)	Annualized cost per Mg MSW (\$/Mg)
I	28	6	0.44
IIA	170	96	6.90
IIB	200	110	7.60
III	470	140	10.40
IV	500	160	10.90

National increased costs given in this table are for new MWC plants that would be operating or under construction by the end of the fifth year of implementation of the NSPS. As shown in Table 10, national total increased capital cost (relative to

baseline) ranges from \$28 million under Regulatory Alternative I to \$500 million under Regulatory Alternative IV. Total increased annualized cost ranges from \$6 million/year under Regulatory Alternative I to \$170 million/year under Regulatory Alternative IV. Increased

annualized cost per unit of waste combusted ranges from \$0.45/Mg (\$0.40/ton) for Regulatory Alternative I to \$11/Mg (\$10/ton) for Regulatory Alternative IV. For perspective, tipping fees currently charged at MWC's for MSW received average about \$44/Mg (\$40/

ton) of MSW and range from less than \$10/Mg to over \$100/Mg. Disposal costs incurred by the general public (including MSW collection, transportation, combustion, and MWC ash disposal), however, typically range from \$40/Mg to over \$100/Mg.

Economic Impacts of Regulatory Alternatives for MWC Emissions: Other studies have considered impacts on households to be "severe" if annual compliance cost per household exceeds \$220 or if annual compliance cost per household exceeds 1 percent of median household income. Using these criteria, household impacts are not considered severe under any of the regulatory alternatives for MWC emissions. Under the most stringent alternative (Regulatory Alternative IV), over 90 percent of the household impacts were less than \$30 per year and less than 0.2 percent of median household income, although some of the household impacts in the smallest communities examined were near \$100 per year.

Economic impacts on government units (counties and municipalities) have been considered "severe" in other studies if both the following two conditions are met: (1) The sum of total current debt service and additional debt service associated with compliance to the regulation as a percent of total general revenues exceeds 15 percent, and (2) the sum of the average sewerage and sanitation cost per household and the average control cost per household as a percent of median household income exceeds 1 percent. Government

units have also been considered severely impacted if a third condition is met: (3) control costs as a percent of total general expenditures exceed 1 percent. Using these criteria, the analyses indicate that the increased costs imposed by any of the regulatory alternatives for control of MWC emissions do not result in severe economic impacts on the government units planning to construct new MWC facilities.

The EPA believes that these studies, which are also used by EPA in assessing impacts of the proposed RCRA Subtitle D standards, provide a reasonable measure for evaluating impacts, since the studies are specifically designed to gauge impacts on households and governmental entities.

It is difficult to estimate the impact of cost increases on tipping fees at MWC's. This is because these fees, which are payments to MWC's for permission to dump MSW at the MWC, are set by local governments and may include subsidies. However, if it is assumed that all increased costs are passed through to the tipping fee, then tipping fees for the various size plants would increase by the amounts shown in Tables 7 and 8. Under the least stringent alternative (Regulatory Alternative I), tipping fees for the various MWC plants would increase by less than \$1 to \$13/Mg (less than \$1 to \$12/ton) of MSW combusted, and under the most stringent alternative (Regulatory Alternative IV), tipping fees would increase by \$8 to \$47/Mg (\$7 to \$43/ton) of MSW combusted. For

comparison, the average MWC tipping fee is currently about \$44/Mg (\$40/ton) MSW, although tipping fees charged at individual sites can range from negligible to over \$100/Mg MSW.

Preliminary results of an analysis of how an NSPS might affect the selection of technology by the industry, including whether some municipalities might scrap their planned incinerators in favor of landfilling, indicate that the regulatory alternative selected would have very little effect on the mix of MWC types that will be used over the next 5 years. However, even taking into account potential costs of controlling air emissions from landfills and meeting RCRA Subtitle D regulations, there may be a slight reduction in the growth rate for MWC's, with the MSW that would have been combusted being landfilled instead.

Partial Benefits Analysis: Table 11 presents partial total and incremental national benefits, benefit to cost ratios, and an implicit valuation of acid gas control under each of the five regulatory alternatives. The benefits shown are for emission reductions of PM. Benefits are calculated based primarily on reduced mortality, morbidity, and property deterioration. The benefits of PM emissions reduction are valued at \$16,000/Mg (\$14,000/ton). This figure is significantly greater than previous Agency estimates for PM. The EPA requests comment on the methodology and data used to derive these estimates.

TABLE 11.—PARTIAL NATIONAL BENEFITS OF THE REGULATORY ALTERNATIVES FOR MWC EMISSIONS

Regulatory alternative	Partial benefits for pm control (\$10 ⁶ /yr)		Annualized Costs (\$10 ⁶ /yr)		Overall B/C ratio	Incremental B/C ratio	Value of MWC acid gas control resulting in incremental B/C=1.0 (\$/Mg)
	Total	Incremental	Total	Incremental			
I.....	88	88	6	6	14.6	14.6	0
IIA.....	88	0	96	90	0.9	(NA)	1,600
IIB.....	88	11	114	16	0.9	0.6	1,500
III.....	88	0	145	31	0.6	(NA)	1,900
IV.....	89	11	163	18	0.6	0.6	1,800

Under Regulatory Alternative I, the incremental benefit to cost ratio is greater than 1, and incremental net benefits are realized. Under the remaining alternatives, acid gas control is applied. The MWC acid gas (SO₂ and HCl) emissions would have to be valued at \$1,900/Mg (\$1,700/ton) or more for the incremental benefit/cost ratio for Regulatory Alternatives IIA through IV to be greater than 1. Although previous NSPS have required control of SO₂ at

costs of as much as \$3,300/Mg (\$3,000/ton) of SO₂ emission reduction, generally average cost-effectiveness levels have been less than \$1,000/ton.

While EPA benefit estimates for SO₂ emissions reduction are generally about \$1,250/ton, HCl emission reduction benefits have not been quantified. Emissions reductions of HCl are greater than for other pollutants, and modeling indicates that some plants have ambient HCl concentrations that exceed the HCl

welfare effects level of 3 µg/dscm (1.3 gr/million dscf) (annual average) at baseline. Regulatory Alternatives IIA, IIB, III, and IV would reduce HCl emissions by about 75 to 95 percent, and would reduce ambient concentrations to below the welfare effects level for all model plants. Despite these potential benefits, no monetary evaluation of HCl emissions is possible at this time. A dose-response function relating health and welfare effects to reduced

emissions of HCl is not currently available. Thus, potential benefits associated with these alternatives in terms of reduced HCl emissions are not considered by the benefits analysis.

There are also other benefits not included in the analysis. Health effects benefits for dioxins/furans control were not included. Health effects benefits from reduced exposure to metals were not included, but have been at least partially counted via the PM benefits analysis. In addition, benefits from reduced landfilling and reduced emissions of acid gases contributing to acid rain have not been included in the analysis. The benefits analysis does not take into consideration the reductions of MWC organics, MWC metals, MWC acid gases, and NO_x resulting from materials separation and NO_x control requirements nor the nonair quality environmental benefits achieved by materials separation; however, these benefits are discussed in Sections V and VI.

The EPA requests comment on all parts of the benefits analysis. The EPA is especially interested in comments regarding the benefit estimates for PM and SO_2 , the appropriate benefits for HCl and dioxin/furan control, and other benefit(s) not included in this analysis.

Regulatory Alternative Selected: Regulatory Alternative IV was selected for control of MWC emissions from new MWC's based on the determination that: (1) the combination of GCP and SD/FF control is the best demonstrated technology for MWC emissions for large plants (> 225 Mg/day (250 tons/day) capacity) and (2) GCP and DSI/FF or

DSI/ESP is the best demonstrated technology for small plants (< 225 Mg/day (< 250 tons/day) MSW capacity). While the emission limits are based on performance of these technologies, the owner or operator of an MWC could use other technologies to comply with the emission standards.

The control technologies identified as best demonstrated technology have been demonstrated at several MWC plants. Manufacturers are currently designing MWC's to include GCP. There are over 15 MWC plants in the U.S. (which contain over 30 individual MWC's) with SD/FF that are either operating, under construction, or have been permitted. Since issuance of the PSD and NSR permitting operational guidance in June 1987, permits for new large MWC's have required SD/FF control. The best demonstrated technology for smaller MWC's DSI/FF and DSI/ESP systems, have been demonstrated in tests at five MWC plants in the U.S. Similar systems have also been used in Europe and Japan. As described previously, no adverse cost or economic impacts were identified for Regulatory Alternative IV. Impacts on households and government units were determined not to be severe, and the regulations are not expected to significantly affect the proportion of MSW that is combusted versus landfilled.

Although additional reductions of MWC emissions 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 would be unreasonably high. Application of acid gas controls based on SD/FF to small MWC's would achieve an additional 2 percent reduction in national acid gas emissions relative to use of acid gas controls based on DSI/ESP or DSI/FF. Disposal costs (compared to baseline) for small MWC plants would increase as much as about \$80/Mg (\$72/ton) of MSW compared to less than \$12/Mg (\$11/ton) of MSW for most large MWC's. The cost effectiveness of best acid gas control would be about \$4,600/Mg (\$4,200/ton) of acid gas removed for a typical small MWC plant, compared to a cost effectiveness of about \$1,500/Mg (\$1,400/ton) of acid gas removed for a typical large MWC. Considering the cost impacts and relatively small potential emissions reduction, EPA believes that control of acid gas emissions from small MWC's with best acid gas control would be unreasonable, and that application of good acid gas control technology is the best demonstrated technology.

The EPA further believes that the 225 Mg/day (250 tons/day) capacity is a reasonable dividing line between small and large MWC's. As can be seen in Figure 1, at capacities below this point annual disposal costs begin to increase sharply. In addition, the existing NSPS (Subpart Db) for this industry and operating guidelines for NSR permits use the same dividing line for large and small facilities, so that the action proposed today is consistent with the existing regulatory framework.

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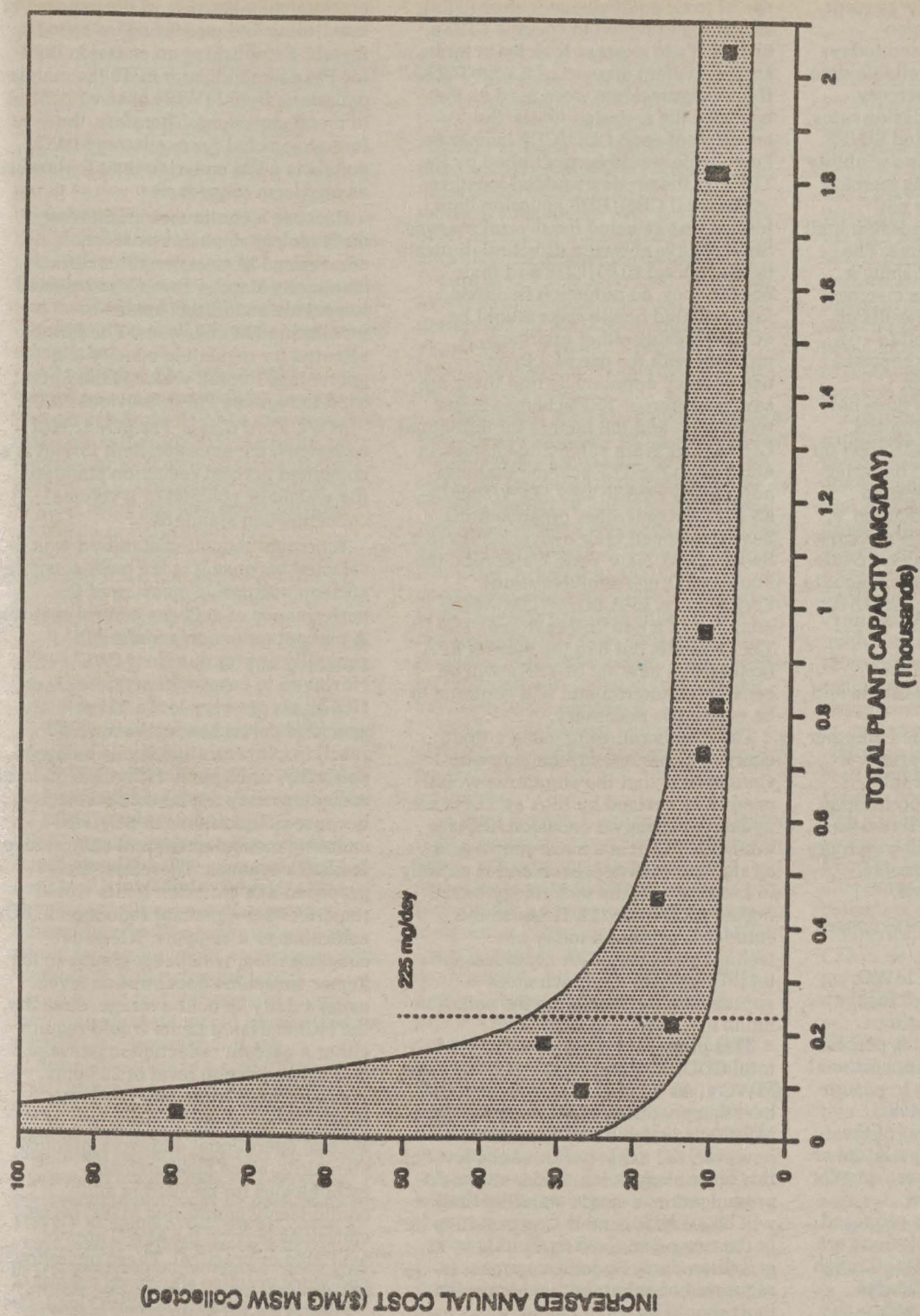


Figure 1. Increased annual cost of SD/FF control v. MNC plant size for new MNC's.

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A mercury emission limit or percent reduction requirement was also considered, but is not proposed today. As previously explained, available data indicate wide variation in mercury collection efficiency and emission rates, even for MWC's with GCP and SD/FF controls. The reasons for this variability and the mechanisms affecting mercury emissions and collection are not understood. Therefore, an emission limit cannot be specified at this time. The EPA and industry are establishing a joint task force to investigate mercury emissions and control. The results of this investigation will be used to determine what action is appropriate with regard to mercury issues.

Although today's proposal does not include a mercury emission limit, it does, however, include a prohibition on the combustion of household batteries as part of the materials separation provisions. As discussed in Section V, household batteries (including mercury oxide, alkaline manganese, silver oxide, and zinc carbon batteries) are thought to be a major source of mercury in MSW, and removal of these batteries would reduce mercury emissions.

At promulgation, based on the information that becomes available and the results of the task force investigation, it will be decided whether a mercury standard is appropriate. It will also be decided whether it is appropriate to maintain the prohibition on combustion of household batteries (possibly in combination with a mercury emission standard) or whether the prohibition should be removed.

G. Selection of Format for the Proposed Standards

For purposes of regulating MWC emissions, the format selected for the proposed standards would be a combination of emission limits, percent reduction requirements, and operational and work practice standards to ensure control of each subclass of MWC emissions. The specific format of the standard proposed for each pollutant or operational practice and the reasons for selection are discussed below.

MWC Organics: Under the proposed standards, MWC organic emissions are measured in units of total tetra- through octa-chlorinated dibenzo-p-dioxins (CDD) and chlorinated dibenzofurans (CDF). To arrive at the total CDD/CDF emission level, the emissions of each tetra- through octa-CDD and CDF homologue are added together. This calculation results in total CDD/CDF emissions in units of ng/Nm³.

Another way of reporting CDD/CDF emissions is in units of toxic equivalents. This approach involves the

use of toxic equivalence factors (TEF), which are assigned to specific CDD's and CDF's to express toxicity in terms of an "equivalent amount of 2,3,7,8-TCDD." If toxic equivalents were used as the basis for the emission limits, the emission of each CDD/CDF isomer or homologue would be multiplied by its TEF and the products added together.

The total CDD/CDF emission limit format was selected for several reasons. Studies have shown a direct relationship between total CDD/CDF and toxic equivalency, so reduction in dioxin/furan-related health risks would be achieved using either approach. A problem with the use of a toxic equivalency approach is that there are several different TEF schemes in use worldwide and the factors for individual CDD's/CDF's are subject to change. In addition to the TEF scheme that was adopted by EPA in 1987 (EPA/5625/3-87-012), several other organizations have developed their own schemes (e.g., Switzerland, New York, California, the Food and Drug Administration). Furthermore, EPA is considering the adoption of a new International TEF (I-TEF) scheme, but like the current EPA factors, this new set of TEF's will be considered interim and will continue to be revised as necessary.

The disadvantage to using a toxic equivalent scheme for the emission standards is that the standards would need to be revised by EPA as TEF's are updated. Setting an emission limit for total CDD/CDF is a more simple and straightforward approach and is entirely in keeping with the technology-based regime of Section 111. Because the standards proposed today are technology-based, EPA considers the total CDD/CDF approach more appropriate for specifying the emission limits in these standards.

This proposal identifies a range of total CDD/CDF emission limits for large MWC's. As explained previously, the best demonstrated technology for large MWC's includes a SD/FF system; however, the exact performance level of this technology is still under study. At promulgation, a single emission limit will be adopted, and it is expected to be in the range of 5 to 30 ng/Nm³ (2 to 12 gr/billion dscf). Specific comment is requested on what the final emission limit should be.

MWC Metals: Establishing emission limits for each of the numerous metals emitted from MWC's was considered but was not adopted as a reasonable format for regulating MWC metals because the types and amounts of metals emitted from an MWC are highly variable and site-specific. In addition, this method might not be practical

economically because of the expense of monitoring and measuring for specific metals. Establishing an emission limit for PM as an indicator of all the metals emissions from MWC's ensures control of metal emissions. Therefore, the format selected for regulating MWC metals is a PM emission limit (expressed as mg/dscm or gr/dscf).

Because a continuous monitoring methodology does not exist for measuring PM emission rates directly, an opacity standard was also selected to provide an indirect means of monitoring PM emissions. The format selected for regulating opacity is a percentage format, which is the format used to regulate PM in previous NSPS.

MWC Acid Gases: For SO₂ or HCl emissions, the emission limit format is a combined percent reduction standard (by weight or volume) or a volume concentration standard.

A percent reduction standard was selected because it is the most accurate and representative measure of the performance of acid gas control systems. A percent reduction standard is generally appropriate for MWC's. However, in cases where inlet SO₂ or HCl levels are very low and the specified percent reductions would result in concentration levels below 30 ppmv SO₂ or 25 ppmv HCl, these percent reductions may not be achievable because of limitations in SO₂/HCl emission measurement and control loop feedback systems. Therefore, the proposed SO₂ emission limits would require either a percent reduction in SO₂ emissions or a 30 ppmv SO₂ outlet concentration, whichever results in the higher emission concentration level, using a daily 24-hour average. Similarly, the HCl emission limits would require either a percent reduction in emissions or a concentration level of 25 ppmv.

Good Combustion Practices: The format selected for GCP is a mix of several operational and work practice standards, since measurement technologies for measuring and continuously monitoring MWC organic emissions leaving the MWC are not available or practical. These operational and work practice standards consist of limits on CO emissions, MWC load, flue gas temperature at the inlet to the PM control device, and operator certification and training requirements. Each of these items can be related to the level of MWC organic emissions in the gases leaving the MWC, and compliance with the requirements associated with each of these items can easily be monitored.

H. Performance Test Methods and Monitoring Requirements

The performance testing and emission monitoring requirements included in the proposed regulation would apply to all MWC's subject to the proposed standards for MWC organics, MWC metals, and MWC acid gases, except as noted below. As stated in the NSPS General Provisions (40 CFR 60.8) initial compliance tests must, unless otherwise specified in the regulation, consist of three separate runs using the applicable test method, and the arithmetic mean of the three runs shall be used to determine compliance.

All emission limits for MWC emissions are corrected to 7 percent O_2 (dry basis). Some MWC's may have CO_2 monitors rather than O_2 monitors, or may prefer to correct to an equivalent percent CO_2 . Owners or operators may request an equivalent emission limit corrected to CO_2 rather than O_2 . Generally, a correction to 7 percent O_2 is equivalent to a correction to 11 or 12 percent CO_2 . However, there is not an exact conversion that is universally applicable because of variations in the carbon content of MSW. The owner or operator making the request must establish the relationship between O_2 and CO_2 for an individual MWC during compliance testing.

MWC Organic Emissions: An initial performance test would be required for all MWC's subject to the proposed MWC organic emission (i.e., dioxin/furan) standard. The emission limit pertains to total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans. The performance test would be conducted in accordance with Method 23. Following the initial performance test, subsequent annual performance tests would be required for all MWC's. However, if three performance tests in a row (three annual tests) indicate compliance with the MWC organic emissions limit, MWC's located at small MWC plants may skip the annual performance test for the next 2 years. At a minimum, an MWC performance test must be performed for MWC's at small MWC plants every 3 years. Those MWC's located at large MWC plants must be tested every year.

MWC Metals: An initial performance test would be required for all MWC's subject to the proposed MWC metals (i.e., PM) emission limit. The performance test would be conducted in accordance with Method 5. Method 1 would be used for determining the number and location of sampling points. Method 3 would be used for flue gas analysis. All performance tests would consist of a minimum of three runs using

Method 5 conducted under representative operating conditions (i.e., at full load). The average PM emission rate of the three runs would be used to determine compliance. Following the initial performance test, a subsequent annual performance test would be required for all MWC's. However, if three performance tests in a row indicate compliance with the PM limit, MWC's located at small MWC plants may skip the annual performance test for the next 2 years. At a minimum, an MWC performance test must be performed for MWC's at small MWC plants every 3 years. Those MWC's located at large MWC plants must be tested every year.

Compliance with the opacity standard would be determined using Method 9 for visible emissions. As stated in section 60.11, for the purpose of determining initial compliance, the minimum total time observations would be 3 hours (30 6-minute averages). A transmissometer would be installed to monitor continuously the opacity and to alert MWC owners and operators of any occurrences of excess emissions requiring corrective action. Data would be recorded and reduced to 6-minute averages using Method 9.

MWC Acid Gases: The proposed regulation for MWC acid gases includes provisions for both SO_2 and HCl emissions.

Sulfur Dioxide. Continuous monitoring of SO_2 emissions would be performed by MWC's to demonstrate continuous compliance with the standards. Installation and operation of continuous emission monitoring systems (CEMS) at the inlet and outlet of the SO_2 control device would be required for MWC's demonstrating compliance with the percent reduction or outlet concentration standard. Those MWC's that elect to demonstrate continuous compliance solely with the 30 ppmv SO_2 emission limit may install and operate CEMS only at the outlet of the control device. Data collected by the CEMS would be used to determine compliance with the SO_2 percent reduction requirements and emission limits.

Compliance with the SO_2 percent reduction requirements and emission limits would be determined using a 24-hour daily (block) average based on CEMS. All valid data in each 24-hour period must be used to determine compliance. The first daily 24-hour average percent reduction and emission values calculated after initial startup would serve as the initial performance test required under § 60.8.

Hydrogen chloride. An initial performance test would be required for

all MWC's subject to the proposed HCl emission standard. Compliance with the HCl percent reduction requirements and emission limits would be conducted in accordance with Method 26. Following the initial performance test, subsequent annual performance tests would be required for all MWC's. However, if three performance tests (three annual tests) in a row indicate compliance with the HCl limit, MWC's located at small MWC plants may skip the annual performance test for the next 2 years. At a minimum, an MWC performance test must be performed for MWC's at small MWC plants every 3 years. Those MWC's located at large MWC plants must be tested every year.

Requirements for CEMS: When establishing standards that require the use of CEMS for determining compliance, it is necessary to consider that monitors undergo periods of downtime and, thus, are not available 100 percent of the time. Well-maintained CEMS have little downtime. However, minimum data requirements would be established that limit the amount of data permitted to be lost before use of an alternative monitoring method is required. These minimum data requirements would provide the owner or operator with time to maintain and calibrate the CEMS, correct minor malfunctions, and, if necessary, arrange for an alternative monitoring method. The minimum data requirements also would prevent the possibility of an affected facility operating for unreasonably long periods without collecting emission data.

Overall, the standards would require CEMS data to be collected during 75 percent of the MWC operating hours per day for 75 percent of the operating days per month. These requirements apply to all CEMS needed to determine compliance with the standards (SO_2 , opacity, CO, O_2 , or CO_2). Collection of this amount of data has been determined to be achievable using a well-operated and properly maintained CEMS. However, this requirement is separate from the compliance test requirements where all valid data would be used to determine compliance even where more than 75 percent of the data is available (e.g., no valid data may be deleted from the calculations to determine compliance). From an enforcement point of view, not operating CEMS is equivalent to not conducting a required performance test.

In order to ensure that CEMS provide accurate data, daily calibration drift checks and quarterly accuracy audits would be required to be performed on each CEMS. These quality assurance

checks would be performed in accordance with 40 CFR part 60, Appendix F, Procedure 1, "Quality Assurance Requirements for Gas Continuous Emission Monitoring Systems Used for Compliance Determination." Appendix F, Procedure 1 applies to all CEMS used for continuous compliance determination under 40 CFR part 60, Subpart Ea.

Combustor Operating Practice Standards: As part of GCP, to minimize reduction in MWC organic emissions from the combustor, CO emission limits and specifications for MWC load level and flue gas temperature at the PM control device inlet are proposed.

Carbon Monoxide. The CO emission limits are specified for each common type of MWC. Each MWC would be required to install a CEMS at the combustor outlet to monitor continuous compliance with the applicable CO emission limit. Compliance would be determined using 4-hour block averages. All valid data would be used to compute each average.

Operating Load. An operating load limit of 100 percent of full demonstrated load is specified for all MWC's. The full load level would be defined during the initial compliance test, but could be raised if an MWC owner or operator can demonstrate during a compliance or subsequent performance test that all other applicable standards for MWC organics, MWC metals, MWC acid gases, and the CO emission limit can be met while operating at a higher load.

All MWC's subject to load limits would be required to install monitors to continuously measure steam flow, and compliance would be determined by calculating 1-hour averages. This requirement would not apply to MWC's that did not generate steam.

Temperature. Temperature would be continuously monitored at the inlet to the PM control device to determine compliance with the 230 °C (450 °F) temperature limit. A block 4-hour average would be used to determine compliance.

Operator Certification and Training. Operator certification and site-specific training of MWC operating personnel would also be required by the proposed standards. There are no test methods pertinent to operator training, but all MWC plants would have to keep records of certification and training as described in Section IV.I.

1. Reporting and Recordkeeping Requirements

The proposed standards would require owners and operators of all affected facilities to submit notifications of construction or reconstruction, date of

anticipated startup, date of actual startup, and anticipated date of demonstration of the CEMS (if applicable), as required under the General Provisions (40 CFR 60.7).

After the initial performance test has been completed, the proposed regulation would require the submission of quarterly compliance reports for SO₂ and the combustor operating parameters that are continuously measured (CO, load level, and flue gas temperature) for all MWC's. Quarterly excess emission reports for opacity must also be submitted for all MWC's. The proposed standards would also require that annual compliance reports for dioxins/furans, PM, and HCl be submitted for all MWC's. However, if three performance tests in a row indicate compliance with the dioxin/furan, PM, or HCl emission limits, MWC's located at small MWC plants would be exempt from the next two annual tests of that pollutant, and simplified annual reports may be submitted for the next 2 years. Full annual reports must be submitted every year for MWC's located at large MWC plants. These reports would include, as applicable for the period covered by the report: (1) Any period where emissions exceeded the standards, or where values of monitored operating parameters were in violation of the standards; (2) results of all annual performance tests; (3) all 24-hour average SO₂ 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; and (4) identification of any periods for which data were excluded from these calculations. In addition, each quarterly report would include the results of the daily CEMS drift tests and quarterly accuracy determinations as required under Appendix F, Procedure 1.

If the minimum amount of data were not obtained for a 24-hour average period, reasons for failure to obtain sufficient data (e.g., CEMS malfunction), and a description of corrective action taken would also be included, along with all information needed to calculate the 24-hour average values according to Method 19. Also, if the minimum amount of data (75 percent of the operating hours per day and 75 percent of operating days per month) were not obtained, this must be included in the quarterly reports and reasons specified.

The proposed regulation would also require that certain types of records be maintained. Records to be maintained include all data outputs of the CEMS; all quarterly and annual reports submitted under this rulemaking; and all records required under Appendix F, Procedure 1.

The required operating manual must be updated annually and be readily accessible. Records of operator certification and training of MWC operating personnel are required. All required records would be maintained for 2 years following the date of such records, after which they could be discarded.

The reporting and recordkeeping requirements in the proposed regulation are necessary to inform enforcement personnel of the compliance status of new MWC's that initiate operation. In addition, they would provide the data and information necessary to ensure continued compliance of these MWC's with the proposed regulation. At the same time, these requirements would not impose an unreasonable burden on MWC owners or operators.

J. Malfunction Provision

The MWC standards being proposed today apply at all times, except during periods of startup, shutdown, and malfunction. A special provision is being added to these proposed standards which places a limit of 3 hours per occurrence on the time that a plant can claim an exemption from standards due to startup, shutdown, or malfunction. This provision does not change the definitions of startup, shutdown, and malfunction in the General Provisions nor does it change any of the requirements in the General Provisions. Malfunction is defined as "any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner. Failures that are 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" (40 CFR 60.2). As specified in 40 CFR 60.7, records must be maintained of the occurrence and duration of any startup, shutdown, or malfunction, any emission levels occurring during such times, the nature and cause of any malfunction, and corrective action taken or preventive measures adopted. These records must support a determination, on a case-by-case basis, that a period of emissions above the allowable limit should be considered as startup, shutdown, or malfunction. The compliance provisions in 40 CFR 60.8 also specify that "at all times, including periods of startup, shutdown, and malfunction," owners or operators shall operate and maintain the affected facility and air pollution controls to minimize emissions.

Most MWC's are base-loaded and operate either continuously or on a Monday through Friday schedule, so the time spent to start-up and shut-down these MWC's is minimal, with only one startup and shutdown period required per week. Furthermore, the proposed MWC standards apply only while MSW is being combusted. Since most MWC's fire fuel oil or natural gas during warm-up and then switch to firing MSW once the MWC is at operating temperature, the proposed MWC standards usually would not apply during MWC warm-up, but would become applicable as soon as MSW is introduced into the MWC. Similarly, shutdowns would not take more than 3 hours while MSW is being fired.

Due to the configuration of SD/FF systems, maintenance can be performed on line to repair most malfunctions. In some cases, such as replacing a rotary atomizer or spray nozzle, the load must be reduced while maintenance is being

performed, but the time spent operating at reduced load would be short. If any malfunction would take more than 3 hours to repair, the MWC could shut down to complete the repair.

V. Rationale for Standards for Materials Separation

A. Background

Currently, the U.S. generates about 150 million Mg (160 million tons) of municipal solid waste (MSW) per year, and under current waste management practices, this amount is expected to grow steadily through the year 2000. Much of the waste stream is attributed to disposable products that are used for a short time and thrown away. These products include "convenience" packaging suited to a fast-paced lifestyle, such as fast food containers and microwavable food packaging. Figure 2 shows the percent contribution (on a mass basis) of each of the major

classes of waste materials to the total MSW stream. As shown in Figure 2, more than 40 percent of the solid waste stream consists of paper and paper products discarded in houses, offices, and factories. Yard waste makes up another 18 percent of the total. The other major components are metals (8.7 percent), glass (8.2 percent), plastics (6.5 percent), and food wastes (7.9 percent). At present, about 80 percent of the total MSW is landfilled, about 10 percent is combusted in municipal waste combustors (MWC's), and about 10 percent is recycled. The "Agenda for Action" indicates that by 1992, 25 percent of the MSW stream should be diverted by source reduction and recycling. Also, the percent landfilled should decrease from 80 percent to 55 percent, and the amount of MSW combusted in MWC's should increase from 10 percent to 20 percent.

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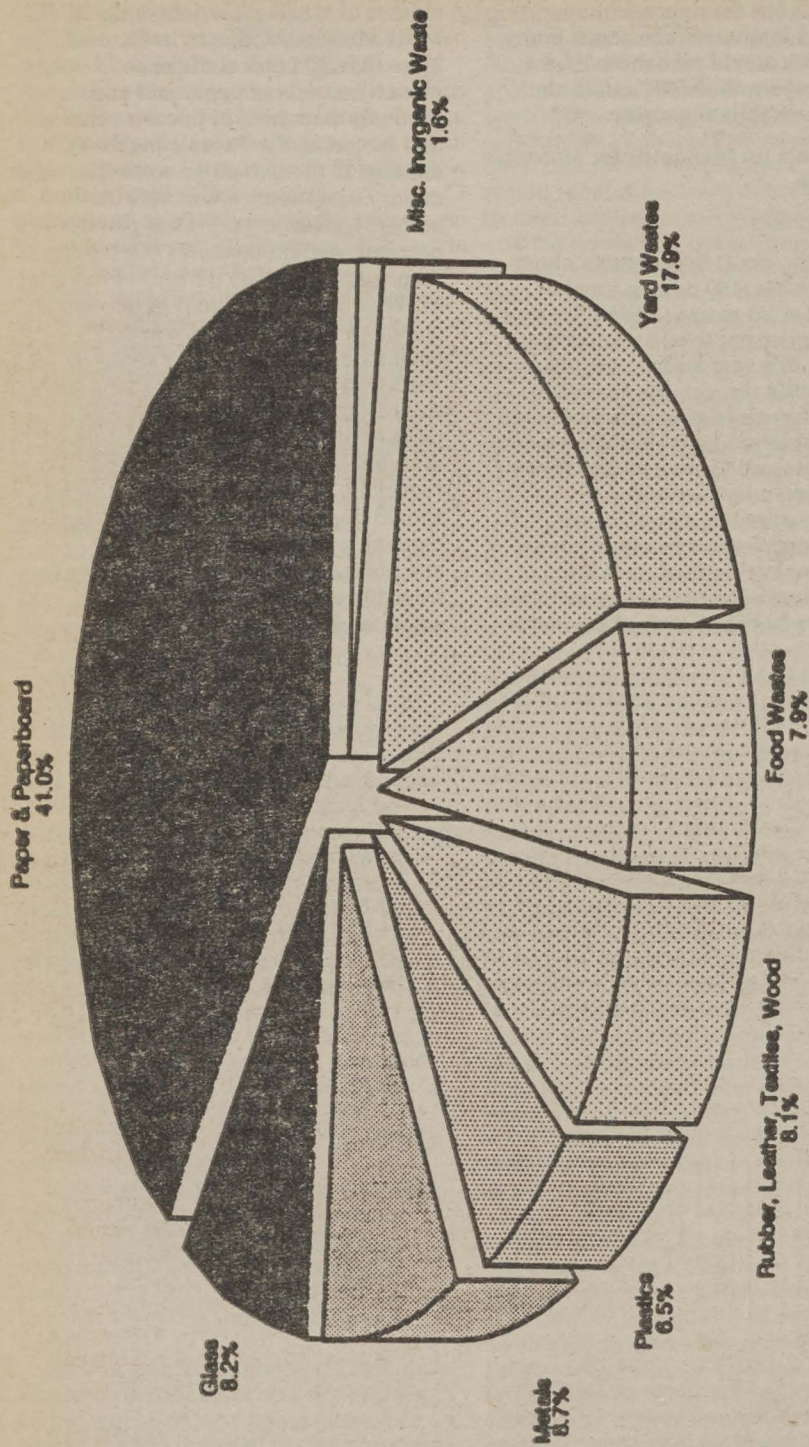


Figure 2. Gross discharges, by weight, of MSW materials.

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B. Selection of Regulatory Alternative for Materials Separation Selection of Alternative

As discussed in this proposal, materials separation refers to the separation and removal of certain components from MSW prior to combustion in an MWC. In many cases, materials separated from MSW can be recycled, thereby preserving natural resources. Recycling these materials would also reduce the amount of waste combusted or landfilled, and could provide funds (\$) to offset separation costs. By reducing the amount of waste to be combusted, overall MWC emissions can be reduced. In addition, emissions of specific constituents of MWC emissions can be reduced by separating certain classes of waste materials. Materials separation technology is applicable to all types of MWC technology including, but not limited to, mass burn MWC's, refuse derived fuel-fired (RDF) MWC's, and modular MWC's.

The proposed standards would require all new MWC's to process the MSW prior to combustion to achieve an overall 25 percent or greater reduction (annual average, by weight) of MSW through separation for recovery of one or more of the following materials: paper and paper-board combined; ferrous metals (including white goods); nonferrous metals; glass; plastics; household batteries; and yard wastes. In calculating the 25 percent weight reduction, a maximum credit of up to 10 percent would be allowed for yard waste separation. The remainder of the 25 percent would come from the other listed materials.

The proposed standards would prohibit the combustion of large lead-acid vehicle batteries (wet lead-acid batteries weighing more than 5 kg [11 lbs] that are manufactured for use in motor vehicles, vessels, or aircraft, or any other use). A program to remove household batteries prior to combustion would also be required.

Separation of the materials discussed above may be achieved by mechanical or manual separation at the MWC site, by off-site mechanical or manual separation, or by community source reduction or materials separation (recycling) programs, or a combination thereof.

Processing of MSW to remove these types of materials prior to combustion yields benefits in terms of reduced emissions potential for all components of MWC emissions including: MWC organics, MWC metals (including mercury), and MWC acid gases. Emissions of nitrogen oxide (NO_x)

would also be reduced. In addition, MWC steam generation efficiency and MWC operating availability have been shown to increase at MWC's that are practicing materials separation.

In addition to the expected emissions reduction achieved by materials separation, additional nonair quality environmental benefits are also expected, including improved MWC ash quality and reductions in pollution and energy requirements associated with extracting and processing virgin materials. The reduced emissions also will contribute to a reduction in global warming.

The Agency considers recovery of materials from the MSW stream to be consistent with the goals and principles of its policy on pollution prevention (54 FR 3845). In particular, the proposed materials separation provisions would encourage pollution prevention through source reduction and recycling. Community separation would be used in many areas to comply with these provisions, resulting in increased public participation in the pollution prevention program. Furthermore, involving the public in materials separation and recycling programs may result in increased environmental awareness and development of an environmental ethic by the general public. This would have long-range environmental benefits.

The overall 25 percent weight reduction level is consistent with the goals of the "Agenda for Action," the Agency's overall strategy for dealing with MSW. The "Agenda for Action" goals include reducing the Nation's total MSW stream by 25 percent through source reduction and recycling by 1992. The overall percent reduction format included in the proposal will allow MWC's flexibility to tailor their program to fit regional markets for recovered materials and seasonal variations in MSW composition.

Selection of Implementation Schedule: The materials separation requirements would be effective (i.e., a materials separation program must be initiated or implemented) upon start up for MWC's that commence construction after promulgation of this new source performance standard (NSPS). However, owners or operators of MWC's that commence construction after today's date, but on or before the date of promulgation would be required to implement the materials separation program by December 31, 1992, or at start up, whichever is later. This is the same date by which existing MWC's must initiate materials separation programs under the guidelines proposed in today's Federal Register notice. It is also consistent with the Agenda for

Action, which called for achieving 25 percent MSW reduction by 1992.

Those MWC's that commence construction between proposal and promulgation of the NSPS, however, are in a situation similar to existing MWC's with regard to materials separation. They will already be under construction or operating when the NSPS is finalized, and additional time will be required to design and implement a separation program. This may include design, purchase, and installation of on-site separation equipment, and/or negotiations and development of contracts with third parties to implement off-site or community separation programs. Putting a program in place to achieve the separation requirements is a relatively complex process which could take up to 2 years, and the December 31, 1992, date provides this amount of time to design and implement a materials separation program. The EPA believes that this is a reasonable means of subcategorizing these sources pursuant to the authority of Section 111(b)(2).

The initial demonstration of compliance with the materials separation provisions is required at the end of the second calendar year following implementation of materials separation. This would be the end of the second full calendar year after start-up for MWC's that commence construction after promulgation. For MWC's that commence construction between proposal and promulgation, compliance demonstration would be required at the end of calendar year 1994 or two calendar years after start-up of the MWC, whichever is later.

Whenever any new process or control system is first started, it frequently does not perform exactly as expected. Despite careful design and planning, time is often needed to observe actual performance and make the necessary adjustments or refinements to the system to achieve design performance. This is true whether the new system is a piece of air pollution control equipment or a community materials separation program.

The General Provisions in 40 CFR 60.8 recognize this fact by allowing up to 180 days after start up of an affected facility for conducting the initial performance test. This allows time to test and adjust the air pollution control hardware and its operation before conducting a stack test that is submitted to the enforcement agency to demonstrate compliance.

Similarly, time is likely to be needed to see how well a specific materials separation program is performing and make changes in the program, if

necessary, to comply with the materials separation provisions. Whether the program involves on-site or off-site mechanical or manual processing facilities, curbside materials separation programs, or some combination, it is difficult to predict in advance the actual percent separation that a specific program will initially achieve. The owners or operators of MWC's may very well need time to measure the actual performance of the new systems or programs, determine how they can best be operated, and make various changes or adjustments to the program before initial compliance is demonstrated.

Because of seasonal variation in the content of MSW, the requirement for 25 percent weight reduction of MSW through separation is based on an annual average. Therefore, MWC owners and operators will not know the percent separation their new system or program is achieving on an annual average basis until the end of the first year of operation; a few months of operation may not be descriptive of annual performance. In order to allow them time to adjust or fine-tune their materials separation program to ensure compliance, the materials separation provisions provide the time necessary to determine the performance of the materials separation program on an annual average basis before compliance must be demonstrated. Compliance demonstration is, therefore, required at the end of the second calendar year of operation of the materials separation program.

C. Rationale for Materials Separation Requirements

Recovery of each of the targeted categories of materials from the waste stream prior to combustion is expected to yield specific air emissions, energy, and collateral benefits. The Agency expects that separation of the specified categories of material would yield the following benefits:

Paper and paperboard: Reductions in MWC metal emissions would result from reduced combustion of paper impregnated with lead-based inks and mercury-based fungicides. Also reduction in carbon dioxide (CO_2) concentration would result due to the decreased mass of paper combusted and the increased amount of forest due to reduced timber demand for virgin paper production. A reduction in MWC acid gas emissions would result from reduced combustion of paper impregnated with chlorine-based bleach (i.e., hydrogen chloride [HCl]) and reduced combustion of sulfur-laden paperboard (i.e., sulfur dioxide [SO_2]). Paper separation can result in an overall downsizing of

MWC's enabled by a reduction in the total combustible fraction of MSW. Indirect reduction in CO_2 and other emissions would also result from reduced energy consumption resulting from increased paper and paperboard recycling and the corresponding reduction in virgin paper and paperboard production.

Ferrous metals: Reductions in MWC metal emissions (especially lead) would result from separation of ferrous materials assembled with lead solder or plated with lead, zinc, or cadmium. Emissions from coke oven batteries would be reduced based on increased use of recycled steel, thereby reducing benzene-soluble organic emissions. Also indirect reduction in emissions associated with energy consumption would result from increased ferrous metal recycling and the corresponding reduction in virgin steel production.

Nonferrous metals: Since nonferrous metals (aluminum cans in particular) are readily recyclable, not only would MWC emissions be reduced through separation, but reductions in energy consumption would also result from increased aluminum recycling and the corresponding reduction in primary aluminum smelting. Also, reductions in the amount of litter along roadsides and in public places could result.

Glass: Reductions in MWC metal emissions (especially lead) would result from separating glass materials containing lead (such as television picture tubes). Also, indirect reductions in emissions associated with energy consumption would result from increased glass recycling and the reduction of virgin materials in glass production.

Plastics: Reductions in MWC metal emissions (especially cadmium and lead) would result from reduced combustion of plastics, which contain such metals as stabilizers and/or in pigments. Potential reductions in emissions of acid gases and chlorinated MWC organics could result from decreased combustion of polyvinyl chloride plastics. An overall reduction in MWC emissions would result from downsizing MWC's enabled by a reduction in the total combustible fraction of MSW. Also, a reduction in CO_2 emissions and energy consumption would result from increased plastics recycling and the corresponding reduction in virgin plastics production.

Household batteries: Reductions in mercury emissions and other MWC metal emissions (including cadmium and nickel) would result from separating household batteries prior to combustion. Add-on control systems typically

achieve a lower percent removal of mercury than other metals. As described in Section IV, mercury emission data are highly variable and the mechanisms of mercury emissions and control are not currently understood. A task force is being formed to investigate mercury emissions and controls. However, much of the mercury in MSW is contained in household batteries. Mercury oxide batteries are the type of battery with the highest mercury content, containing about 35 percent mercury, by weight. Common alkaline manganese batteries contain 7 percent mercury, and small silver oxide batteries contain about 1 percent mercury. The widely-used zinc carbon batteries may also contain small amounts of mercury. Therefore, in lieu of a mercury emission limit, it is proposed that a program be established to remove household batteries from MSW.

Although the Agency is proposing inclusion of a program to remove household batteries, it is recognized that very little information is available on the economic impacts or environmental benefits of such a program. The Agency solicits comments on whether the program should be required or not, what type of program should be required, what problems will be faced in implementing a program, and how effective a program would be in removing batteries and reducing mercury emissions. The Agency intends to include on the task force representatives from owners and operators of MWC's, State and local governments, and household battery manufacturers.

Lead-acid vehicle batteries: Removal of lead-acid vehicle batteries would result in a direct reduction in MWC metal emissions (especially lead). Also a reduction in MWC acid gas emissions (especially sulfuric acid), and reduction in MWC emissions associated with combustion of plastic lead-acid battery casings would be achieved. Indirect reductions in emissions will also result from the reduced demand for lead from primary lead smelters.

Yard waste: Reductions in NO_x emissions and increased combustion stability would result from a decrease in the nitrogen content and moisture of the MSW. Emissions of MWC organics would be reduced due to improved combustion stability since yard waste often has a high moisture content and exhibits inconsistent combustibility. Also, energy consumption would be reduced due to a decreased need for auxiliary fuel.

The overall 25 percent MSW reduction and vehicle battery and household battery removal can be

achieved by demonstrated technologies, including mechanical and/or manual methods or deposit/return programs for removal of each of the specified materials. The EPA's estimated costs of compliance assume that some manual separation at the MWC will be necessary.

Additional information supporting the above conclusions is contained in the docket.

The goal of the materials separation requirements is to encourage removal of multiple materials to achieve reductions in MWC emissions. The typical yard waste content of MSW is 18 percent (by weight), but some communities will have over 25 percent yard wastes. In calculating the 25 percent overall MSW reduction, a maximum credit of 10 percent would be given for yard waste separation to ensure that the goal of the materials separation requirements is met.

The EPA believes that materials separation, used in conjunction with good combustion practices, and add-on controls, will result in further reductions of emissions from MWC's. It is simply common sense, and the Agency's expectation, that reductions in the amount of pollution-generating materials combusted in an MWC will reduce the amount of pollutants in its air emissions. In addition, materials separation should improve the combustion efficiency of MWC's, and thus reduce MWC emissions, by removing noncombustibles like metals, glass, and water-saturated yard wastes from the feed stream to the unit. In fact, there are a number of studies (which are part of the record for this rulemaking) documenting significant reductions in MWC emissions as a result of application of materials separation technologies.

The Agency is, at this time, unable to reliably quantify the emission reductions attributable to materials separation when an MWC is equipped with highly efficient at-the-stack air pollution control devices. Not only are the limited existing test data insufficient to make this quantification, but other difficulties exist as well. First, the composition of waste received at MWC's varies depending on the types of waste generated in the service area and the season of the year. Therefore, the proportion of each separable material in the waste feed will vary among MWC's. Because of this variability, and economic factors, MWC's will choose different ways of accomplishing materials separation, and the percent reduction of specific materials will vary among MWC's. While MWC emissions as a whole will be reduced, it is difficult

to predict the specific reduction in each component of MWC emissions (e.g., MWC metals, MWC organics, and MWC acid gases). Further incremental reductions thus cannot be reliably measured. Second, because of the substantial removals achieved by air pollution control devices, the remaining pollution being measured is small, and it becomes increasingly difficult to measure and interpret reliably with available test methods. In some cases, normal variability in the amount of metals, organics, and acid gas precursors in the incoming feed could make it difficult to interpret emission reductions attributable to materials separation. That is, it will not be possible to determine which reduction is attributable to variable waste feed and which to materials separation.

The processing of MSW to remove specified types of materials prior to combustion will also produce benefits associated with reduced quantities of ash to be landfilled and reduced levels of toxic materials in the ash. The proposed requirement for an overall 25 percent MSW reduction and the prohibitions on the combustion of vehicle batteries and household batteries will yield an appreciable tonnage reduction in the quantities of MWC residues (both bottom ash and flyash) disposed of in landfills. It is expected that the 25 percent MSW reduction coupled with the prohibitions on batteries would result in an approximate reduction of 80 percent in ferrous and nonferrous metals, and glass. This would reduce the tonnage of ash requiring disposal by 30 percent. With respect to ash quality or toxicity, the entire range of air toxics in ash is of concern with regards to fugitive emissions associated with the handling, storage, and transportation of ash. The principal toxic components of ash with respect to groundwater contamination are lead and cadmium. The requirement for materials separation and related prohibitions will produce ashes characterized by substantially lower toxicity.

The Agency believes that the long-term viability of markets for recovered materials would be significantly enhanced by ensuring a stable supply of recovered materials. The Agency believes that a stable market supply would result from the proposed standards. Such stable supplies would tend to encourage long-term contracts with materials recovery firms and further the development of alternative end-uses. This same principle was recognized by the Congress in enacting the 1976 Resource Conservation and Recovery Act (RCRA) when it provided

that State solid waste management plans shall not preclude States of local governments from entering into long-term contracts for supplying solid waste to resource recovery facilities, operating such facilities, and securing long-term markets for recovered materials and energy [RCRA Section 4003(a)(5)]. See also H. Rep. No. 94-1491, 94th Cong. 2d Sess. 10 (1976) ("Resource recovery facilities cannot be built unless they are guaranteed a supply of discarded material"). The Agency is also aware that the economics of materials recovery is in many cases driven more by avoided landfill or MWC disposal cost than by potential revenues from sales of recovered materials.

D. Materials Separation Methods

Separation of materials from MSW is accomplished in two ways: household separation (including deposit/return programs) and centralized processing. Household separation is the separation of recyclable materials from the waste by the generator (i.e., household or business); it is presently the primary method of separation in the U.S. At the household level, separation is accomplished by placing waste items (e.g., glass, paper, aluminum, etc.) in segregated containers. These containers are either picked up at the curbside or taken to local recycling bins or buyback centers. Deposit/return systems are also used to encourage separation and recycling of beverage bottles and cans. The homeowner would return the items to the point of purchase. Household separation of yard waste can be accomplished either by backyard composting or by segregating it for separate curbside pick-up where it is transported to a community composting site. Separation of lead-acid vehicle batteries could be achieved by a deposit/return system where the batteries are returned to the battery recycler, battery retailer, service station, or other recycling center. The separation of household batteries could be achieved through a deposit/return system and/or a prohibition on household disposal of batteries with MSW and implementation of separate community collections for batteries. The success of community programs depends on many factors including the level of planning, community participation rate (which may vary depending on whether the program is voluntary or mandatory), and local market demand for separated materials.

An increasing amount of MSW separation is accomplished at centralized processing facilities which operate at MSW transfer stations,

landfills, or MWC's. At centralized processing facilities, recyclable items are removed from the waste stream by mechanical separation systems, manual handpicking, or a combination of both. A wide variety of automated processes may be used to separate the various components of MSW.

Ferrous metals are generally removed magnetically, except for white goods (appliances such as stoves, refrigerators, and air conditioners) which are visually identified and removed as waste is unloaded. Household batteries generally use ferrous metal (e.g., steel) casings and can be removed with the ferrous metal fraction. Nonferrous metals are separated by eddy current (electromagnetic) separation, electrostatic separation (which separates conductors such as metals and paper from nonconductors such as plastic and glass), or by a variety of wet and dry methods which separate metals according to density. Methods for glass removal include wet and dry density methods, pulverization/screening, and optical sorting (by automatic photocells). Mechanical systems currently processing MSW in the U.S. achieve about 80 to 90 percent ferrous metal recovery, 60 to 70 percent aluminum recovery, and 70 to 80 percent glass recovery. Some fractions of yard waste can be removed mechanically. For example, grass clippings and other heavy materials may be gravity separated after screening out larger items. However, the product is not pure, and may contain broken glass and other contaminants. Mechanical systems can separate some paper and plastics from the waste stream using air classification or electrostatic separation, but these systems normally do not separate the various types of paper and plastic into specific material types (e.g., paper grade or plastic resin type). In many cases, some manual sorting is performed along with mechanical separation to increase separation efficiency and to remove residual contaminants from the separated fractions.

Currently, there are no fully-automated mechanical systems for removing lead-acid vehicle batteries from MSW. At centralized processing facilities, a specialized metal detector, which selectively detects large lead objects, is available and can be used to identify and locate the batteries in the waste traveling on a conveyor belt, and then the battery can be manually removed.

E. Legal Authority to Issue Materials Separation Standards for MWC's

In this rule, the EPA's proposed determination of the "best technological

system of continuous emission reduction", which Section 111 standards of performance must reflect, includes determinations for the pre-combustion, combustion, and post-combustion stages of MWC operation. Best demonstrated technology for pre-combustion would include a requirement that new and existing MWC's remove noncombustible, toxic, recyclable, and compostable materials from their feed materials prior to combustion (referred to as "materials separation" in this preamble). The EPA believes that it possesses legal authority to require precombustion materials separation pursuant to Section 111. Such requirements are necessary to address the "nonair quality health and environmental impacts and energy requirements" that Congress requires the Agency to take into account in making a best demonstrated technology determination. Clean Air Act (CAA) section 111(a)(1)(C). The EPA construes this language as requiring it to consider not only the adverse impacts on other environmental media and energy use of Section 111 standards, but also that EPA may consider the nonair health and environmental benefits and energy benefits that can result. Consideration of nonair and energy impacts are an important part of determining what constitutes a "best" technology. (See H. Rep. No. 95-564, 95th Cong. 1st Sess. 128, 129 (Conf. Rep.); H. Rep. No. 95-294, 95th Cong. 1st Sess. 187.)

As noted above, EPA believes that there will be a reduction in MWC air emissions of toxic gases and other pollutants harmful to health as a result of materials separation. These reductions include not only criteria pollutants, but toxics such as lead, mercury, and cadmium. Moreover, as noted in detail in Section V.C. above, the Agency also expects the nonair health and environmental benefits from materials separation to be very great. Materials separation will improve MWC ash quality by removing noncombustibles from the unit's fuel stream, thus allowing better thermal destruction in the combustor and so keeping pollutants out of the combustion residues (ash). Materials separation should facilitate growth of markets for recycling by assuring adequate supplies of feed materials for recycling facilities. Recycling of separated materials will reduce the amount of waste ultimately disposed, saving critically scarce landfill capacity and reserving it for wastes for which land disposal is the best management alternative. Recycling of separated materials will also lessen the demand for raw materials, resulting in

overall conservation of resources, and other environmental benefits. For example, recycling of newsprint and other paper products reduces the demand for raw timber, which preserves existing forests, a consideration in combatting global warming. Reducing demand for raw materials can also require fewer imports of raw materials. See section 1002(c)(3) of RCRA where Congress found that "the recovery and conservation of such materials [separated from solid waste] can reduce the dependence of the United States on foreign resources and reduce the deficit in its balance of payments." Congress went on to find that "millions of tons of recoverable materials which could be used are needlessly buried each year," and that "methods are available to separate usable materials from solid waste." RCRA section 1002(c)(1)(2). The EPA further anticipates that there will be energy savings associated with increased utilization of recycling. For example, the recycling processes of secondary aluminum, lead, and glass are much less energy-intensive than the corresponding processes that use virgin raw materials. In short, the removal of recyclables and other materials from MWC feed streams advances the national policy "to promote the protection of human health and the environment and to conserve valuable material and energy resources by promoting a national research and development program for * * * new and improved methods of collection, separation, and recovery, and recycling of solid wastes * * *." RCRA section 1003(a)(9).

Congress authorized EPA to consider nonair quality environmental and energy benefits such as these as an important component of a Section 111 best technology determination. These significant nonair quality environmental and energy benefits cannot be assured without including a materials separation requirement as part of the standard of performance of MWC's. The EPA believes that Congressional intent would be best effectuated by reading the CAA as authorizing EPA to require removal of toxics and compostable and recyclable portions of the MWC feed stream prior to combustion. The statutory language does not prohibit such a standard (indeed, it would be incongruous for it to do so, given the statutory requirement to include nonair and energy considerations in the best technology determination), and appears broad enough to encompass the materials separation requirement.

Thus, a "standard of performance," which EPA establishes for new and

existing sources pursuant to section 111, is defined to include not only conventional emission limitations measured at the stack, but also other forms of emission restriction, including operating requirements and precombustion fuel conditioning requirements. See CAA section 302(1) (a "standard of performance" includes "any requirement relating to the operation or maintenance of a source to assure continuous emission reduction.") (emphasis added). Standards of performance must reflect the degree of "emission limitation" achievable, and an "emission limitation" is defined to include "any requirement relating to the operation or maintenance of a source to assure continuous emission reduction." CAA section 302(k). Under these provisions, removal of noncombustibles, toxics, recyclables, and compostables may be a "means of operating" an MWC in order to assure continuous emission reduction, and thus can be adopted as part of the section 111 standard of performance.

Other sections of the statute also support the EPA's interpretation that a section 111 standard of performance may include requirements expressed as other than traditional at-the-stack emission limits where necessary to achieve important air and nonair quality environmental and energy benefits. Section 111(a)(7)(B), for example, authorizes EPA to include "precombustion cleaning or treatment of fuels" as part of NSPS. See also H. Rep. No. 95-294 at 189.

(There may doubtlessly be many pretreatment techniques and/or process modifications capable of achieving comparable or improved degrees of emissions control in fossil-fired boilers as well as in most fuel-burn[ing] industrial sources * * *. To this end, the Administrator should take into consideration all of the processing steps performed on a material from its natural state through to final usage in determining the requirements under this section for a technological continuous emission reduction system.) (emphasis supplied)

Separating noncombustibles like metals and glass from the feed stream to an energy-recovering MWC is indeed a type of precombustion cleaning of fuel, and consequently furthers the Congressional intent that EPA consider such measures as part of the section 111 standards of performance.

Some persons commenting on draft versions of this proposal suggested that the materials separation requirement could only be authorized as a "design, equipment, work practice, or operational standard" pursuant to CAA section 111(h). They went on to maintain that Section 111(h) does not give EPA the

authority to require removal of certain constituents from the MWC feed stream. The EPA questions whether the proposed materials separation requirement is a "work practice or operational standard." Certainly, the proposed requirement does not have the degree of mandated operating specificity that Congress sought to avoid in limiting the scope of work practice standards. The proposal does not require an MWC to carry out the proposed materials separation requirement in any particular way (by using particular types of equipment, for example). Rather, the proposal merely describes a minimal level of precombustion feed conditioning which can be achieved in many different ways (for instance, by relying on a variety of different community source separation programs, or by separating certain recyclables at the MWC while a community separates others).

Even assuming that the proposed materials separation requirement were considered to be a "work practice standard," however, EPA believes that it would be within the Agency's section 111(h) authority. The EPA may promulgate a work practice standard when "it is not feasible to prescribe or enforce a standard of performance." CAA section 111(h)(1). One statutory example of when it is not feasible to prescribe or enforce a standard of performance is when "the application of measurement methodology to a particular class of sources is not practicable due to technological or economic limitations." CAA section 111(h)(2). The legislative history indicates that Congress intended EPA to have authority to promulgate work practice standards when it finds that it is not feasible to develop or measure numerical concentration limits at the stack. See S. Rep. No. 95-127, 95th Cong., 1st Sess. 43, 44 (even though asbestos is capable of measurement, a work practice standard for asbestos was acceptable because of the impossibility of developing a numerical emissions standard).

In this case, EPA is presently unable to measure reliably the reductions in MWC emissions attributable to the removal of noncombustibles, recyclables, and compostables from MWC feed, and so is unable to reliably correlate at-the-stack measurements to materials separation technology. Thus, EPA is unable to develop numerical emissions standards reflecting the performance of materials separation technology. Since stack measurements and numerical standards would be technically impractical, EPA would be empowered to promulgate a "work practice" standard. The EPA also

believes that it would be economically and technically impracticable to monitor separately each of the toxics that are in the MWC feed stream (which potentially include each toxic in consumer use in an industrialized society) in order to document the toxics removal achieved by materials separation. The EPA requests comment on these issues.

More fundamentally, EPA also questions whether it is "feasible" to prescribe or enforce a numerical standard of performance within the meaning of section 111(h) where prescribing solely a top-of-stack numerical limitation would preclude obtaining significant nonair environmental and energy benefits which Congress has directed EPA to consider. The Agency solicits comment on how to interpret the interplay of these statutory provisions. The EPA also requests comment on the related question of how nonair quality and energy considerations are to be taken into account in assessing section 111(h)(3) equivalency demonstrations.

Several interested parties have also argued that the Agency is without authority to promulgate a work practice or operational standard if it also establishes a numerical at-the-stack emission limit for a pollutant. The EPA's current view is that this argument is not persuasive. The statute contains no express command preventing the Agency from adopting a fuel pretreatment or work practice standard as well as a numerical emission limit. Nor does the legislative history state that Congress meant to forbid such a two-part standard of performance. Under these circumstances, EPA may adopt reasonable interpretations of the statutory language that effectuate statutory goals, see *Chemical Manufacturers Association v. Natural Resources Defense Council*, 47D U.S. 1102, 1108 (1985), particularly where the interpretation assures important nonair and energy benefits and also assures an additional reduction in a pollutant regulated by a numerical standard.

F. Cost Impacts of the Proposed Standards

In the long run, the monetary benefits of materials separation and resale of separated materials are expected to outweigh the costs, resulting in no net annualized cost increase. However, the initial costs of materials separation at individual MWC plants will be highly variable. Depending on whether local markets are established for resale of materials, and other site-specific factors, disposal cost increases at typical new MWC plants could vary from a net

annualized cost of about \$20/Mg (\$18/ton) of MSW to a net credit (savings) of \$25/Mg (\$23/ton) of MSW (see Table 12). Even at the higher cost, the standards are acceptable. Higher costs would only be temporary and would decrease over time as markets for separated materials are established.

TABLE 12.—RANGES OF INDIVIDUAL PLANT CONTROL COSTS FOR THE PROPOSED MATERIALS SEPARATION ALTERNATIVE

Plant size (Mg/day)	Net annualized cost range (in \$1,000/yr and \$/Mg of MSW)	
	"Best" case: 100% sale of separated materials (net savings)	"Worst" case: No sale, land disposal of separated materials (net cost)
180	-1,400 *	580
	-\$25/Mg	\$11/Mg
730	-4,200	2,300
	-\$20/Mg	\$11/Mg
2,050	-5,400	12,100
	-\$9/Mg	\$20/Mg

* Negative costs indicate net savings by materials separation.

Table 12 shows estimated ranges of net annualized costs and credits of materials separation for three different size MWC plants. These values include annualized capital costs for materials separation equipment and annual operating and maintenance costs. Other costs and credits included are: credits for reduced landfilling of ash; credits for reduced incineration costs due to downsizing of new MWC's (since separation would result in less waste to be combusted and would allow communities to build smaller MWC's); costs resulting from lost energy revenues (since less steam and electrical energy would be produced by the MWC due to reduced combustion of MSW); and credits for materials sales revenues. At the lower end of the cost ranges shown on Table 12, credits are taken for 100 percent sale of the following materials: glass, ferrous metals, aluminum, and high density polyethylene and polyethylene terephthalate plastics, while it is assumed the MWC pays a recycler to accept separated paper. At the higher end of the cost ranges, it is assumed that separated materials cannot be sold and must be landfilled. The no-sale assumption is a worst-case assumption. Markets for separated materials are already established in many locations. The proposed requirements for materials separation and other Federal, State, and local actions will promote stable supplies of separated materials and will encourage development and stabilization of markets. Additionally, the flexibility

provided sources by the form of the 25 percent materials separation requirement would allow sources to focus on the recycle of materials with the highest market value. Thus, the Agency believes there will not be a significant cost for materials separation over the long run.

Thus, despite the range of net costs and credits shown for individual plants in Table 12, the national net annualized cost of materials separation is estimated to be negligible (\$0/Mg of MSW) or a net savings over the long run. No severe economic impacts on households or government units are expected to result from the proposed materials separation provisions. (Also, see "Materials Separation—Combustion Permit" in Section H, "Compliance Provisions".)

G. Overall Agency Strategy to Promote MSW Reduction and Recycling

As discussed in Section IV.A. of this notice, in February 1988, EPA created an MSW Task Force to specifically address the problem of increasing waste generation and decreasing management capacity. The Task Force was given the assignment of assessing the solid waste problem, examining alternatives for solving it, and developing a well-coordinated strategy of action for improving the Nation's management of MSW.

In developing the strategy, the Task Force held public meetings and solicited comments from the public and interested environmental groups, trade organizations, and government organizations. The Task Force's recommendations are presented in the report, "The Solid Waste Dilemma: An Agenda for Action" (EPA/530-SW-88-052), and information supporting the recommendations can be found in a supplemental document entitled, "Background Document for Solid Waste Dilemma: An Agenda for Action" (EPA/530-SW-88-054A).

As stated in the "Agenda for Action," EPA "recommends using 'integrated waste management' systems to solve municipal solid waste generation and management problems at the local, regional, and national levels." * * * A key element of integrated waste management is the hierarchy, which favors source reduction (including reuse) to first decrease the volume and toxicity and increase the useful life of products in order to reduce the volume and toxicity of waste. Recycling (including composting) is the preferred waste management option to further reduce potential risks to human health and the environment, divert waste from landfills and combustors, conserve energy, and

slow the depletion of nonrenewable natural resources." In the "Agenda for Action," EPA set a near-term "goal of managing 25 percent of our nation's municipal solid waste through source reduction and recycling by 1992." Furthermore, EPA expects the percentage of MSW reduction and recycling to continue to increase after 1992. A number of cities are already achieving the 25 percent materials separation requirements.

Source reduction and recycling help prevent many of the problems associated with MSW, including the difficulty of siting new landfills and MWC's to handle the large volumes of waste being generated. Preventing generation of wastes and diverting waste components from landfills and MWC's into reuse, recycling, or composting helps to alleviate siting problems and potential risks to human health and the environment attributable to improper management. Waste reduction and recycling also conserve natural resources by reducing the amount of virgin materials needed to produce new products. As the Congress found in promulgating RCRA in 1976, "Methods are available to separate usable materials from solid waste; and the recovery and conservation of such materials can reduce the dependence of the United States on foreign resources and reduce the deficit in its balance of payments." 42 U.S.C. 6902(c) (2) and (3). Thus, planning and implementing these activities now yields benefits in managing wastes and conserving natural resources in the years to come. The "Agenda for Action" strategy for implementing the Agency's national waste management goals are briefly summarized below.

The "Agenda for Action's" recommendations for recycling include fostering the implementation of existing Federal procurement guidelines (as well as evaluating guidelines for additional commodities), and creating an interagency working group to develop pilot and full-scale projects for separating recyclable materials in Federal agencies. Markets for secondary materials and recycled goods must be stimulated and stabilized; thus EPA will conduct market development studies for different commodities, will examine economic and regulatory incentives for using secondary or recycled materials, and will foster the formation of regional marketing councils for the exchange of market information. A National Recycling Council will be formed with members from all sectors of waste management to track recycling issues and problems and to recommend

actions. Finally, EPA will study how to foster the recycling of lead-acid batteries, including examining the current incentives and disincentives associated with liability. Today's proposed standards which prevent the combustion of lead-acid batteries will encourage their recycle. Also, in keeping with the "Agenda for Action," industry should step up its efforts in fostering the recycling of plastics and paper. State and local governments should encourage separation of recyclable materials, conduct waste exchanges, and provide incentives for stable markets for recycled goods.

During the development of this proposed rule, EPA contacted members of the MWC industry, State and local government organizations, and the environmental community in an effort to obtain their views and ideas regarding materials separation requirements as part of best demonstrated technology under Section 111. By today's action, the Agency is affirming its current position that materials separation is part of best demonstrated technology. However, during these discussions, a number of ideas and suggestions were discussed with respect to alternative approaches and strategies for incorporating materials separation as best demonstrated technology which the Agency wishes to discuss in an interactive policy forum. This forum will be scheduled to take place in early February 1990 during the public comment period for today's proposed rulemaking. The Agency anticipates that this forum will result in a series of suggestions and recommendations for Agency consideration during the development of the final rule.

While today's proposed materials separation requirements apply only to MSW being combusted in MWC's, as other related Federal standards are developed, the appropriateness of including materials separation provisions will be considered.

The EPA requests comments or recommendations on other actions that could be initiated by EPA to promote recycling and source reduction through the EPA's regulatory programs for MWC's.

H. Compliance Provisions

Methodology Overview: A number of alternatives were considered in developing the methods for determining compliance with the materials separation provisions. As proposed, compliance with the percent reduction requirement would be determined by comparing the amount of material recovered with the amount of incoming waste. The MWC would be required to

weigh all MSW received and combusted, and to weigh the materials separated for recovery, and keep monthly records. At the end of each calendar year (January through December), the annual average percent reduction of MSW (by weight) would be calculated from the monthly totals. The weights of vehicle and household batteries separated would also be recorded. The monthly recordkeeping and annual calculations to demonstrate compliance were determined to be reasonable because this approach would provide assurance that the separation provisions continue to be met on an ongoing basis. Furthermore, centralized MSW processing facilities and communities that are currently practicing separation generally keep such records. Therefore, the added reporting and recordkeeping burden of the proposal would be minimal. The alternative of not requiring an annual compliance demonstration was considered, but not selected for proposal.

In calculating compliance with the 25 percent or greater MSW weight reduction, a maximum credit of 10 percent would be given for yard waste separation, even if the separated yard waste weighs more than 10 percent of the weight of the MSW. The remainder of the required 25 percent MSW reduction would have to be achieved by separation of one or more of the other specified materials.

In calculating the weight of ferrous metals separated, white goods such as stoves, refrigerators, and air conditioners could be included; however, whole automobiles and other vehicles could not be included. Additionally, in calculating the weight of MSW received, and combusted and the weight of materials separated, construction and demolition wastes would not be included.

See Section I, "Reporting and Recordkeeping" for information on the schedules for compliance demonstration. Also, see "Materials Separation—Combustion Permit" in this section for a discussion of combustion permit provisions.

Materials Separation Plan: A description of the separation procedures (whether on-site or off-site) must be submitted along with the initial demonstration of compliance. Off-site materials separation programs will generally be more complex to monitor than on-site programs.

If an off-site source reduction or separation program is used to comply in whole or in part with the materials separation requirements, the adequacy of the separation program and

associated reporting procedures will be reviewed for approval on a site-specific basis. The off-site separation plan should provide a specific description of the program, including program elements related to the control of MSW flow, legal requirements and sanctions, and recordkeeping.

The plan should include a description of all procedures used to ensure control of the MSW flow. The following topics should be addressed, as applicable:

- The boundaries of the MSW service area(s) and any portions of the area(s) for which the MSW is delivered to landfills rather than an MWC;
- The ownership of waste from the time it is deposited at curbside to the time it is delivered to the MWC, landfill, materials recovery facility, recycling facility, or other treatment or disposal facility;
- Materials separation methods and destination of the MSW and each separated material (e.g., materials recovery or recycling facility, broker, MWC, landfill);
- Contractual arrangements, if applicable, between the MWC and the off-site party responsible for separation, and contractual arrangements between other involved parties, such as contracts between municipalities and private haulers of MSW;
- Any economic incentives for household participation in separation such as deposit/return systems on beverage bottles and cans or on batteries;
- Any economic incentives for active MSW haulers participation in the separation program (e.g., differential fees for deposit of waste at a recycling center versus an MWC);
- Any curbside separation requirements; and
- Provisions for separate collection of recoverable materials, and collection schedules (e.g., schedules for separate curbside collection of yard waste, glass, cans, white goods, etc.; location of community bins for drop-off of such materials).

The plan should also describe any legal requirements or sanctions that may be part of the off-site separation program. For example, copies of any local or State regulations requiring homeowners to separate yard wastes or other specified recoverable materials should be included. Copies of legislation (e.g., bottle bills) instituting deposit/return systems should also be included. Any penalties or sanctions for not following separation program requirements that can be applied to residences, private waste haulers, or other parties should be described.

The plan should also specify method(s) of demonstrating compliance with the materials separation provisions in the standards and should describe recordkeeping procedures. The following topics should be addressed, as applicable:

- Method(s) of determining the amount (by weight) of the recoverable materials specified in the standards, vehicle batteries, and/or household batteries (as applicable) that are separated on a monthly and annual average basis. Methods could include actual measurements using scales or calculational procedures;
- Method(s) for determining the amount (by weight) of MSW combusted (excluding construction and demolition waste) on a monthly and annual average basis. Methods could include actual measurements using scales or calculational procedures;
- Location(s) where weight determinations are made and which party is responsible (e.g., MWC, off-site material separation facility, transfer station, recycling facility, landfill);
- Recordkeeping procedures including type and frequency of information recorded, who is responsible for keeping records, location of records;
- Auditing procedures and frequency of audits; and
- Schedule and procedures for reporting monthly and annual weights of separated materials and other information to the MWC and the State regulatory agency or EPA.

Contractual Arrangements: In addition to developing a separation plan and submitting annual demonstrations of compliance, the proposed standards also allow the MWC owner or operator to enter into a contract with the governing body of any community or any other party whose action is required to maintain compliance.

Under Section 111 of the CAA, the owner or operator, which in the case of today's proposed standards is the owner or operator of the MWC, is responsible for demonstrating compliance with the standards. As discussed previously, in some cases, the owner or operator of the MWC may depend on another party to comply with some or all of the materials separation requirements at an "off-site" location. This does not prevent the owner or operator of the MWC from demonstrating compliance with these requirements by obtaining the necessary records from the off-site separator which show the weight of materials separated from the MSW and either the weight of MSW received by the off-site separator or the weight of processed MSW shipped by the off-site separator to the MWC. By this means, the owner

or operator of the MWC can monitor compliance with the materials separation requirements and based on this information take whatever steps are necessary to ensure continued compliance with these requirements. It does, however, make it more difficult and impose an additional administrative burden on the owner or operator of the MWC than if compliance with the materials separation requirements is achieved "on-site" at the MWC.

To minimize this administrative burden on the owner or operator of the MWC, in cases where the owner or operator of the MWC is depending on another party to demonstrate compliance with some or all of the materials separation requirements, today's proposal includes provisions that would allow other parties responsible for materials separation to become "co-operators" with the owner or operator of the MWC for purposes of demonstrating compliance with the materials separation requirements. These provisions apply *only* to the materials separation requirements and do not apply to other requirements or emission limits in today's standards. In addition, these provisions do not require parties performing off-site separation to enter into this relationship, they only provide the opportunity for this relationship where desired by both the owner or operator of the MWC and the other party performing off-site separation.

Materials Separation—Combustion Permit: The EPA is also proposing that best demonstrated technology for combustible MSW or RDF include a combustion permit for some of the separated materials under limited circumstances. In cases where a recycling market is shown to be unavailable for the separated combustible material, and the owner or operator of the MWC cannot recover or recycle other materials in the MSW or RDF, an application could be made for a combustion permit. A recycling market would be considered to be unavailable if, after separating the combustible material and searching for 120 days, an owner or operator could demonstrate to the Administrator either that no recycler will accept the material, or that the price the recycler is charging (including transportation costs) is equal to or exceeds the cost of landfilling (including transportation costs). The materials separation requirement would remain in force whether or not the Administrator granted a combustion permit. That is, materials would be separated whether or not a combustion permit were issued. For the material(s) covered by the combustion permit, records would be

maintained of the amount of material(s) separated (prior to combustion), and that would be the amount of separated (and combusted) material(s) credited toward the overall 25 percent MSW reduction requirement contained in the definition of "processed MSW" in the standard. The amount of other separated materials (not covered by the combustion permit) would have to be sufficient in combination with the separated (combusted) materials to achieve the overall 25 percent MSW reduction requirement (annual average). The combustion permit could be granted for a maximum of 1 year (without prejudice to filing petitions at later dates if recycling markets for combustibles continue to be unavailable).

The reason for this part of the proposal is that a large part of the reason EPA considers materials separation to be part of best demonstrated technology is to obtain environmental benefits from actually recycling the separated materials. If separated combustible materials actually prove to be unrecyclable after the owner or operator spends reasonable time and efforts to find a recycling market and the materials separation requirement cannot be satisfied by separating other materials, then the nonair environmental benefits from separating the material would no longer be demonstrated. Under such circumstances, it would not make sense to continue to preclude combustion of the separated materials, and to force their landfilling. The EPA believes it is preferable to burn the combustible materials in an MWC than to landfill them. Not only is landfilling a disfavored waste management option (see RCRA section 1002(b)(8)), but it is sound policy to recover the energy value of the combustibles rather than burying them (see CAA section 111(a)(1)(C) and RCRA section 1002(c)(1)). (The same is not necessarily true for noncombustible recoverables. If these are burned, the incinerator ash will contain the metals and other noncombustibles which will end up being land disposed in any case. This is why the proposal is limited only to combustible recoverables.)

The Agency is proposing that the test for unavailability of a recycling market for a particular material turn on a comparison of the cost of landfilling versus the cost of recycling. This test appears to be the relevant comparison because once combustion is precluded, these are the two principal management options for the separated material. If a material can be recycled for less expense than landfilling, it would be economically rational (as well as

environmentally preferable) to recycle the material, even if the recycler has to be paid to take the material.

The EPA is also proposing that the owner or operator must demonstrate to the Administrator that recycling markets are unavailable. The authority to issue combustion permits will not be delegated. This demonstration would require documentation of the recyclers that the owner or operator of the MWC has contacted, and a documentation of the costs of recycling versus the costs of landfilling. The EPA is proposing that a market be unavailable for at least 120 days before a petition could be considered because market fluctuations can be a short-term phenomenon and because owners or operators appear to be able to store combustibles for greater than this amount of time while seeking recycling markets. A petition would have to be approved by the Agency before the combustibles could be burned and the duration of the exception could not exceed 1 year. (If markets continue to be unavailable after 1 year, another petition could be made.) Both of these conditions appear necessary to EPA to ensure maximum effort to comply with the materials separation requirement and to actually recycle separated combustible materials.

Permits may be renewed for an additional year if the Regional Administrator determines it is appropriate and the conditions specified in § 60.56a(h)(1) continue to be met.

Comments are also specifically solicited on whether, under certain circumstances, the requirement to separate materials for which a combustion permit has been granted under 40 CFR 60.56a(h) should be dropped. The Agency specifically solicits comments on what criteria could be used to determine whether a source or community would not have to separate materials for which they receive a permit to burn the waste.

The following example illustrates how EPA envisions the exception would operate:

A community operating an MWC separates newspapers from the MSW burned in its MWC. During a 4-month period, the community is unable to recycle the newspapers because the best arrangement they can make involves paying a recycler \$40 per ton to take the newspapers (including transportation cost). (Other recyclers will not take the newspapers for any price.) The cost of landfilling the newspapers is \$30 per ton (including transportation cost). Newspapers comprise 8 percent of the materials that are separated from the MSW and the community can demonstrate that it is unable to separate

8 percent of recoverables other than newspapers (in order to achieve an overall 25 percent materials separation). Under these circumstances, the Administrator could grant the combustion permit for newspapers for up to 1 year. Upon grant of the permit, the MWC could burn newspapers and would achieve credit for the newspaper separation based on the weight of newspaper separated, just as if they had been recycled.

Enforcement Guidance: Following adoption of standards, the Agency frequently develops enforcement guidance for use in enforcement actions to ensure consistent and uniform enforcement of the standards. This guidance outlines the steps the Agency will likely follow, depending on the merits of the situation in question, in taking enforcement actions when violations of the standards occur. In this guidance, the Agency balances the seriousness of the violation against the potential impacts associated with various remedies. Thus, in the case of today's proposed standards, the Agency would consider the impacts of any remedy to a violation on waste management in a community, particularly the potential for waste not to be collected or to be diverted to a less desirable disposal alternative than combustion.

One of the primary objectives of an enforcement action is to prevent further noncompliance, and this is often achieved by negotiating a settlement agreement with the noncomplying source that ensures that the source will come into compliance with the standards. In the case of today's proposed standards, this could involve working with the owners or operators of the source to identify those actions necessary to achieve compliance and the time required to implement such actions.

If, as an example, the owner or operator of the MWC failed to comply with the materials separation requirements in today's standards, and the owner or operator is dependent on another party to provide processed waste, a review of the reason for noncompliance may indicate that the materials separation system utilized by this other party needs to be altered in some manner to ensure achieving the 25 percent separation requirement. This could necessitate installation of additional separation equipment or changes in local waste management practices, such as purchase of additional trucks and hiring of additional personnel for waste collection, or the adoption of local ordinances with financial

incentives or fines to ensure more intensive curbside separation efforts.

Such changes would require time to implement. One remedy to a violation of the materials separation requirements might well be a consent agreement between the enforcement agency and the owner or operator of the MWC and/or other party responsible for separation, where the other party has agreed to be a co-operator for purposes of compliance with the materials separation requirements. The consent decree might permit the MWC to burn unprocessed waste for a limited period of time if the necessary additional equipment or changes to the waste management system are made to ensure compliance with the materials separation requirements at the end of a specified period of time.

Of course, in cases of continued and repeated noncompliance, enforcement actions seeking shutdown of the MWC may be taken. In any event, the Agency solicits comments on enforcement guidance that might be developed following promulgation of today's standards and on possible remedies that might be sought in response to various violations.

1. Reporting and Recordkeeping Requirements

The proposed standards would require that the Administrator be notified of the initial MWC startup for all affected facilities. At the time of submittal of the initial compliance demonstration for materials separation (i.e., at the end of the second calendar year after initial start-up) an MWC facility would be required to submit a description of the procedures for separating materials for recovery to achieve the overall MSW reduction requirement and a description of the procedures for ensuring that lead-acid vehicle batteries would not be combusted at the affected facility. The facility must also submit a description of the collection program for household batteries. If an off-site separation program is used, the plan describing the program and compliance methods would be submitted for approval at the time of submittal of the initial compliance demonstration.

The proposed standards would require all affected facilities to submit annual compliance reports to show the overall percent reduction of MSW achieved by separation of the specified materials. The annual percent reduction would be calculated for each calendar year (January through December) from the monthly total weight of MSW received and weight of materials

separated for recovery each month, including any credits for a community source reduction or separation program. The first annual report submitted at the end of the first full calendar year (January through December) after start-up of an MWC would not be used to determine compliance with the materials separation requirements, but would be used to review progress made toward the materials separation requirements. The initial demonstration of compliance with the materials separation requirements would not be calculated and reported until the end of the second full calendar year (January through December) after start-up. For MWC's that commence construction between proposal and promulgation, the initial compliance demonstration (annual average) would not be calculated and reported until the end of calendar year 1994 or the second full calendar year after start-up, whichever is later. The annual average percentage MSW weight reduction would be calculated and reported at the end of all following years.

The proposed standards would also require that certain types of records be maintained, beginning at the initial start-up of an MWC (or in January 1993 for MWC's that commenced construction between proposal and promulgation). The records to be maintained include: the amount (by weight) of MSW received on a monthly basis at the affected facility, the amount (by weight) of MSW combusted on a monthly basis in the affected facility, and the amount of materials (by type and weight) on a monthly basis that is separated for recovery; the amounts (by weight) of vehicle batteries and household batteries on a monthly basis that are separated for recovery; the estimated amount (by type and weight) of materials reduced or separated for recovery on a monthly basis through an off-site or community source reduction or materials separation (recycling) program; and the calculations of the annual average percentage reduction in MSW achieved for each calendar year (January through December).

J. Solicitation of Comments on Materials Separation Requirements

The EPA welcomes comments on all aspects of the proposed materials separation provisions, and has specifically identified several topics on which comments and information are requested.

First, the Agency solicits comments on the proposed 25 percent materials reduction level and the associated air emission and other environmental benefits expected to result from

materials separation. The EPA requests information on potential separation techniques and on whether a higher or lower percent reduction is more reasonable.

In particular, during development of the proposed standards, it was suggested by some that 15 percent MSW reduction would be more reasonable, however others have suggested that 40 percent would be preferable. Those who support a lower percent reduction (e.g., 15 percent) should provide information on specific difficulties in achieving the 25 percent reduction as defined in the proposal, and describe their basis for stating that 15 percent (or some other number) is more reasonable than 25 percent. Those supporting a higher percent reduction (e.g., 40 percent) should provide specific information showing the 40 percent (or another number above 25 percent) is achievable using demonstrated technologies, and is reasonable.

Comments are requested on the proposed prohibition on combustion of vehicle batteries and the plan to remove household batteries, and the practicality of on-site or off-site separation programs for battery removal.

The EPA is aware that different areas have different MSW disposal problems. Accordingly, comments are solicited on the following questions. Should the 25 percent MSW reduction be uniformly applied to all areas of the country, or should there be different requirements for urban areas, residential areas, metropolitan areas, and rural areas? Should the stringency of the materials separation requirements vary for different MWC's depending on the type of area, but still be designed to achieve an overall 25 percent reduction on a national basis? How would the areas be defined?

Another approach to separation that was considered, but not selected for proposal, was specification of a percent reduction (by weight) for each individual recoverable material in MSW (e.g., a certain percent of the paper in MSW must be separated for recovery, a certain percent of ferrous metals, etc.). For reasons stated previously, the overall 25 percent weight reduction was chosen for proposal. However, comments are requested on the material-specific percent reduction approach. Commenters should include the reasons they favor or do not favor this approach, and submit information on the percent separation achievable for specific materials. Supporters of a material-specific percent reduction approach are also asked to suggest methods of demonstrating compliance. It

would be more difficult to demonstrate compliance with material-specific percent reductions because the weight of each material (e.g., paper, plastics, etc.) in the unseparated MSW would need to be known in order to determine the percent of the material that was separated. The content of unprocessed MSW is variable depending on factors such as climate, type and number of residences, and type and number of commercial businesses that produce MSW in the community. There is also seasonal variation in MSW content. Commenters should address how the owner or operator of the MWC could determine the weight of each specific material in the unprocessed MSW.

The Agency further solicits comments on whether other types of materials should be included in the list of recoverable materials that can be separated. The Agency is aware of arguments that recovering and stockpiling recovered materials, such as batteries, may create a separate environmental hazard.

The Agency is aware of arguments that separation and recovery of materials from the MSW stream may result in delay or cancellation of MWC projects and/or the landfilling of some separated materials, thereby potentially increasing the amount of waste disposed of in landfills. The Agency is also aware, however, that once materials are separated, there is an economic incentive to recycle the separated materials which ranges up to the cost of alternative disposal at a landfill. Since landfill costs are substantial, this economic incentive to recycle is also substantial. The Agency solicits comments on these issues. In particular, the Agency is interested in receiving comments concerning the relative multimedia environmental impacts of MSW disposal by landfilling versus combustion.

Suggestions are also requested on ways to implement the materials separation requirements to minimize the burden for MWC owners or operators and the communities they serve. For example, what compliance schedule is most reasonable? (An alternative approach that would phase in separation requirements is discussed in the next section.)

There are several implementation issues associated with off-site separation programs. The proposed standards would allow off-site source reduction or source separation programs to be used to comply, in whole or in part, with the materials separation requirements. For example, if the MWC service area collected yard waste,

paper, glass, aluminum cans, and/or other materials separately and did not combust these collected materials, credit toward the 25 percent MSW reduction would be given. The prohibition on combustion of lead-acid vehicle batteries could also be achieved through off-site programs. In these cases, MWC's would be required to submit a plan describing the off-site or community program and the means of verifying compliance. Section H describes the type of information that should be included in such plans. Comment is requested on how to structure such plans, how to determine compliance where community programs are used, what type of measurement methods could be used, and what types of records should be kept. Comments are specifically requested on how to give credit for source reduction programs (e.g., where commercial businesses or households reduce the amount of waste generated) and for backyard composting of yard waste at the household level.

The EPA also solicits comment on the timing for submitting a materials separation plan. It may make more sense to submit the plan at the time of initial start-up rather than as part of the initial compliance demonstration so that there is time to evaluate the adequacy of the procedures described in the plan.

Finally, the EPA requests comments concerning the contractual provisions previously discussed in Section H. The proposed standards allow the MWC and parties performing off-site separation to enter into a contractual agreement designating the party performing off-site separation as a co-operator of the MWC regarding compliance with the materials separation requirements. In this way, where off-site materials separation programs are used, enforcement actions for noncompliance with the materials separation provisions could be taken against the off-site MSW processor responsible for the violation. The EPA requests comment on the feasibility of such contract provisions, and on other approaches for the enforcement of materials separation provisions.

K. Solicitation of Comment on Alternative Phase-in of Materials Separation Requirements

The "Agenda for Action" requires a 25 percent MSW reduction through source reduction and recycling by 1992, but also calls for increasing the percent reduction level to higher levels after 1992. The proposed MWC standards would also establish a 25 percent reduction level. However, greater percent removals may be achievable. As markets for separated materials

strengthen and expand, higher percent separation levels will become more feasible technically and economically. The Agency solicits comments on whether materials separation standards for MWC's should require phasing-in of more stringent requirements over time.

One alternative that was considered and rejected was a three-step phase-in of materials separation requirements. This approach would be similar to the proposed standards in that all MWC's would be prohibited from combusting MSW unless the MSW had been processed to separate materials for recovery achieving a specified percent overall reduction (by weight) of the MSW. However, the percent reduction of MSW would be less than 25 percent through 1992; after 1992 it would be 25 percent, consistent with the "Agenda for Action;" and after some later date (e.g., 1995) a higher percent reduction (e.g., 40 percent) would be required. After consideration, it was determined that there is no need to specify a reduction level lower than 25 percent prior to 1992. Only new MWC's, which commence construction after today's date would be subject to this NSPS. Given that for MWC's there is generally a 2-year or longer time period from commencement of construction until facility start-up, most of these new MWC's would not be operating until 1992 or later, and would not have to demonstrate compliance with the materials separation provisions until the second year of operation of the materials separation system. Thus, specifying a different percent reduction before 1992 would be of little use.

The proposed regulations, therefore, start with the requirement for a 25 percent reduction of MSW. The Agency requests comments on whether the 25 percent separation requirement should be phased-in under some other schedule and on whether higher performance levels should be established in subsequent years and if they should be phased-in with one or two steps. Specifically, comments are requested on the desirability of increasing the 25 percent separation level to 40 percent by December 1995.

L. Potential Alternative Approach for Requiring Materials Separation

The Agency also considered an alternative approach for requiring materials separation from MWC's. Rather than including materials separation directly in the NSPS, the Agency could issue new source permitting guidance which would require States to consider and include materials separation requirements in new MWC permits unless there is a site-specific reason that separation is not

appropriate. This operational guidance would then be used by States and local agencies in making best available control technology (BACT) determinations for prevention of significant deterioration (PSD) permitting and lowest achievable emission rate (LAER) determinations for new source review (NSR) permitting. This approach would allow more flexibility in regulating individual MWC's, and the economic implications of applying materials separation to new MWC's could be judged on a case-by-case basis. Under this permitting approach, if local markets for separated materials are poor, a new MWC might not be required to apply materials separation.

However, under the current CAA (1977), once an NSR permit is issued, it is final unless the method of MWC operation is changed. This would mean that if a local materials separation market did not exist at the time of initial operation and separation was not required, the NSR permit could not be changed to require separation when a market did develop. This would not encourage market development. Under some of the CAA amendments under consideration, NSR permits would be reviewed every 5 years. If such provisions were included in the CAA, the feasibility of materials separation could be reevaluated at each 5 year renewal. The EPA requests comments on the alternative approach of implementing materials separation at new MWC's through NSR permitting.

M. Spokane and Huntington Remands

The Administrator has recently denied two appeals involving (in part) the issue of whether materials separation is part of BACT in PSD permits issued to MWC's. *Spokane Regional Waste-to-Energy Project*, PSD Appeal No. 88-12 (June 9, 1989) and *Huntington Mass-Burn Incinerator*, PSD Appeal No. 89-2 (August 2, 1989). The EPA denied both appeals, concluding that the petitioners had failed to show that materials separation was part of BACT for the facilities at issue.

The EPA does not view these petition denials as precluding requiring materials separation as part of the Section 111 NSPS and guidelines for existing sources. In the first place, all that was at issue in these appeals was whether petitioners had met their burden of showing that the PSD permit determination not to include a separation requirement was clearly erroneous. *Spokane Appeal* at p. 3. The EPA is under no such burden in the present rulemaking. Further points of

distinction are that the Agency was not asked to review the relation of materials separation to all MWC emissions and thus did not consider certain types of pollutant emission reductions (for example, petitioners made no specific assertions regarding the overall life cycle benefits of materials separation, and also did not consider the nonair quality environmental benefits of materials separation in detail, an important factor in making Section 111 determinations.) Furthermore, although BACT determinations can have national precedential effect, EPA believes that a proposed decision of national import to require MWC's to perform materials separation can be more appropriately made in the context of a national rulemaking even if the Administrator declines to do so in deciding an individual PSD appeal.

The Administrator further stated that in denying these appeals that petitioners had failed to show that materials separation technologies were "available" (within the meaning of the definition of BACT contained in Section 169(3) of the CAA) for MWC's because petitioners had failed to show that use of materials separation in combination with other air pollution control technology would lead to a demonstrable reduction in emissions of regulated pollutants. *Spokane Appeal* at p. 22. The EPA has included, as part of the record of this proposed rulemaking, data (some of which were not presented to EPA by petitioners in the respective PSD appeals) showing reduction in MWC emissions through use of materials separation. Although these studies do not deal with situations where materials separation was used along with the best demonstrated technology-type of air pollution control technology, it is the Agency's engineering judgment that a reduction of pollutant input into an MWC will result in the MWC emitting fewer of these pollutants. Furthermore, with respect to new sources, materials separation will allow for downsizing of MWC's (because a lower volume of material will need to be combusted), which will in turn lead to a reduced mass of MWC emissions, cf. RCRA Section 4003(d) ("it is the intention of this chapter and the planning process established pursuant to this chapter that in determining the size of the waste-to-energy facility, adequate provision shall be given to the present and reasonably anticipated future needs of the recycling and resource recovery interest within the area encompassed by the planning process"). In contrast, the option of downsizing the MWC's at issue in

Spokane and Huntington was not available. Given that separation technologies are demonstrated for all of the types of materials considered in today's rule, that materials separation results in documented reduction in MWC emissions regulated under the proposal, and the Agency's judgment that these reductions would continue even if the MWC is also equipped with at-the-stack air pollution control technology, the Agency believes that materials separation is a demonstrated technology for new MWC's under Section 111.

VI. Rationale for the Standards for Nitrogen Oxides (NO_x)

A. Selection of NO_x

Municipal waste combustors (MWC's) are a significant source of NO_x emissions. As the number of MWC's increases (over 150 new MWC's are projected to be built in the next 5 years), there is increasing concern over NO_x emissions, and control of NO_x is being considered in new source permitting decisions.

From an environmental perspective, NO_x emissions are of increasing concern. Furthermore, minimizing the increase in NO_x from this source category is consistent with Administration policies embodied in the President's Clean Air Act legislation and the International NO_x Protocol. Reasons for concern include: acid deposition; increased regional/global ozone background concentrations (which may be NO_x limited); untold nutrient effects on some natural waters, including estuaries; visibility/PM₁₀ problems in western cities; and potential effects of transformation products of NO_x. Current regulations do not prevent projected increases in NO_x emissions, and total U.S. emissions of NO_x are already almost equal to emissions of sulfur oxides (SO_x). Although insufficient information is available to design a strategy for major reductions in NO_x, a growing consensus supports establishing limits to prevent continued increases in emissions. The possibility of using cost-effective controls on existing sources appears limited; therefore, controls for new sources must be the basis for any strategy to further restrict increased emissions. The EPA is also concerned about other major sources of NO_x. As standards for these other sources are established or reviewed, EPA will consider a similar approach for controlling NO_x.

Municipal waste combustors are significant sources of NO_x emissions. For example, in the absence of additional regulation, a typical large

mass burn MWC with a design capacity of 2,040 Mg/day (2,250 tons/day) will emit about 1,180 Mg (1,300 tons) of NO_x each year. A medium-size 950 Mg/day (1,050 tons/day) MWC plant will emit about 550 Mg (610 tons) of NO_x each year. Without the NO_x standards proposed today, national emissions of NO_x from MWC's could increase by almost 30,000 Mg/year (33,000 tons/year) by 1994.

National ambient air quality standards have been established for NO_x because of known adverse effects on public health and welfare. Impacts of NO_x have been documented in criteria documents prepared under section 108 of the Clean Air Act (CAA). These effects are the primary basis for determining that NO_x emissions from new MWC's constitute a potential danger to public health and welfare. Consequently, NO_x emissions are also selected for control under new source performance standards (NSPS) for MWC's.

B. Selection of Best Demonstrated Technology for NO_x Control

Types of Combustors: Nitrogen oxides are formed during combustion through oxidation of fuel-bound nitrogen (i.e., nitrogen contained in municipal solid waste [MSW]) and fixation of atmospheric nitrogen. Conversion of fuel-bound nitrogen occurs at relatively low temperatures (less than 1,100°C or 2,000°F), while fixation of atmospheric nitrogen generally occurs at higher temperatures. Most of the NO_x formed during normal operation of MWC's is associated with fuel-bound nitrogen. All types of MWC's produce NO_x emissions, and emission levels are similar for the four types of MWC's (mass burn, modular, refuse-derived fuel [RDF], and fluidized-bed combustion [FBC]).

Emission Control Techniques for NO_x: Two basic approaches are used to control NO_x emissions: (1) Combustion modifications and (2) add-on controls. Combustion modifications include staged combustion, low excess air, and flue gas recirculation. Combustion modification techniques reduce NO_x emissions by controlling the amount of oxygen and the temperature in the combustion zone. Two combustion modification NO_x control techniques, low excess air and staged combustion, can be used separately or together. With low excess air, the amount of air (oxygen) supplied to the combustor is reduced, lowering the oxygen (O₂) concentration in the flame zone and reducing the formation of thermal NO_x. With staged combustion, the amount of underfire air at the grate is reduced.

generating a starved-air region. Secondary air to complete combustion is added as overfire air after the combustion gas has partially cooled. By creating a starved-air zone, fuel-bound nitrogen is converted to nitrogen (N_2) instead of NO_x . When the O_2 for completing combustion is provided, the reduced temperature slows the formation of NO_x . This technique can reduce formation of fuel NO_x . Consistent and quantifiable NO_x reductions, however, have not been demonstrated for low excess air or staged combustion technologies applied to MWC's.

Another combustion modification technique is flue gas recirculation. In flue gas recirculation, cooled flue gas is mixed with combustion air, thereby reducing the O_2 content of the combustion air supply. The flame temperature is lowered and less O_2 is present in the flame zone, reducing thermal NO_x generation. At one mass burn MWC in California, where flue gas recirculation is used to supply 10 percent of the underfire air, reductions of about 15 percent in NO_x emissions have been observed. Reductions of 10 to 25 percent were reported for a Japanese MWC using flue gas recirculation.

Combustion modifications for NO_x control generally do not increase emissions of other pollutants. However, if the modifications are not properly applied, higher emissions of carbon monoxide (CO), hydrocarbons, and products of incomplete combustion may result. For example, if the excess air is decreased too much, visible emissions and higher CO concentrations may result. If too much flue gas is recirculated, the flame zone can become unstable, causing poor combustion and higher CO and organic emissions.

Potential add-on controls for MWC's include selective noncatalytic reduction (SNCR), selective catalytic reduction (SCR), and natural gas reburning techniques. Selective noncatalytic reduction refers to add-on NO_x control techniques which reduce NO_x to N_2 without the use of catalysts. These techniques include Thermal $DeNO_x^{tm}$, which uses injection of ammonia into the combustor as the reducing agent; the NO_x OUT process, which injects urea and chemical additives; and a two-stage urea/methanol injection process. To date, only Thermal $DeNO_x^{tm}$ has been demonstrated on full-scale MWC's in the U.S., and it is in use at three MWC plants in California.

In Thermal $DeNO_x^{tm}$, ammonia is injected into the convection section of the combustor where temperatures are between 860°C (1,600°F) and 970°C (1,800°F) (the optimum reaction temperature range). Based on short-term

testing and continuous emission monitoring data from the three MWC plants in California with Thermal $DeNO_x^{tm}$ controls and other information, removal efficiencies of about 45 percent or more and NO_x emission levels in the range of 120 to 200 ppmv (24-hour average) are achievable. However, the precise level within this range has not yet been specified. Emission levels vary among MWC's and may differ for different types of MWC technologies. Additional long-term NO_x emission data are currently being collected and analyzed. The emission level(s) and/or percent reductions achievable by SNCR will be determined prior to promulgation, and a single emission limit will be promulgated. Alternatively, there may be different limits promulgated for different subcategories of MWC technologies.

One potential concern associated with noncatalytic ammonia injection technology is the potential for formation of detached ammonium chloride plumes. At two of the facilities, visible plumes have sometimes formed, which are believed to be caused by the reaction of residual ammonia and chloride after the flue gas exits the stack. The formation of such plumes appears to depend on site-specific factors involving the design and operation of the combustor, the efficiency of the acid gas and particulate matter (PM) control devices at removing HCl and ammonia from the flue gas, the NO_x control equipment, and meteorological conditions.

In SCR, ammonia is injected into the flue gas downstream of the combustor where it is mixed with the NO_x contained in the flue gas and passed through a catalyst bed. In the catalyst bed, NO_x is reduced to N_2 at temperatures much lower than the 860 °C (1,600 °F) required for the reactions to occur without a catalyst. Depending on the type of catalyst, these reactions occur at temperatures of 190 to 400 °C (375 to 750 °F). Tests of SCR systems at two MWC's in Japan and at coal- and oil-fired facilities in the U.S. indicate potential NO_x removal rates well above 45 percent, but these systems have not been applied to MWC's in the U.S. One concern is that performance can be detrimentally affected by catalyst poisoning by either metals or acid gases. Furthermore, these systems are more expensive than SNCR control systems. In some cases, since ammonia is injected into the flue gas rather than the combustor, and catalyst beds may be located after economizers on PM control devices, flue gas reheat may be necessary to reach the desired catalyst operating temperature. This can be a significant expense.

Natural gas reburning is an add-on NO_x control technique that overlaps combustion modification techniques. Low excess air is provided at the combustor grate, with recirculated flue gas introduced above the grate. Natural gas is added to this low excess air zone to generate a fuel-rich zone. Air is supplied above the fuel-rich zone to complete combustion. This process is designed to reduce NO_x formation without generating CO emissions.

Natural gas reburning at MWC's is a new technology. A pilot-scale test of an MWC indicated average NO_x removal efficiencies of about 50 percent and NO_x emissions below about 150 ppmv. There are also pilot-scale data on reburning for coal-fired (pulverized coal-type) boilers. However, this technology has not been commercially applied on either MWC's or coal-fired boilers in the U.S. Reburning with oil has been used on coal-fired boilers in Japan.

Regulatory Alternatives for NO_x Control: A regulatory baseline and three NO_x control regulatory alternatives were analyzed in selecting standards for proposal. The baseline alternative reflects the level of emissions control expected in the absence of an NSPS. In this case, the baseline alternative assumes no NO_x control on any new MWC's.

The three NO_x regulatory alternatives represent application of NO_x control to some or all MWC plants. Controlled NO_x emission levels are based on SNCR technology, because this technology is considered to be well demonstrated. As described previously, the use of SNCR for NO_x control will achieve a NO_x emission limit in the range of 120 to 200 ppmv on a 24-hour daily (block) average basis. The exact emission limit(s) or percent reduction requirements will be determined prior to promulgation, and a single emission limit will be promulgated. Alternatively, there may be different emission limits for different subcategories of MWC technologies. An owner or operator could comply with the applicable emission limit using any technology.

Table 13 presents the three regulatory alternatives. The first two alternatives include a size cutoff, and would only require control of larger plants. This is because: (1) Smaller plants have lower annual NO_x emissions and account for a relatively small percentage of the new MWC population, and (2) capital cost increases, annual costs (in terms of \$/Mg MSW combusted), and cost effectiveness of control (\$/Mg NO_x removed) are greater for smaller MWC's than for large MWC's. Previous NSPS for NO_x emissions from combustion

sources have been less than \$1,000/Mg (\$900/ton) NO_x based on the use of combustion modifications.

TABLE 13.—REGULATORY ALTERNATIVES FOR NO_x CONTROL FOR NEW MWC PLANTS

Regulatory alternative	MWC plant sizes regulated	Percent of national MWC capacity affected
1	> 800 Mg/day.....	70
2	> 225 Mg/day.....	90
3	All plants.....	100

Under Regulatory Alternative 1, a NO_x emission limit of 120 to 200 ppmv would be proposed for MWC units located at MWC plants with aggregate capacities greater than 800 Mg/day (880 tons/day) of MSW. This limit would affect about 70 percent of national new MWC capacity. Under Regulatory Alternative 2, a NO_x emission limit of 120 to 200 ppmv would be proposed for MWC units at plants with capacities above 225 Mg/day (250 tons/day) of MSW. This limit would affect about 90 percent of new MWC capacity. Regulatory Alternative 3, the most stringent alternative, would require NO_x control for all MWC plants regardless of size. This alternative has

the lowest emissions, but the highest costs.

Model Plant Impacts of the Regulatory Alternatives for NO_x Control: Under the regulatory alternatives shown in Table 13, those plants that are affected would emit NO_x in concentrations below the emission limit (120 to 200 ppmv). In Table 14, the ranges of annual NO_x emissions for individual model plants under the baseline and the regulatory alternatives are presented. These emission impacts were estimated by applying NO_x control technology (SNCR) to the various size groups of MWC plants as specified by the regulatory alternatives.

TABLE 14.—RANGE ON NO_x EMISSIONS FOR INDIVIDUAL MWC PLANTS UNDER THE BASELINE AND REGULATORY ALTERNATIVES FOR NO_x CONTROL

Regulatory alternative	MWC plant sizes regulated	NO _x Emission (Mg/year)		
		Very large plants	Large plants	Small plants
Baseline.....	None.....	550-1,300	260-420	16-130
1.....	> 800 Mg/day.....	300-710	260-420	16-130
2.....	> 225 Mg/day.....	300-710	140-230	16-130
3.....	All plants.....	300-710	140-230	9-70

As shown in Table 14, baseline NO_x emissions at very large MWC plants (i.e., MWC plants with aggregate capacities greater than 800 Mg/day [880 tons/day] of MSW) range from 550 to 1,300 Mg/year (600 to 1,400 tons/year). Under each of the three regulatory alternatives, very large plants are required to control NO_x emissions, resulting in NO_x emissions ranging from 300 to 710 Mg/year (330 to 780 tons/year).

At those large MWC plants that combust greater than 225 Mg/day (250 tons/day) of MSW but equal to or less than 800 Mg/day (880 tons/day) of MSW, baseline NO_x emissions range from 260 to 420 Mg/year (290 to 460 tons/year). These intermediate-size large plants would not be required to

control NO_x emissions under Regulatory Alternative 1, but would be required to meet the NO_x emission limit under Regulatory Alternatives 2 and 3. Under Alternatives 2 and 3, NO_x emissions at these large MWC plants would range from 140 to 230 Mg/year (150 to 250 tons/year).

Baseline NO_x emissions at small MWC plants (i.e., MWC plants with aggregate capacities equal to or less than 225 Mg/day [250 tons/day] of MSW) are low relative to large plants and range from 16 to 130 Mg/year (18 to 140 tons/year). Small plants would not be required to control NO_x emissions under Regulatory Alternatives 1 or 2, but under Regulatory Alternative 3, NO_x emissions at small MWC plants would

be reduced to a range of 9 to 70 Mg/year (10 to 77 tons/year).

Table 15 presents the ranges of increased capital costs (relative to baseline), increased annualized costs, and increased (over baseline) annualized cost per Mg of MSW combusted for small, large, and very large MWC plants under each regulatory alternative. The cost per Mg of MSW is a measure which can be used to compare impacts for different size plants on a common basis. For perspective, MSW disposal costs incurred by the general public typically range from about \$40/Mg (\$36/ton) to over \$100/Mg (\$90/ton) of MSW, including collection, transportation, combustion, and ash disposal.

TABLE 15.—RANGES OF INDIVIDUAL PLANT CONTROL COSTS UNDER THE REGULATORY ALTERNATIVES FOR NO_x CONTROL

	Capital cost (\$1,000's)	Annualized cost (\$1,000's)	Annualized cost per Mg MSW (\$/Mg)
Regulatory Alternative 1:			
Very large plants.....	2,200-3,700	660-1,200	1.70-2.40
Large plants.....	0	0	0
Small plants.....	0	0	0
Regulatory Alternative 2:			
Very large plants.....	2,200-3,700	660-1,200	1.70-2.40
Large plants.....	2,000	550-580	2.40-3.60
Small plants.....	0	0	0
Regulatory Alternative 3:			
Very large plants.....	2,200-3,700	660-1,200	1.70-2.40
Large plants.....	2,000	550-580	2.40-3.60

TABLE 15. RANGES OF INDIVIDUAL PLANT CONTROL COSTS UNDER THE REGULATORY ALTERNATIVES FOR NO_x CONTROL—Continued

	Capital cost (\$1,000's)	Annualized cost (\$1,000's)	Annualized cost per Mg MSW (\$/Mg)
Small plants.....	620-1,000	190-280	7.40-20.10

Under each of the three alternatives, increased cost per unit of MSW combusted at very large MWC plants (i.e., those combusting greater than 800 Mg/day [880 tons/day] of MSW) ranges from \$1.70 to \$2.40/Mg (\$1.50 to \$2.20/ton) of MSW.

Under Regulatory Alternative 1, intermediate-size large plants (i.e., those with aggregate capacities greater than 225 Mg/day [250 tons/day] but equal to or less than 800 Mg/day [880 tons/day] of MSW) would incur no increased costs over baseline since they are not required to install NO_x controls. These large plants would be required to install NO_x controls under Regulatory Alternatives 2 and 3, and increased cost ranges from \$2.40 to \$3.60/Mg (\$2.20 to \$3.30/ton) of MSW.

Small MWC plants (i.e., those with aggregate capacities equal to or less than 225 Mg/day [250 tons/day] of MSW) would incur no increased costs (over baseline) under Regulatory Alternatives 1 or 2. Under Regulatory Alternative 3, small plants would be required to control NO_x emissions, and increased annualized cost per unit of MSW combusted would be significantly higher than for large plants, ranging from \$7.40 to \$20.10/Mg (\$6.70 to \$18.30/ton) of MSW.

National Impacts of the Regulatory Alternatives for NO_x Control: The national annual NO_x emissions (and the emission reductions relative to baseline emissions) from MWC plants under the baseline and each of the regulatory alternatives are shown in Table 16. As shown in the table, national baseline NO_x emissions from MWC plants are 29,000 Mg/year (32,000 tons/year).

Under the three regulatory alternatives, national emissions would be reduced by 37 to 45 percent, and national emissions would range from 19,000 Mg/year (21,000 tons/year) under Alternative 1 to 16,000 Mg/year (18,000 tons/year) under Alternative 3. The table shows that by controlling the large plants (under Alternative 1 or 2) most of the achievable emission reduction is

realized, and control of small plants under Alternative 3 would result in little additional emission reduction.

TABLE 16.—NATIONAL NO_x EMISSIONS UNDER BASELINE AND THE REGULATORY ALTERNATIVES FOR NO_x CONTROL

	NO _x emissions (Mg/year)	Percent reduction relative to baseline emissions
Baseline.....	29,000	0
1.....	19,000	37
2.....	17,000	42
3.....	16,000	45

Table 17 shows the national total increased capital costs (relative to baseline), increased total annualized cost, total increased annualized cost per unit of MSW combusted and incremental cost effectiveness (cost per Mg of NO_x emission reduction) for each of the regulatory alternatives. National costs given in this table are for new MWC plants that will be operating or under construction by the end of the fifth year of implementation of the NSPS. As shown in Table 17, national increased capital cost ranges from \$77 million under Regulatory Alternative 1 to \$123 million under Regulatory Alternative 3. Total increased annualized cost ranges from \$24 million under Regulatory Alternative 1 to \$37 million under Regulatory Alternative 3. Average increased annualized cost per unit of MSW combusted (relative to baseline) ranges from \$1.60/Mg (\$1.50/ton) for Regulatory Alternative 1 to \$2.50/Mg (\$2.30/ton) for Regulatory Alternative 3. The incremental cost effectiveness (incremental cost per Mg of NO_x emission reduction relative to the next less stringent regulatory alternative) ranges from \$2,200/Mg (\$2,000/ton) NO_x for Regulatory Alternative 1, to \$3,400/Mg (\$3,100/ton) NO_x for Regulatory Alternative 2, up to \$9,200/Mg (\$8,400/ton) for Regulatory Alternative 3.

TABLE 17.—NATIONAL NO_x CONTROL COSTS UNDER THE REGULATORY ALTERNATIVES FOR NO_x CONTROL

Regulatory alternative	Total capital cost (\$10 ⁶ /yr)	Total annualized cost (\$10 ⁶ /yr)	Total annualized cost per Mg MSW (\$/Mg)	Incremental cost effectiveness (\$/ton of NO _x)
1	77	24	1.60	2,200
2	97	30	2.00	3,400
3	123	37	2.50	9,200

Regulatory Alternative Selected: Regulatory Alternative 2 was selected for the proposed standard for NO_x and represents best demonstrated technology for MWC units at large MWC plants considering cost, nonair quality health and environmental impacts, and energy requirements. The proposed standards can be complied with through the use of any technology (e.g., post-combustion controls such as SNCR, SCR, or natural gas reburning, or by combustion modifications such as staged combustion, low excess air, flue gas recirculation, etc.).

The NO_x control technology that served as the basis for Regulatory Alternative 2 (i.e., SNCR by ammonia injection) is demonstrated on three MWC's in the U.S., and both SNCR and SCR technologies are demonstrated on additional MWC's in Japan and Europe, and no severe cost, economic, or energy impacts are expected to result from its application.

Relative to the regulatory baseline, NO_x standards based on Regulatory Alternative 2 would achieve about a 42 percent reduction in NO_x emissions from MWC's on a national basis. About 90 percent of new MWC's would be covered. The increase in MSW disposal cost (relative to baseline) would be about \$2.00/Mg (\$1.80/ton) of MSW processed, which is low relative to typical baseline disposal costs of \$40/Mg (\$36/ton) to over \$100/Mg (\$90/ton) of MSW.

While additional NO_x reductions would be achieved by applying the standard to all MWC's (Regulatory Alternative 3), these reductions would

be small, and the cost impacts would be unreasonably high for MWC's located at small MWC plants. Application of NO_x controls to small MWC's would achieve an additional 3 percent reduction in national NO_x emissions relative to Alternative 2. Cost impacts are about 4 to 5 times higher for small MWC's than for large MWC's. At an individual MWC level, the cost effectiveness of NO_x control of such a standard would be about \$10,500/Mg (\$9,500/ton) of NO_x removed for a typical small MWC plant, compared to a cost effectiveness of about \$2,200/Mg (\$2,000/ton) of NO_x removed for a typical large MWC plant. The increase in disposal costs for a typical small plant would be about \$8.20/Mg (\$7.40/ton) compared to less than \$2.00/Mg (\$1.80/ton) for a typical large MWC. Considering the cost impacts and relatively small potential emissions reduction, control of NO_x emissions from MWC's with capacities equal to or less than 225 Mg/day (250 tons/day) is not considered reasonable.

It has been contended that SNCR technology for NO_x control should not serve as the basis for the standard because it is more expensive than NO_x controls imposed in other industries. Such inter-industry comparisons cannot control this decision. The existence of less expensive or more expensive controls in other categories does not govern the decisions in this category. *Portland Cement Ass'n v. Ruckelshaus*, 486 F.2d 375, 389 (D.C. Cir. 1973), cert. denied, 417 U.S. 921 (1974); and cf. *American Meat Inst. v. EPA*, 528 F.2d 442, 466 (7th Cir. 1975). The EPA must review the statutory factors and arrive at an independent conclusion on whether to base NO_x standards on SNCR or any other technology on a category-by-category basis.

The EPA also solicits comment on the applicability of other types of NO_x emission control technologies to MWC's, including flue gas recirculation, natural gas reburn, and SCR. Comments in this area should address the performance capabilities of these technologies (i.e., the emission levels that can be achieved) and the costs associated with their use.

C. Performance Testing and Monitoring Requirements for NO_x

The proposed standards would require continuous monitoring of NO_x emissions using a continuous emission monitor (CEMS) for all MWC's with capacities greater than 225 Mg/day (250 tons/day) of MSW. An initial compliance test for NO_x would be required during the first 24 consecutive unit operating hours at full load. Compliance with the emission limit

would be determined using a block 24-hour average as measured by the CEMS. All valid data must be used in calculating emission rates, even if the minimum CEMS data requirement is met. Calculations to determine compliance would be made using Method 19.

The CEMS for NO_x are subject to the same minimum data collection requirements as described for other CEMS in Section IV.H. The minimum CEMS data requirement would be 75 percent of the hours per day and 75 percent of the days per month the unit is operated. Quality assurance would be maintained in accordance with Appendix F.

D. Reporting and Recordkeeping for NO_x

As described under "Rationale for the Standards for MWC Emissions" (Section IV.I.), the proposed standards would require that the Administrator be notified of the initial MWC unit startup for all affected facilities located within large MWC plants and of the planned date for initial compliance testing. Following the initial compliance tests for NO_x, a report would be submitted summarizing the compliance test results and the performance evaluation of the CEMS.

After the initial compliance test has been completed, the proposed standards would require that quarterly compliance reports for NO_x be submitted for all affected facilities located within large MWC plants. The quarterly report would need to include, as applicable, for the period covered by the report: (1) any period where emissions exceeded the applicable standard; (2) results of all annual performance tests; (3) all 24-hour average NO_x emission rates calculated during the period; and (4) identification of any periods for which data were excluded from these calculations. In addition, each quarterly report for NO_x would include the results of the daily CEMS drift tests and quarterly accuracy determinations as required under Appendix F, Procedure 1.

If the minimum amount of NO_x data was not obtained for a 24-hour averaging period, reasons for failure to obtain sufficient data and a description of corrective action taken would also be included, along with all information needed to calculate the 24-hour average values according to Method 19. Any failure to obtain the minimum amount of data for CEMS (75 percent of operating hours per day and 75 percent of operating days per month) must be reported in the quarterly reports along with reasons.

The proposed standards would also require that certain types of records be maintained. Records to be maintained include all data outputs of the CEMS; all quarterly reports submitted under this rulemaking; and all records required under Appendix F, Procedure 1. All required records would be maintained for 2 years following the date of such records, after which they could be discarded.

The reporting and recordkeeping requirements in the proposed NO_x standards are necessary to provide enforcement personnel with the data and information necessary to ensure that existing MWC's achieve continued compliance with the NO_x standards. At the same time, these requirements would not impose an unreasonable burden on MWC owners or operators.

VII. Combined Impacts of the Proposed Standards

The impacts of the proposed municipal waste combustor (MWC) emissions standard (based on good combustion practices [GCP] and acid gas/particulate matter [PM] control systems), the proposed materials separation standard, and the proposed nitrogen oxide (NO_x) emission standard are additive. The combined national emission impacts for these types of standards are summarized in Table 18.

As shown in Table 18, the combined national total annualized cost for the three proposed standards would be about \$190 million/year, and the combined annualized cost per unit of municipal solid waste [MSW] combusted would be \$12.90/Mg (\$11.70/ton) of MSW combined.

TABLE 18.—COMBINED NATIONAL EMISSION REDUCTIONS FOR THE SELECTED REGULATORY ALTERNATIVES

Pollutant (regulatory alternative selected)	Annual total emission reduction
MWC emissions (regulatory alternative IV):	
MWC organics:	15 kg/year
Dioxins/Furans	
MWC metals:	6,000 Mg/year
Particulate matter	
MWC acid gases:	
Sulfur dioxide	36,000 Mg/year
Hydrogen chloride	47,000 Mg/year
Materials separation	Additional reductions in MWC emissions
Nitrogen oxide (NO _x) (regulatory alternative 2):	12,000 Mg/year

TABLE 19.—COMBINED NATIONAL CONTROL COSTS FOR THE SELECTED REGULATORY ALTERNATIVES

Standard (regulatory alternative selected)	Total annualized cost (\$10 ⁶ /yr)	Annualized cost per Mg MSW (\$/Mg)
MWC emissions (regulatory alternative IV)	160	10.90
Materials separation.....	0	0
NO _x (regulatory alternative 2)	30	2.00
Combined total.....	190	12.90

The standards for materials separation and NO_x would add to the economic impacts on households and government units discussed for the MWC emission standards in section IV.F. However, as discussed in section V, the materials separation standards could result in net benefits (reduced costs) for waste disposal for some households and government units. Although households in some communities could incur disposal costs increase of over \$100/year for the combination of the three standards, no severe economic impacts are anticipated.

VIII. Miscellaneous

A. Prevention of Significant Deterioration Considerations

Today's rulemaking under section 111(b) would establish a new classification of pollutants subject to regulation under the Act: "Municipal waste combustor (MWC) emissions." The components of MWC emissions are MWC metals, MWC organics, and MWC acid gases. A consequence of this action is that prevention of significant deterioration (PSD) rules will now apply to all subject major stationary sources that have significant increases in this pollutant. Absent any significance levels in the regulations to exempt *de minimis* emission increases, PSD review would be triggered by any increase in MWC emissions (see, e.g., 40 CFR 52.21(b)(23)(ii)).

In order to maintain a manageable review process which focuses resources on environmental priorities, EPA is proposing in today's notice significance thresholds for these pollutants in a manner similar to those promulgated on August 7, 1980, for other regulated pollutants. At that time, EPA established emissions thresholds, expressed in tons per year, below which emissions would be considered *de minimis* and not be made subject to review. The Agency established these thresholds for 15 pollutants—the six criteria pollutants

plus the four pollutants addressed at that time by national emission standards for hazardous air pollutants (NESHAP) and the five addressed by the new source performance standards (NSPS) (see, e.g., 40 CFR 52.21(b)(23)(i)).

The current significance levels were established in 1980 as simple indicators of what emission levels could appropriately be considered *de minimis*. These emission levels have proven to be reasonable in implementing the PSD program. For noncriteria pollutants, the significance numbers were based on a percentage of the emissions of a well-controlled facility of modest size. For NESHAP pollutants, this level was 10 percent of allowable emissions from the subject facility; for NSPS, it was 20 percent. Projected impacts from emissions at this rate were compared to available health and welfare data to assure avoiding appreciable adverse effects.

For the purpose of establishing what amount of MWC emissions would be significant, a 225 Mg/day (250 tons/day) capacity MWC plant was evaluated. This capacity level was chosen since it is typical of many of the moderately sized MWC plants and represents that threshold capacity where a 90 Mg/year (100 tons/year) emission rate would qualify an MWC plant as being major under PSD. An MWC of this size typically would have the potential after controls to emit 90 Mg/year (100 tons/year) of MWC emissions. Because MWC emissions have carcinogenic components, EPA believes that a significance threshold of no higher than 10 percent of that emission rate is appropriate. Thus, the Agency proposes a significance emission level of 9 Mg/year (10 tons/year) of MWC emissions as a trigger for PSD review.

The August 1980 Federal Register also provided exemptions from the otherwise required PSD air quality monitoring data analyses for these sources which could demonstrate that their maximum expected air quality impact could be less than the values indicated in, e.g., 40 CFR 52.21(i)(B)(i) (45 FR 52676, 52709). Those air quality values were generally set at levels reflecting five times the lowest detectable ambient concentrations that could be measured by available monitoring equipment. The MWC emissions being regulated today present a somewhat different situation in that no ambient monitoring methods exist to measure these MWC-specific classifications of pollutants. For this reason, the Administrator will not at this time require PSD permit applicants to monitor specifically for MWC emissions. Applicants for MWC permits will, of

course, continue to be responsible for performing appropriate monitoring for other regulated pollutants.

The EPA recognizes that the determination of significance thresholds for review of increases in MWC emissions is important. Comment on the proposed threshold and the approach to defining it is therefore solicited and will be carefully reviewed.

B. Permitting Operational Guidance

On June 26, 1987, the EPA's Office of Air Quality Planning and Standards issued operational guidance for use by State and local agencies with PSD or nonattainment area new source review (NSR) permitting authority. The operational guidance was intended to be followed by State and local agencies in reviewing best available control technology determinations in PSD permits and lowest achievable emission rate determinations under NSR. These programs apply to MWC plants larger than 225 Mg/day (250 tons/day) capacity.

Today's proposal also would establish NO_x standards for large MWC plants and require materials separation, which were not included in the 1987 operational guidance. The NSPS would thus set more stringent emission control requirements for new MWC's than was urged under the 1987 operational guidance, and future permitting decisions under PSD and NSR programs must comply with this NSPS, if EPA adopts it as a final rule.

IX. Administrative Requirements

A. Public Hearing

Three public hearings are planned. Each will discuss the proposed standards in accordance with section 307(d)(5) of the Clean Air Act (CAA). Persons wishing to make oral presentations should contact EPA at the address given in the ADDRESSES section of this preamble. Oral presentations should be limited to 15 minutes each. Any member of the public may file a written statement before, during, or within 30 days after the hearing. Written statements should be mailed to the Air Docket Section at the address given in the ADDRESSES section of this preamble.

A verbatim transcript of the hearings and written statements will be available for public inspection and copying during normal working hours at the EPA's Air Docket Section in Washington, DC (see ADDRESSES section of this preamble).

B. Docket

The docket is an organized and complete file of all the information submitted to or otherwise considered in

the development of this proposed rulemaking. The principal purposes of the docket are: (1) To allow interested parties to identify and locate documents so that they can effectively participate in the rulemaking process, and (2) to serve as the record in case of judicial review (except for interagency review materials (section 307(d)(7)(A))). The docket number for this rulemaking is A-89-08.

C. Clean Air Act Procedural Requirements

1. *Administrator Listing—Section 111.* As prescribed by section 111 of the CAA, as amended, establishment of standards of performance for municipal waste combustors (MWC's) is based on the Administrator's determination (52 FR 25399, dated July 7, 1987) that these sources contribute significantly to air pollution which may reasonably be anticipated to endanger public health or welfare.

2. *Periodic Review—Section 111.* The regulation will be reviewed 4 years from the date of promulgation as required by the CAA. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements.

3. *External Participation—Section 117.* In accordance with section 117 of the CAA, publication of this proposal was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies. The Administrator will welcome comments on all aspects of the proposed regulation, including economic and technological issues.

4. *Economic Impact Assessment—Section 317.* Section 317 of the CAA requires the Administrator to prepare an economic impact assessment for any new source performance standard (NSPS) promulgated under section 111(b) of the Act. An economic impact assessment was prepared for the proposed standards and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the proposed standards to ensure that the proposed standards would represent the best system of emission reduction considering costs. Portions of the economic impact assessment are included in the background information documents and additional information is included in the docket.

D. Office of Management and Budget Reviews

1. *Paperwork Reduction Act.* The information collection requirements in this proposed rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1980, 44 U.S.C. 3501 *et seq.* Comments on these requirements should be submitted to the Office of Information and Regulatory Affairs, OMB, 726 Jackson Place NW, Washington, DC 20503, marked "Attention: Desk Officer for EPA." Copies of these comments should also be submitted to Air Docket Section (LE-131), Attention: Docket No. A-89-08, U.S. Environmental Protection Agency, 401 M Street SW, Washington, DC 20460. The final rule will reflect consideration of any comments on the information collection requirements.

The average annual burden of the reporting and recordkeeping requirements associated with the proposed regulation during the first 3 years of the NSPS would be 65 person-years, based on an average of 26 respondents per year.

2. *Executive Order 12291 Review.* This regulation was submitted to the OMB for review as required by Executive Order 12291. Any written comments from OMB and any responses to those comments will be included in Docket No. A-89-08. This docket is available for public inspection at the EPA's Air Docket Section, which is listed under the ADDRESSES section of this notice.

E. Regulatory Flexibility Act Compliance

The Regulatory Flexibility Act (RFA) (Public Law 96-354, September 19, 1980), requires consideration of the impacts of proposed regulations on small entities including small businesses, organizations, and jurisdictions. As described in section IV.F., no households or local governments would experience severe economic impacts as a result of the proposed NSPS. The RFA, however, requires a broader look into whether there will be significant adverse economic effects and, if so, how those impacts will be distributed among small entities. The major purpose of the RFA is to keep paperwork and 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. Another purpose is to involve the small entities in the regulatory development process.

The RFA specifies that a regulatory flexibility analysis must be prepared if a proposed regulation will have: (1) A

significant economic impact on (2) a substantial number of small entities. For the RFA, the question is whether impacts are significant—not severe. One criterion that EPA has used specifies that economic impacts are significant whenever compliance costs will increase production costs by more than 5 percent. As a result of the proposed standards, the combustion costs per Mg of municipal solid waste (MSW), as well as tipping fees, may increase by more than 5 percent.

Will these significant economic impacts be felt by a substantial number of small entities? For NSPS regulations, EPA often has applied a 20 percent rule; if more than 20 percent of small entities are significantly impacted, the specific concerns of the RFA must be addressed. Unfortunately, it is rarely clear what the 20 percent should be of. In this case it could be 20 percent of the small entities with MWC's—but almost by definition 100 percent of those entities will be significantly impacted—or 20 percent of small entities in the "industry." Regardless of how the criterion is viewed, EPA finds only a few small businesses and only a handful of small governments that will own or operate MWC's.

The EPA has taken appropriate steps to involve small entities in the regulatory development process, and to mitigate potential adverse effects for small entities. In the spring of both 1988 and 1989 EPA presented status reports on the standards at a public meeting of the National Air Pollution Control Techniques Advisory Committee (NAPCTAC). The function of NAPCTAC is to serve as a forum for involving industry and the public in the regulatory development process for air pollution emission controls. Owners of all existing MWC's, all firms involved in owning or operating MWC's, and a wide selection of public interest groups were invited to attend and participate in the NAPCTAC meeting. In the autumn of 1988 EPA mailed a package of about a dozen documents covering most aspects of development of the standards. The mailing went to substantially the same parties—over 300 in total. Recipients were invited to comment on all aspects of the development of the standards.

In compliance with the RFA, measures to mitigate effects on small entities were also considered. Small entities that own or operate MWC's most likely will have small modular MWC's. For that reason the mitigation measures discussed in this section focus on small MWC's as surrogates for small entities. There are several ways potentially significant adverse economic impacts on small

entities will be mitigated. First, the standards contain mitigation measures. Several of the requirements are less restrictive for smaller MWC's. To the extent the proportion of small-entity owners and operators of small MWC's exceeds the proportion of small-entity owners and operators of large MWC's, the proposal provision for small MWC's translates into an easing of the economic burden on small entities relative to large entities.

Second, there are several things small governments can do in the face of steep compliance costs. In almost all cases these governments have available to them an alternative waste disposal technology—landfilling—and many ways to expand source reduction, materials separation, and recycling programs. Small governments have the opportunity to join in, or join in forming, intergovernmental service districts, or to contract with neighboring waste disposal operations for disposal services. Whenever intergovernmental agreements lead to the construction of MWC's of larger capacity than otherwise would have been constructed, air pollution control costs per Mg of MSW will shrink. Governments also can exercise monopoly market power to restrict competition among landfills and MWC's to improve the financial viability of particular MWC's. Finally, small governments that want to combust MSW have the option of building and operating MWC's as public ventures, or arranging for the MWC's to be built and operated as private ventures. The small governments can investigate both financial markets and then select whichever approach offers the best terms.

F. List of Subjects in 40 CFR Parts 51, 52 and 60

Air pollution control, Incorporation by reference, Intergovernmental relations, Reporting and recordkeeping, Municipal waste combustors, Municipal solid waste.

Dated: November 30, 1989.

William K. Reilly,
Administrator.

For the reasons set forth in the preamble, it is proposed that part 51, 52, and 60, chapter I, title 40 of the Code of Federal Regulations, be amended as follows:

PART 51—REQUIREMENTS FOR PREPARATION, ADOPTION, AND SUBMITTAL OF IMPLEMENTATION PLANS

1. The authority citation for part 51 continues to read as follows:

Authority: Secs. 101(b)(1), 110, 160-169, 171-178, and 301(a) of the Clean Air Act; 42 U.S.C. 7401(b)(1), 7410, 7470-7479, 7501-7508, and 7601(a).

§ 51.166 [Amended]

2. In § 51.166 paragraph (b)(23)(i) the "Pollutant and Emission Rate" is amended by adding an entry to the end to read as follows:

Municipal waste combustor emissions:
10 tpy

PART 52—APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

3. The authority citation for part 52 continues to read as follows:

Authority: 42 U.S.C. 7401-7462.

§ 52.21 [Amended]

4. In § 52.21, paragraph (b)(23)(i) the "Pollutant and Emission Rate" is amended by adding an entry to the end to read as follows:

Municipal waste combustor emissions:
10 tpy

PART 60—STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES

5. The authority citation for part 60 continues to read as follows:

Authority: 42 U.S.C. 7401, 7411, 7414, 7416 and 7601.

6. Part 60 is amended by adding a Subpart Ea, consisting of §§ 60.50a through 60.59a, as follows:

Subpart Ea—Standards of Performance for Municipal Waste Combustors

Sec.

60.50a Applicability and delegation of authority.

60.51a Definitions.

60.52a Standard for MWC metals.

60.53a Standard for MWC organics.

60.54a Standard for MWC acid gases.

60.55a Standard for nitrogen oxides.

60.56a Standard for MWC operating practices.

60.57a MWC operator certification and training.

60.58a Compliance and performance testing.

60.59a Reporting and recordkeeping requirements.

Subpart Ea—Standards of Performance for Municipal Waste Combustors

§ 60.50a Applicability and delegation of authority.

(a) The affected facility to which this subpart applies is each municipal waste combustor (MWC) unit for which construction, modification, or reconstruction is commenced after December 20, 1989.

(b) Physical or operational changes made to an existing MWC unit to comply with emission guidelines under Subpart Ca are not considered a modification or reconstruction and do not bring an existing MWC unit under this subpart.

(c) The following authorities shall be retained by the Administrator and not transferred to a State.

§ 60.56a(h)

§ 60.51a Definitions.

"ASME" means the American Society of Mechanical Engineers.

"Bubbling fluidized bed combustor" means a fluidized bed combustor in which the majority of the bed material remains in the primary combustion zone.

"Chief facility operator" means the person in direct charge and control of the operation of an MWC and who is responsible for daily on-site supervision, technical direction, management, and overall performance of the facility.

"Circulating fluidized bed combustor" means a fluidized bed combustor in which the majority of the bed material is carried out of the primary combustion zone and is transported back to the primary zone through a recirculation loop.

"Coal/RDF co-fired combustor" means a combustor that is designed to fire coal and refuse-derived fuel (RDF) simultaneously.

"Continuous emission monitoring system" or "CEMS" means a monitoring system for continuously measuring the emissions of a pollutant from an affected facility.

"Dioxin/furan" means total tetra-through octa-chlorinated dibenzo-p-dioxins and dibenzofurans.

"Ferrous metals" means metals and alloys containing iron. Ferrous metals include, but are not limited to, pieces of scrap metal and household appliances made of iron-containing metals, including stoves, refrigerators, air conditioners, and other appliances. Ferrous metals do not include whole automobiles or other vehicles or vehicle bodies.

"Four-hour block average" or "4-hour block average" means the average of all hourly emission rates when the affected facility is operating and combusting MSW measured over 4-hour periods of from 12:00 midnight to 4 a.m., 4 a.m. to 8 a.m., 8 a.m. to 12:00 noon, 12:00 noon to 4 p.m., 4 p.m. to 8 p.m., and 8 p.m. to 12:00 midnight.

"Large MWC plant" means an MWC plant with an MWC plant capacity greater than 225 megagrams per day (250 tons per day) of municipal-type solid waste (MSW).

"Mass burn refractory MWC" means a combustor that combusts MSW in a refractory wall furnace.

"Mass burn rotary waterwall MWC" means a combustor that combusts MSW in a cylindrical rotary waterwall furnace.

"Mass burn waterwall MWC" means a combustor that combusts MSW in a conventional waterwall furnace.

"Maximum MWC unit load" means the maximum 1-hour MWC unit load achieved during the initial compliance test or during any subsequent test demonstrating compliance at a higher unit load.

"Modular excess air MWC" means a combustor that combusts MSW and that is not field-erected and has multiple combustion chambers, all of which are designed to operate at conditions with combustion air amounts in excess of theoretical air requirements.

"Modular starved air MWC" means a combustor that combusts MSW and that is not field-erected and has multiple combustion chambers in which the primary combustion chamber is designed to operate at substoichiometric conditions.

"Municipal waste combustor" or "MWC" or "MWC unit" means any device that combusts MSW including, but not limited to, field-erected incinerators (with or without heat recovery), modular incinerators (starved air or excess air), boilers (i.e., steam generating units), and furnaces (whether suspension-fired, grate-fired, mass-fired, or fluidized bed-fired).

"Municipal-type solid waste" or "MSW" means refuse, more than 50 percent of which is waste consisting of a mixture of paper, wood, yard wastes, food wastes, plastics, leather, rubber, and other combustible materials, and noncombustible materials such as metal, glass, and rock. RDF is considered to be MSW. Construction/demolition waste is not considered to be MSW.

"MWC acid gases" means sulfur dioxide and hydrogen chloride gases emitted from MWC units.

"MWC metals" means condensable metals associated with particulate matter emissions from MWC units.

"MWC organics" means organic compounds emitted from MWC units and includes total tetra- through octa-chlorinated dibenzo-p-dioxins and dibenzofurans.

"MWC plant" means one or more MWC units at the same location for which construction, modification, or reconstruction is commenced after December 20, 1989.

"MWC plant capacity" means the aggregate MWC unit capacity of all MWC units at an MWC plant. MWC

units for which construction, modification, or reconstruction is commenced before December 20, 1989 are not included for determining applicability under this subpart.

"MWC unit capacity" means the maximum design charging rate of an MWC unit expressed in megagrams per day (tons per day) of MSW combusted.

"MWC unit load" means volume of steam produced expressed in kilograms per hour (pounds per hour) of steam.

"Particulate matter" means total particulate matter emitted from MWC units as measured by Method 5 (see § 60.58a).

"Potential hydrogen chloride emission rate" means the hydrogen chloride emission rate that would occur from combustion of MSW in the absence of any hydrogen chloride emissions control.

"Potential sulfur dioxide emission rate" means the sulfur dioxide emission rate that would occur from combustion of MSW in the absence of any sulfur dioxide emissions control.

"Processed MSW or RDF" means MSW or RDF that has been processed to separate materials for recovery prior to combustion in an MWC unit. MSW or RDF is considered to be processed MSW or RDF if an overall 25 percent or greater reduction by weight (annual average) of MSW is achieved through separation for recovery of some or all of the following recoverable materials:

Paper and paperboard combined;
Ferrous metals;
Nonferrous metals;
Glass;
Plastics;
Household batteries; and
Yard waste.

A maximum of 10 percent reduction (by weight) of the overall MSW shall be attributed to separation of yard waste. The 25 percent or greater overall reduction requirement may be achieved by on-site mechanical separation, on-site manual separation, off-site mechanical separation, off-site manual separation, or a curbside source reduction or materials separation (recycling) program, or a combination thereof.

"Recoverable materials" means paper and paperboard combined; ferrous metals; nonferrous metals; glass; plastics; household batteries; and yard waste.

"Refuse-derived fuel" or "RDF" means a type of MSW produced by processing MSW through shredding and size classification. This includes all classes of RDF including low density fluff RDF through densified RDF fuel pellets.

"Refuse-derived fuel spreader stoker" means a steam generating unit that

combusts RDF in a semi-suspension firing mode using air-fed distributors.

"Same location" means the same or contiguous property that is under common ownership or control, including properties that are separated only by a street, road, highway, or other public right-of-way. Common ownership or control includes properties that are owned, leased, or operated by the same entity, parent entity, subsidiary, subdivision, or any combination thereof, including any municipality or other governmental unit, or any quasi-governmental authority (e.g., a public utility district or regional waste disposal authority).

"Shift supervisor" means the person in direct charge and control of the operation of an MWC and who is responsible for on-site supervision, technical direction, management, and overall performance of the facility during an assigned shift.

"Small MWC plant" means an MWC plant with an MWC plant capacity of 225 megagrams per day (250 tons per day) or less of MSW.

"Twenty-four hour daily average" or "24-hour daily average" means the average of all hourly emission rates when the affected facility is operating and firing MSW measured over a 24-hour period between 12:00 midnight and the following midnight.

"Unprocessed MSW or RDF" means MSW or RDF that has not been processed to separate materials for recovery prior to combustion or for which less than a 25 percent reduction by weight (annual average) of MSW is achieved as specified under "processed MSW or RDF."

"Vehicle batteries" means any wet lead-acid battery weighing more than 5 kilograms (11 pounds) that is manufactured for use in motor vehicles, vessels, or aircraft, or for any other (nonvehicular) use.

"Yard waste" means vegetative matter removed as a result of outdoor maintenance practices from residential and commercial yards, municipal parks, gardens, golf courses, and other similar areas, and includes, but is not limited to, grass trimmings, tree branches, straw, and leaves.

§ 60.52a Standard for MWC metals.

(a) On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility shall cause to be discharged into the atmosphere from that affected facility any gases that contain particulate matter in excess of 34 milligrams per dry standard cubic meter

(0.015 grains per dry standard cubic foot), corrected to 7 percent oxygen (dry basis).

(b) On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility subject to the particulate matter emission limit under paragraph (a) of this section shall cause to be discharged into the atmosphere from that affected facility any gases that exhibit greater than 10 percent opacity (6-minute average).

§ 60.53a Standard for MWC organics.

(a) On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility located within a small MWC plant shall cause to be discharged into the atmosphere from that affected facility any gases that contain dioxin/furan emissions that exceed 75 nanograms per normal cubic meter (30 grains per billion standard cubic feet), corrected to 7 percent oxygen (dry basis), except as provided under paragraph (b) of this section.

(b) On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility combusting RDF and located within a small MWC plant shall cause to be discharged into the atmosphere from that affected facility any gases that contain dioxin/furan emissions that exceed 250 nanograms per normal cubic meter (100 grains per billion standard cubic feet), corrected to 7 percent oxygen (dry basis).

(c) On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility located within a large MWC plant shall cause to be discharged into the atmosphere from that affected facility any gases that contain dioxin/furan emissions that exceed (5 to 30) nanograms per normal cubic meter ([2 to 12] grains per billion standard cubic feet), corrected to 7 percent oxygen (dry basis).

§ 60.54a Standard for MWC acid gases.

(a) On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility located within a small MWC plant shall cause to be discharged into the atmosphere from that affected facility any gases that contain sulfur dioxide in excess of 50 percent of the potential sulfur dioxide emission rate (50 percent reduction by weight or

volume) or 30 parts per million by volume, corrected to 7 percent oxygen (dry basis), whichever is less stringent.

(b) On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility located within a small MWC plant shall cause to be discharged into the atmosphere from that affected facility any gases that contain hydrogen chloride in excess of 20 percent of the potential hydrogen chloride emission rate (80 percent reduction by weight or volume) or 25 parts per million by volume, corrected to 7 percent oxygen (dry basis), whichever is less stringent.

(c) On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility located within a large MWC plant shall cause to be discharged into the atmosphere from that affected facility any gases that contain sulfur dioxide in excess of 15 percent of the potential sulfur dioxide emission rate (85 percent reduction by weight or volume) or 30 parts per million by volume, corrected to 7 percent oxygen (dry basis), whichever is less stringent.

(d) On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility located within a large MWC plant shall cause to be discharged into the atmosphere from that affected facility any gases that contain hydrogen chloride in excess of 5 percent of the potential hydrogen chloride emission rate (95 percent reduction by weight or volume) or 25 parts per million by volume, corrected to 7 percent oxygen (dry basis), whichever is less stringent.

§ 60.55a Standard for nitrogen oxides.

On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility located within a large MWC plant shall cause to be discharged into the atmosphere from that affected facility any gases that contain nitrogen oxides in excess of (120 to 200) parts per million by volume, corrected to 7 percent oxygen (dry basis).

§ 60.56a Standards for MWC operating practices.

(a) On and after the date on which the initial compliance test is completed or is required to be completed under § 60.8, no owner or operator of an affected facility shall cause such facility to exceed the carbon monoxide standards shown in Table 1.

TABLE 1.—MWC OPERATING STANDARDS

MWC technology	Carbon monoxide emission limit (parts per million by volume)*
Mass burn waterwall.....	100
Mass burn refractory.....	100
Mass burn rotary waterwall.....	150
Modular starved air.....	50
Modular excess air.....	50
Refuse derived fuel spreader stoker.....	150
Bubbling fluidized bed combustor.....	100
Circulating fluidized bed combustor.....	100
Coal/RDF co-fired combustors.....	150
Other Technologies.....	150

* Measured at the combustor outlet in conjunction with a measurement of oxygen concentration, corrected to 7 percent oxygen (dry basis), using a 4-hour block average.

(b) No owner or operator of an affected facility that generates steam shall cause such facility to operate at a load level greater than 100 percent of the maximum MWC unit load. Any owner or operator of an affected facility who wishes to operate at a load level greater than the maximum MWC unit load may do so by conducting a repeat test to establish a higher maximum MWC unit load.

(c) No owner or operator of an affected facility shall cause such facility to operate at a temperature exceeding 230°C (450°F) measured at the particulate matter control device inlet.

(d) Except as provided under paragraphs (g) and (h) of this section, on and after the date of initial start-up, no owner or operator of an affected facility shall cause unprocessed MWC or RDF to be combusted in such facility.

(e) Except as provided under paragraph (g) of this section, on and after the date of initial start-up, no owner or operator of an affected facility shall cause vehicle batteries to be combusted in such facility.

(f) Except as provided under paragraph (g) of this section, on and after the date of initial start-up, a program to remove household batteries from MWC prior to combustion shall be established.

(g) The owner or operator of an affected facility that commenced construction, modification, or reconstruction after December 20, 1989, but before (date of promulgation), shall meet the requirements of paragraphs (d), (e), and (f) of this section on and after December 31, 1992, or on and after the date of initial start-up, whichever is later.

(h)(i) The owner or operator of an affected facility may apply to the Administrator for a materials

separation/combustion permit for any combustible material designated for separation under the materials separation plan under § 60.59a(d) for which a market is unavailable for the separated material for 120 days. A market is considered to be unavailable for such combustibles if the Administrator determines that: the cost of recycling such combustibles exceeds the cost of landfilling them, and that the 25 percent reduction in the weight of MWC or RDF contained in the definition of "processed MSW or RDF" cannot be obtained through separation of other recoverable materials. An owner or operator wishing to demonstrate that a recycling market is unavailable for recoverable combustibles must submit a demonstration to the Administrator that includes: a list of recycling facilities and facility officials contacted, a written discussion of why he was not able to obtain recycling for the combustible wastes, and/or a list of landfill facilities and facility individuals contacted and a documented comparison of the costs of recycling versus the costs of landfilling. The MWC owner or operator must also provide to the Administrator the following certification:

I certify under penalty of law that a recycling market is unavailable for the following combustible recoverables as defined in 40 CFR 60.51a. I believe that the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

(2) If a materials separation/combustion permit has been issued, separated material(s) covered under the materials separation/combustion permit may be combusted in the affected facility and are credited toward the overall 25 percent materials separation requirement under the definition of "processed MSW or RDF" under § 60.51a.

(3) If a materials separation/combustion permit is granted by the Administrator, it shall be valid for a maximum of 1 year. Reapplication may be made for subsequent materials separation/combustion permits within 60 days before expiration of such a permit and may be renewed for 1 year.

§ 60.57a MWC operator certification and training.

(a) Within 24 months from the date that ASME adopts a certification program for MWC unit (resource recovery facility) operators, each chief facility operator and shift supervisor of an affected facility shall obtain and keep current either a provisional or operator certification from ASME.

(b) The owner or operator of an affected facility shall cause an ASME-certified shift supervisor to be on duty at the affected facility at all times during periods of MWC unit operation. This requirement shall take effect 24 months after the date that ASME adopts a certification program for MWC unit (resource recovery facility) operators.

(c) The owner or operator of an affected facility shall develop and update on a yearly basis a site-specific operating manual that shall, at a minimum, address the following elements of MWC unit operation:

- (1) Summary of the applicable standards under this subpart;
- (2) Description of basic combustion theory applicable to an MWC unit;
- (3) Procedures for receiving, handling, and feeding MSW;
- (4) MWC unit startup, shutdown, and malfunction procedures;
- (5) Procedures for maintaining proper combustion air supply levels;
- (6) Procedures for operating the MWC unit within the standards established under this subpart;
- (7) Procedures for responding to periodic upset or off-specification conditions;
- (8) Procedures for minimizing particulate matter carryover;
- (9) Procedures for monitoring the degree of MSW burnout;
- (10) Procedures for handling ash;
- (11) Procedures for monitoring MWC unit emissions; and
- (12) Reporting and recordkeeping procedures.

(d) The owner or operator of an affected facility shall establish a program for reviewing the operating manual annually with each person who has responsibilities affecting the operation of an affected facility including, but not limited to, chief facility operators, shift supervisors, control room operators, ash handlers, maintenance personnel, and crane/load handlers.

(e) The initial review of the operating manual, as specified under paragraph (d) of this section, shall be conducted prior to assumption of responsibilities affecting MWC unit operation by any person required to undergo training under paragraph (d) of this section. Subsequent reviews of the manual shall be carried out annually by each such person.

(f) The operating manual shall be kept in a readily accessible location for all persons required to undergo training under paragraph (d) of this section. The operating manual and records of training shall be available for inspection by EPA upon request.

§ 60.58a Compliance and performance testing.

(a) The standards under this subpart apply at all times, except during periods of startup, shutdown, or malfunction: *Provided, however,* That the duration of startup, shutdown, or malfunction shall not exceed 3 hours per occurrence.

(b) The following procedures and test methods shall be used to determine compliance with the emission standards for PM under § 60.52a:

(1) Method 1 shall be used to select sampling site and number of traverse points.

(2) Method 3 shall be used for gas analysis.

(3) Method 5 shall be used for determining compliance with the particulate matter emission standard. The minimum sample volume shall be 3.4 cubic meters (120 cubic feet). The temperature of the sample gas in the probe and filter holder shall be 160 °C (320 °F). An oxygen or carbon dioxide measurement shall be obtained simultaneously with each Method 5 run.

(4) For each Method 5 run, the emission rate shall be determined using:

- (i) Oxygen or carbon dioxide measurements,
- (ii) Dry basis F factor, and
- (iii) Dry basis emission rate calculation procedures in Method 19.

(5) An owner or operator may request that compliance be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

(6) The owner or operator of an affected facility shall conduct an initial compliance test for particulate matter and opacity as required under § 60.8.

(7) Method 9 shall be used for determining compliance with the opacity standard.

(8) The owner or operator of an affected facility shall install, calibrate, maintain, and operate a continuous emission monitoring system (CEMS) for measuring opacity and record the output of the system.

(9) Following the date the initial compliance test for particulate matter is completed or is required to be completed under § 60.8 for an affected facility located within a large MWC plant, the owner or operator shall conduct a performance test for particulate matter on an annual basis (no more than 12 calendar months following the previous compliance test).

(10) Following the date the initial compliance test for particulate matter is completed or is required to be

completed under § 60.8 for an affected facility located within a small MWC plant, the owner or operator shall conduct a performance test for particulate matter on an annual basis (no more than 12 calendar months following the previous compliance test). If all three performance tests for a 3-year period indicate compliance with the particulate matter standard, the owner or operator may forego a performance test for the subsequent 2 years. At a minimum, a performance test for particulate matter shall be conducted every third year (no more than 36 months following the previous compliance test). If a performance test conducted every third year indicates compliance with the particulate matter standard, the owner or operator may forego a performance test for an additional 2 years.

(c) The following procedures and test methods shall be used to determine compliance with the standards for dioxin/furan emissions under § 60.53a:

(1) Method 23 shall be used for determining compliance with the dioxin/furan emission standards.

(2) The owner or operator of an affected facility shall conduct an initial compliance test for dioxin/furan emissions as required under § 60.8.

(3) Following the date of the initial compliance test or the date on which the initial compliance test is required to be completed under § 60.8, the owner or operator of an affected facility located within a large MWC plant shall conduct a performance test for dioxin/furan emissions on an annual basis (no more than 12 calendar months following the previous compliance test).

(4) Following the date of the initial compliance test or the date on which the initial compliance test is required under § 60.8, the owner or operator of an affected facility located within a small MWC plant shall conduct a performance test for dioxin/furan emissions on an annual basis (no more than 12 calendar months following the previous compliance test). If all three performance tests in a 3-year period indicate compliance with the dioxin/furan emissions standard, the owner or operator may forego a performance test for the subsequent 2 years. At a minimum, a performance test for dioxin/furan emissions shall be conducted every third year (no more than 36 months following the previous compliance test). If a performance test conducted every third year indicates compliance with the dioxin/furan emissions standard, the owner or operator may forego conducting a performance test for an additional 2 years.

(5) An owner or operator may request that compliance with the dioxin/furan emissions standard be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

(d) The following procedures and test methods shall be used for determining compliance with the sulfur dioxide standards under § 60.54a:

(1) The percentage reduction in the potential sulfur dioxide emissions (%P_{SO2}) is computed using the following formula:

$$\%P_{SO2} = \frac{(E_i - E_o)}{E_i} \times 100$$

where:

E_i is the daily potential sulfur dioxide emission rate.

E_o is the daily sulfur dioxide emission rate measured at the outlet of the acid gas control device.

(2) Method 19 shall be used for determining the sulfur dioxide emission rate.

(3) An owner or operator may request that compliance with the sulfur dioxide emissions standard be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

(4) The owner or operator of an affected facility shall conduct an initial compliance test for sulfur dioxide as required under § 60.8. The sulfur dioxide compliance test shall be conducted over 24 consecutive unit operating hours at maximum MWC unit load. Compliance with the sulfur dioxide standard shall be determined using a 24-hour daily average.

(5) The owner or operator of an affected facility shall install, calibrate, maintain, and operate a CEMS for measuring sulfur dioxide emissions discharged to the atmosphere and record the output of the system.

(6) Following the date of the initial compliance test or the date on which the initial compliance test is required to be completed under § 60.8, compliance with the sulfur dioxide standard shall be determined based on the arithmetic average of the hourly emission rates during each 24-hour daily period measured between 12:00 midnight and the following midnight using CEMS inlet and outlet data, if compliance is based on a percentage reduction, or outlet data

only if compliance is based on an emission limit.

(7) At a minimum CEMS data shall be obtained for 75 percent of the hours per day for 75 percent of the days per month the unit is operated and combusting MSW.

(8) The 1-hour averages required under paragraph (d)(5) of this section shall be expressed in nanograms per hour (pounds per hour) and used to calculate the 24-hour daily average emission rates. The 1-hour averages shall be calculated using the data points required under § 60.13(b). At least two data points shall be used to calculate each 1-hour average.

(9) All valid CEMS data shall be used in calculating emission rates and percent reductions even if the minimum CEMS data requirements of paragraph (d)(7) of this section are met.

(10) The procedures under § 60.13 shall be followed for installation, evaluation, and operation of the CEMS.

(11) The CEMS shall be operated according to Performance Specification 1, 2, and 3 (Appendix B).

(12) Quarterly accuracy determinations and daily calibration drift tests shall be performed in accordance with Procedure 1 (Appendix F).

(13) The span value of the CEMS at the inlet to the sulfur dioxide control device is 125 percent of the maximum estimated hourly potential sulfur dioxide emissions of the MWC unit, and the span value of the CEMS at the outlet to the sulfur dioxide control device is 50 percent of the maximum estimated hourly potential sulfur dioxide emissions of the MWC unit.

(14) When sulfur dioxide emissions data are not obtained because of CEMS breakdowns, repairs, calibration checks and zero and span adjustments, emissions data shall be obtained by using other monitoring systems as approved by the Administrator or Method 19 to provide as necessary emission data for a minimum of 75 percent of the hours per day for 75 percent of the days per month the unit is operated and combusting MSW.

(e) The following procedures and test methods shall be used for determining compliance with the hydrogen chloride standards under § 60.54a:

(1) The percentage reduction in the potential hydrogen chloride emissions (%P_{HCl}) is computed using the following formula:

$$\%P_{HCl} = \frac{(E_i - E_o)}{E_i} \times 100$$

where:

E_i is the daily potential hydrogen chloride emission rate.

E_o is the daily hydrogen chloride emission rate measured at the outlet of the acid gas control device.

(2) Method 26 shall be used for determining the hydrogen chloride emission rate.

(3) An owner or operator may request that compliance with the hydrogen chloride emissions standard be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

(4) The owner or operator of an affected facility shall conduct an initial compliance test for hydrogen chloride as required under § 60.8.

(5) Following the date of the initial compliance test or the date on which the initial compliance test is required under § 60.8, the owner or operator of an affected facility located within a large MWC plant shall conduct a performance test for hydrogen chloride on an annual basis (no more than 12 calendar months following the previous compliance test).

(6) Following the date of the initial compliance test or the date on which the initial compliance test is required under § 60.8, the owner or operator of an affected facility located within a small MWC plant shall conduct a performance test for hydrogen chloride on an annual basis (no more than 12 calendar months following the previous compliance test). If all three performance tests in a 3-year period indicate compliance with the hydrogen chloride standard, the owner or operator may forego a performance test for the subsequent 2 years. At a minimum, a performance test for hydrogen chloride shall be conducted every third year (no more than 36 months following the previous compliance test). If a performance test conducted every third year indicates compliance with the hydrogen chloride standard, the owner or operator may forego conducting a performance test for an additional 2 years.

(f) The following procedures and test methods shall be used to determine compliance with the nitrogen oxides standard under § 60.55a:

(1) Method 19 shall be used for determining the nitrogen oxides emission rate.

(2) An owner or operator may request that compliance with the nitrogen oxides emissions standard be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen. The relationship between oxygen and carbon dioxide levels for the affected facility shall be established during the initial compliance test.

(3) The owner or operator of an affected facility subject to the nitrogen oxides standard under § 60.55a shall conduct an initial compliance test for nitrogen oxides as required under § 60.8. The initial compliance test for nitrogen oxides shall be conducted over 24 consecutive hours of unit operation using a CEMS for measuring nitrogen oxides to determine compliance with the nitrogen oxides standard. Compliance with the nitrogen oxides standard shall be determined using a 24-hour daily average.

(4) The owner or operator of an affected facility subject to the nitrogen oxides emissions standard of § 60.55a shall install, calibrate, maintain, and operate a CEMS for measuring nitrogen oxides discharged to the atmosphere and record the output of the system.

(5) Following the initial compliance test or the date on which the initial compliance test is required to be completed under § 60.8, compliance with the emission limits for nitrogen oxides required under § 60.55a shall be determined based on the arithmetic average of the hourly emission rates during each 24-hour daily period measured between 12:00 midnight and the following midnight using CEMS data.

(6) At a minimum CEMS data shall be obtained for 75 percent of the hours per day for 75 percent of the days per month the unit is operated and combusting MSW.

(7) The 1-hour averages required by paragraph (f)(6) of this section shall be expressed in parts per million volume (dry basis) and used to calculate the 24-hour daily average emission rates under § 60.55a. The 1-hour averages shall be calculated using the data points required under § 60.13(b). At least two data points shall be used to calculate each 1-hour average.

(8) All valid CEMS data must be used in calculating emission rates even if the minimum CEMS data requirements of paragraph (f)(7) of this section are met.

(9) The procedures under § 60.13 shall be followed for installation, evaluation, and operation of the CEMS.

(10) Quarterly accuracy determinations and daily calibration drift tests shall be performed in accordance with Procedure 1 (Appendix F).

(11) When nitrogen oxides emissions data are not obtained because of CEMS breakdowns, repairs, calibration checks, and zero and span adjustments, emission data calculations to determine compliance shall be made using other monitoring systems as approved by the Administrator or Method 19 to provide as necessary emission data for a minimum of 75 percent of the hours per day for 75 percent of the days per month the unit is operated and combusting MSW.

(g) The following procedures shall be used for determining compliance with the operating standards under § 60.56a:

(1) Compliance with the carbon monoxide emission limits in § 60.56a(a) shall be determined using a 4-hour block average.

(2) The owner or operator of an affected facility shall install, calibrate, maintain, and operate a CEMS for measuring carbon monoxide at the combustor outlet and record the output of the system.

(3) An owner or operator may request that compliance with the carbon monoxide emission limit be determined using carbon dioxide measurements corrected to an equivalent of 7 percent oxygen.

(4) The owner or operator of an affected facility shall install, calibrate, maintain, and operate a steam flow meter and measure steam flow in kilograms per hour (pounds per hour) steam on a continuous basis and record the output of the monitor. Steam flow shall be calculated in 1-hour block averages.

(5) The owner or operator of an affected facility shall install, calibrate, maintain, and operate a device for measuring temperature and measure the temperature of the flue gas stream at the inlet to the particulate matter air pollution control device on a continuous basis and record the output of the device. Temperature shall be calculated in 4-hour block averages.

(6) Maximum MWC unit load shall be determined during the initial compliance test. Maximum MWC unit load shall be the maximum 1-hour load achieved during the initial compliance test or any subsequent tests.

(7) The minimum data requirement under this section is 75 percent of the hours per day for 75 percent of the days per month the MWC unit is operated and combusting MSW.

(8) All valid data must be used in calculating the parameters specified under paragraph (g) of this section even if the minimum data requirements of paragraph (g)(6) of this section are met.

(9) Quarterly accuracy determinations and daily calibration drift tests for carbon monoxide CEMS shall be performed in accordance with Procedure 1 (Appendix F).

(10) (i) Except as provided under paragraph (g)(10)(iv) of this section, the initial demonstration of compliance with the percent reduction requirement (annual average) contained in the definition of "processed MSW or RDF" in § 60.51a and the provisions of §§ 60.56a (d), (e), and (f) shall be required at the end of the second full calendar year (January through December) after the date of initial start-up of an affected MWC. The annual average percent MSW reduction calculated and reported at the end of the first full calendar year after initial start-up shall not be used to determine compliance.

(ii) Compliance with the percent reduction requirement contained in the definition of "processed MSW or RDF" in § 60.51a shall be determined by calculating the percentage difference between the weight of MSW received at the affected facility (as defined in § 60.51a) and the weight of MSW combusted in the MWC unit or the weight of separated recoverable materials. Except as provided under paragraph (iv) of this section, beginning the month after the date of the initial start-up for new MWC's, the percent reduction in MSW shall be calculated on a monthly basis using the monthly total weights recorded in compliance with §§ 60.59a (8) and (9). At the end of each full calendar year (January through December) the annual average percent MSW reduction (by weight) shall be calculated. In calculating the percent MSW reduction, a maximum of 10 percent MSW weight reduction shall be attributed to separation of yard waste. If the annual average percentage reduction requirement contained in the definition of "processed MSW or RDF" in § 60.51a is not achieved, the MSW or RDF is not considered to be processed MSW or RDF.

(iii) An owner or operator who elects to achieve, either wholly or partially, the percent reduction requirement contained in the definition of "processed MSW or RDF" in § 60.51a or the prohibition of vehicle batteries in § 60.56a (e) or the removal of household batteries in § 60.56a (f) through an off-site source reduction or materials separation (recycling) program shall submit a separation plan which contains sufficient information to measure the performance of the off-site separation program on an annual basis beginning the first full calendar year (January

through December) after the initial start-up of the affected facility, except as provided under paragraph (g)(10)(iv) of this section. The off-site separation plan shall be submitted along with the initial compliance demonstration results.

(iv) The owner or operator of an affected facility that commenced construction after December 20, 1989, but on or before (date of publication of final rule), shall meet the requirements of paragraphs (g)(10)(ii) and (g)(10)(iii) of this section beginning the month after start-up or January 1993, whichever is later. For such affected facilities, the initial demonstration of compliance with the percent reduction requirement (annual average) contained in the definition of "processed MSW or RDF" in § 60.51a and the provisions of §§ 60.56a (d), (e), and (f) shall be required at the end of the second full calendar year (January through December) after the date of initial start-up of the affected MWC or at the end of calendar year 1994, whichever is later.

(v) The owner or operator of an affected facility is responsible for operating the affected facility in compliance with all provisions of the standards including the prohibition on combustion of unprocessed MSW and vehicle batteries under §§ 60.56a (d) and (e) and the implementation of a program for removal of household batteries under § 60.56a (f). In cases where another party provides processed MSW, or removes vehicle batteries or removes household batteries, the provider of the service may become a co-operator of the affected facility. If the party providing the off-site processing of MSW, removal of vehicle batteries or removal of household batteries elects to become a co-operator for purposes of demonstrating compliance with the provisions of §§ 60.56a (d), (e) or (f), the owner or operator of the affected facility shall submit, at the time of submittal of the initial compliance demonstration related to the requirements under §§ 60.56a (d), (e) and (f):

(A) A copy of a validly executed contract between the owner and operator of the affected facility and the party providing the processing of MSW, removal of vehicle batteries, or removal of household batteries which contain the following provisions:

(1) An undertaking by the party that is co-operator or sole operator of the affected facility within the meaning of § 111 of the Clean Air Act, 42 U.S.C. 7411, regarding compliance with the requirements under §§ 60.56a (d), (e) or (f); and

(2) An undertaking by the party to meet the requirements under §§ 60.56a

(d), (e) or (f) and a description of the specific actions that will be implemented to comply with these requirements; and

(B) A certified statement signed by an authorized official representing the party that they agree to become a co-operator, or sole operator, for the purpose of demonstrating compliance with the requirements under §§ 60.56a (d), (e) or (f) and recognizing that enforcement actions, including penalties, may be taken against the party for failure to demonstrate compliance with these requirements.

§ 60.59a Reporting and recordkeeping requirements.

(a) The owner or operator of an affected facility shall provide notification of intent to construct and of planned initial start-up date. The MWC unit capacity and MWC plant capacity shall be provided at the time of the notification of construction.

(b) The owner or operator of an affected facility subject to the standards under § 60.52a, § 60.53a, § 60.54a, § 60.55a, or § 60.56a shall maintain records of the following information for each affected facility:

- (1) Calendar date.
- (2) The emission rates and parameters measured.
- (3) Identification of the operating days when the calculated sulfur dioxide and nitrogen oxides emission rates or when the operating parameters exceeded the applicable standards, with reasons for such exceedances as well as a description of corrective actions taken.
- (4) Identification of operating days for which sulfur dioxide or nitrogen oxides emissions or operational data have not been obtained, including reasons for not obtaining sufficient data and a description of corrective actions taken.
- (5) Identification of the times when sulfur dioxide or nitrogen oxides emission or operational data have been excluded from the calculation of average emission rates or parameters and the reasons for excluding data.

(6) The results of daily sulfur dioxide, nitrogen oxides, and carbon monoxide CEMS drift tests and accuracy assessments as required under Appendix F, Procedure 1.

(7) The results of all annual performance tests conducted to determine compliance with the particulate matter, dioxin/furan, hydrogen chloride, and mercury standards.

(8) Except as provided under paragraph (b)(13) of this section, beginning the month after the date of the initial start-up, the amount (by weight)

of MSW or RDF received on a monthly basis at the affected facility, the amount (by weight) of MSW or RDF combusted on a monthly basis, and the amount of recoverable materials (by type and weight) separated on a monthly basis. Separated paper and paperboard are to be stored in a covered area and protected from rain and moisture, so that the moisture content of the paper and paperboard when weighed is similar to their moisture content when received in the MSW or RDF.

(9) Except as provided under paragraph (b)(13) of this section, beginning the month after the date of the initial start-up, the estimated amount (by type and weight) of recoverable materials reduced or separated for recovery on a monthly basis through an off-site or community source reduction or materials separation (recycling) program.

(10) Except as provided under paragraph (b)(13) of this section, beginning at the end of the first full calendar year after the date of initial start-up, the calculations of the annual average percentage reduction in MSW achieved for the previous calendar year.

(11) Except as provided under paragraph (b)(13) of this section, beginning the month after the date of the initial start-up, the amount (by weight) of vehicle batteries on a monthly basis that is separated for recovery.

(12) [Reserved]

(13) The owner or operator of an affected facility that commenced construction after December 20, 1989 but on or before (date of promulgation), shall meet the requirements of paragraphs (b) (8), (9), (10), (11), and (12) of this section beginning the month after

initial start-up or January 1993, whichever is later.

(c) The owner or operator of an affected facility shall submit the initial compliance test data, the performance evaluation of the CEMS using the applicable performance specifications in Appendix B, and the maximum MWC unit load.

(d) A plan describing the procedures for separating materials for recovery to achieve the 25 percent or greater MSW reduction requirement contained in the definition of "processed MSW or RDF" in § 60.51a and describing the procedures for ensuring that vehicle batteries are not combusted in the affected facility and a description of the program for removal of household batteries shall be provided at the time of submittal of the initial demonstration of compliance with the requirements of §§ 60.56a (d), (e), and (f). For affected facilities that commenced construction after December 20, 1989 but on or before (date of promulgation), such information shall be provided by the 30th day following the end of calendar year 1994 or the end of the second full calendar year after initial start-up, whichever is later. For all other affected facilities, such information shall be provided by the 30th day following the end of the second full calendar year after initial start-up.

(e) The owner or operator of an affected facility shall submit quarterly compliance reports for sulfur dioxide, nitrogen oxide (if applicable), carbon monoxide, load level, and temperature to the Administrator containing the information recorded under paragraph (b) of this section for each pollutant or parameter. Such reports shall be

postmarked by the 30th day following the end of each calendar quarter.

(f) The owner or operator of an affected facility shall submit quarterly excess emission reports containing the information recorded under paragraph (b) of this section, as applicable, for opacity. Such excess emission reports shall be postmarked by the 30th day following the end of each calendar quarter.

(g) The owner or operator of an affected facility shall submit annual reports to the Administrator containing the information recorded under paragraph (b) of this section for all pollutants regulated under this subpart, as applicable, to the affected facility. Such reports shall be postmarked by the 30th day following the end of each calendar year.

(h) Records of CEMS, steam flow, and temperature data shall be maintained for at least 2 years after date of recordation and be made available for inspection upon request.

(i) Records showing the names of persons who have completed review of the operating manual, including the date of the initial review and all subsequent annual reviews, shall be maintained for at least 2 years after date of manual review and be made available for inspection upon request.

(j) A description of the procedures employed for ensuring that unprocessed MSW or RDF is not combusted in an affected facility shall be maintained, along with associated records to demonstrate use of such procedures, and made available for inspection upon request.

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Part VII

Office of Management and Budget

Governmentwide Guidance for New
Restrictions on Lobbying; Interim Final
Guidance

OFFICE OF MANAGEMENT AND BUDGET**Governmentwide Guidance for New Restrictions on Lobbying**

AGENCY: Office of Management and Budget

ACTION: Interim Final Guidance

SUMMARY: This interim final guidance is called for by Section 319 of Public Law 101-121. Section 319 generally prohibits recipients of Federal contracts, grants, and loans from using appropriated funds for lobbying the Executive or Legislative Branches of the Federal Government in connection with a specific contract, grant, or loan. Section 319 also requires that each person who requests or receives a Federal contract, grant, cooperative agreement, loan, or a Federal commitment to insure or guarantee a loan, must disclose lobbying.

DATE: This guidance is effective December 23, 1989. Comments on OMB's interim final guidance must be in writing and must be received by [60 days from publication]. Late-filed comments will be considered to the extent practicable.

ADDRESS: Office of Management and Budget, 10300 New Executive Office Building, Washington, DC 20503.

FOR FURTHER INFORMATION CONTACT: For contracts, contact Richard C. Loeb, Office of Federal Procurement Policy, OMB (telephone: 202-395-3300). For grants and loans, contact Barbara F. Kahlow, Financial Management Division, OMB (telephone: 202-395-3053).

SUPPLEMENTARY INFORMATION:**A. Background.**

On October 23, 1989, the President signed into law the Department of the Interior and Related Agencies Appropriations Act for Fiscal Year 1990 ("the Act"). Section 319 of the Act amends title 31, United States Code, by adding a new Section 1352, entitled "Limitation on use of appropriated funds to influence certain Federal contracting and financial transactions." Section 1352 takes effect with respect to Federal contracts, grants, loans, cooperative agreements, loan insurance commitments, and loan guarantee commitments that are entered into or made more than 60 days after the date of the enactment of the Act, i.e., December 23, 1989.

Section 1352 requires the Director of the Office of Management and Budget to issue governmentwide guidance for agency implementation of, and compliance with, the requirements of this section. The Conference Report indicates that the conferees "expect that all agencies shall expeditiously promulgate regulations to implement the requirements of this section, and

that all such regulations shall be uniform and shall comply with the government-wide guidance issued by the Director of the Office of Management and Budget pursuant to paragraph (b)(7). Also, major agencies, as designated by OMB, shall issue a common rule complying with the guidance issued by OMB."

B. Interim Final Guidance.

OMB's interim final guidance is prepared in regulation format to facilitate its use by the executive departments and agencies in preparing the common rule called for in the Conference Report. There will be two common rules issued by the executive departments and agencies as interim final rules within 90 days of this interim final guidance: a common rule to appear in the Federal Acquisition Regulation (FAR) for most contracts; and a common rule for contracts not subject to the FAR, grants, loans, cooperative agreements, loan insurance commitments, and loan guarantee commitments ("nonprocurement"). The FAR common rule will contain the same substance as the OMB guidance, without elaboration, but will be reformatted, with additional instructions. The nonprocurement common rule will be verbatim to the OMB guidance. All three documents (OMB's interim final guidance and the two interim final common rules) will share a public docket. The final versions of all three will be published simultaneously.

The FAR common rule will be co-signed by the three agencies (the Department of Defense, the General Services Administration, and the National Aeronautics and Space Administration) authorized to issue the FAR rulemaking, effective for all executive departments and agencies. The nonprocurement common rule will be signed by the following 29 major agencies: Departments of Agriculture, Commerce, Defense, Education, Energy, Health and Human Services, Housing and Urban Development, Interior, Justice, Labor, State, Transportation, Treasury, Veterans Affairs; ACTION, Agency for International Development, Environmental Protection Agency, Export-Import Bank of the United States, Federal Emergency Management Agency, General Services Administration, National Aeronautics and Space Administration, National Endowment for the Arts, National Endowment for the Humanities, National Science Foundation, Overseas Private Investment Corporation, Peace Corps, Small Business Administration, Tennessee Valley Authority and United States Information Agency.

The following Circulars of the Office of Management and Budget (OMB) will be revised to indicate a cross reference to the requirements in the OMB guidance: OMB Circular A-21, "Cost Principles for Educational Institutions;" OMB Circular A-87, "Cost Principles for State and Local Governments;" and, OMB Circular A-122, "Cost Principles for Nonprofit Organizations." Costs made specifically unallowable by the requirements in the guidance are not made allowable under any of the provisions of

these Circulars. Conversely, costs that are specifically unallowable under the provisions of these Circulars are not made allowable under the requirements in the guidance.

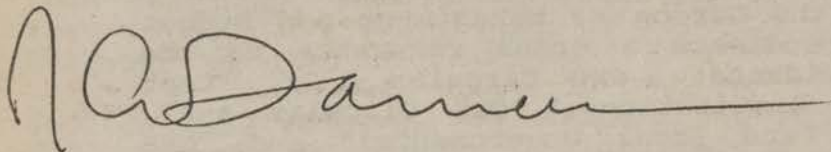
Costs made specifically unallowable by the requirements in the OMB guidance will not be made allowable under any of the provisions of the FAR. Conversely, costs that are specifically unallowable under the provisions of the FAR are not made allowable under the requirements in the OMB guidance.

The guidance calls for an annual report to be prepared by each Inspector General and to be submitted to Congress. Copies of these reports should be forwarded to the Financial Management Division of OMB as well.

The guidance also calls for semi-annual compilations of disclosure reports to be prepared by each agency and to be submitted to Congress. Agencies shall submit a "negative" report if no disclosure reports were received.

C. Paperwork Reduction Act.

This interim final guidance contains information collection requirements. Accordingly, a Paperwork Reduction Act emergency approval was requested pursuant to 44 U.S.C. 3507(g) and 5 C.F.R. 1320.18 and was granted under OMB control number 0348-0046. OMB estimates the reporting burden for this information collection to average 30 minutes per response. The time necessary for filing the first disclosure may differ from that for the subsequent disclosures. However, in the absence of experience with such reporting, OMB does not have sufficient data to determine the universe of total covered Federal actions or the volume of activity that will be affected by this guidance. Therefore, an estimate of the total burden of this information collection requirement is not provided at this time. Public comment is requested to assist in accurately estimating the burden of this information collection, including: (1) estimates of the amount of time required to comply with this reporting requirement, (2) estimates of the number of expected disclosure reports, and (3) the basis for these estimates. OMB is also interested in comments on the feasibility of electronic or other methods for filing the information on the disclosure standard form to the Federal Government.



Richard G. Darman
Director.

PART ____ - NEW RESTRICTIONS ON LOBBYING**Subpart A - General****Sec.**

- ____.100 Conditions on use of funds.
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Appendix A to Part ____ - Certification Regarding Lobbying**Appendix B to Part ____ - Disclosure Form to Report Lobbying****Appendix C to Part ____ - Contract Clause**

Authority: Section 319, Public Law 101-121 (31 U.S.C. 1352);
[citation to Agency rulemaking authority].

Subpart A - General

- (____.100 Conditions on use of funds.

(a) No appropriated funds may be expended by the recipient of a Federal contract, grant, loan, or cooperative agreement to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal,

amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(b) Each person who requests or receives from an agency a Federal contract, grant, loan, or cooperative agreement shall file with that agency a certification, set forth in Appendix A, that the person has not made, and will not make, any payment prohibited by paragraph (a) of this section.

(c) Each person who requests or receives from an agency a Federal contract, grant, loan, or a cooperative agreement shall file with that agency a disclosure form, set forth in Appendix B, if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under paragraph (a) of this section if paid for with appropriated funds.

(d) Each person who requests or receives from an agency a commitment providing for the United States to insure or guarantee a loan shall file with that agency a statement, set forth in Appendix A, whether that person has made or has agreed to make any payment to influence or attempt to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with that loan insurance or guarantee.

(e) Each person who requests or receives from an agency a commitment providing for the United States to insure or guarantee a loan shall file with that agency a disclosure form, set forth in Appendix B, if that person has made or has agreed to make any payment to influence or attempt to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with that loan insurance or guarantee.

(_____.105 Definitions.

For purposes of this part:

(a) Agency, as defined in 5 U.S.C. 552(f), includes Federal executive departments and agencies as well as independent regulatory commissions and Government corporations, as defined in 31 U.S.C. 9101(1).

(b) Covered Federal action means any of the following Federal actions:

- (1) The awarding of any Federal contract;
- (2) The making of any Federal grant;
- (3) The making of any Federal loan;
- (4) The entering into of any cooperative agreement; and,
- (5) The extension, continuation, renewal, amendment, or

modification of any Federal contract, grant, loan, or cooperative agreement.

Covered Federal action does not include receiving from an agency a commitment providing for the United States to insure or guarantee a loan. Loan guarantees and loan insurance are addressed independently within this part.

(c) Federal contract means an acquisition contract awarded by an agency, including those subject to the Federal Acquisition Regulation (FAR), and any other acquisition contract for real or personal property or services not subject to the FAR.

(d) Federal cooperative agreement means a cooperative agreement entered into by an agency.

(e) Federal grant means an award of financial assistance in the form of money, or property in lieu of money, by the Federal Government or a direct appropriation made by law to any person. The term does not include technical assistance which provides services instead of money, or other assistance in the form of revenue sharing, loans, loan guarantees, loan insurance, interest subsidies, insurance, or direct United States cash assistance to an individual.

(f) Federal loan means a loan made by an agency. The term does not include loan guarantee or loan insurance.

(g) Indian tribe and tribal organization have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B). Alaskan Natives are included under the definitions of Indian tribes in that Act.

(h) Influencing or attempting to influence means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

(i) Loan guarantee and loan insurance mean an agency's guarantee or insurance of a loan made by a person.

(j) Local government means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

(k) Officer or employee of an agency includes the following individuals who are employed by an agency:

(1) An individual who is appointed to a position in the Government under title 5, U.S. Code, including a position

under a temporary appointment;

(2) A member of the uniformed services as defined in section 101(3), title 37, U.S. Code;

(3) A special Government employee as defined in section 202, title 18, U.S. Code; and,

(4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, U.S. Code appendix 2.

(1) Person means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

(m) Reasonable compensation means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

(n) Reasonable payment means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

(o) Recipient includes all contractors, subcontractors at any tier, and subgrantees at any tier of the recipient of funds received in connection with a Federal contract, grant, loan, or cooperative agreement. The term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

(p) Regularly employed means, with respect to an officer or employee of a person requesting or receiving a Federal contract, grant, loan, or cooperative agreement or a commitment providing for the United States to insure or guarantee a loan, an officer or employee who is employed by such person for at least 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract, grant, loan, cooperative agreement, loan insurance commitment, or loan guarantee commitment. An officer or employee who is employed by such person for less than 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

(q) State means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or

possession of the United States, an agency or instrumentality of a State, and a multi-State, regional, or interstate entity having governmental duties and powers.

(____).110 Certification and Disclosure.

(a) Each person shall file a certification, and a disclosure form, if required, with each submission that initiates agency consideration of such person for:

- (1) Award of a Federal contract, grant, or cooperative agreement exceeding \$100,000; or
- (2) An award of a Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding \$150,000.

(b) Each person shall file a certification, and a disclosure form, if required, upon receipt by such person of:

- (1) A Federal contract, grant, or cooperative agreement exceeding \$100,000; or
- (2) A Federal loan or a commitment providing for the United States to insure or guarantee a loan exceeding \$150,000, unless such person previously filed a certification, and a disclosure form, if required, under paragraph (a) of this section.

(c) Each person shall file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under paragraphs (a) or (b) of this section. An event that materially affects the accuracy of the information reported includes:

- (1) A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or
- (2) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or,
- (3) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(d) Any person who requests or receives from a person referred to in paragraphs (a) or (b) of this section:

- (1) A subcontract exceeding \$100,000 at any tier under a Federal contract;
- (2) A subgrant, contract, or subcontract exceeding \$100,000 at any tier under a Federal grant;
- (3) A contract or subcontract exceeding \$100,000 at any tier under a Federal loan exceeding \$150,000; or,
- (4) A contract or subcontract exceeding \$100,000 at any tier under a Federal cooperative agreement,

shall file a certification, and a disclosure form, if required, to the next tier above.

(e) All disclosure forms, but not certifications, shall be forwarded from tier to tier until received by the person referred to in paragraphs (a) or (b) of this section. That person shall forward all disclosure forms to the agency.

(f) Any certification or disclosure form filed under paragraph (e) shall be treated as a material representation of fact upon which all receiving tiers shall rely. All liability arising from an erroneous representation shall be borne solely by the tier filing that representation and shall not be shared by any tier to which the erroneous representation is forwarded. Submitting an erroneous certification or disclosure constitutes a failure to file the required certification or disclosure, respectively. If a person fails to file a required certification or disclosure, the United States may pursue all available remedies, including those authorized by section 1352, title 31, U.S. Code.

(g) For awards and commitments in process prior to December 23, 1989, but not made before that date, certifications shall be required at award or commitment, covering activities occurring between December 23, 1989, and the date of award or commitment. However, for awards and commitments in process prior to the December 23, 1989 effective date of these provisions, but not made before December 23, 1989, disclosure forms shall not be required at time of award or commitment but shall be filed within 30 days.

(h) No reporting is required for an activity paid for with appropriated funds if that activity is allowable under either Subpart B or C.

Subpart B - Activities by Own Employees

{ __.200 Agency and legislative liaison.

(a) The prohibition on the use of appropriated funds, in { __.100 (a), does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a Federal contract, grant, loan, or cooperative agreement if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.

(b) For purposes of paragraph (a) of this section, providing any information specifically requested by an agency or Congress is allowable at any time.

(c) For purposes of paragraph (a) of this section, the following agency and legislative liaison activities are allowable at any

time only where they are not related to a specific solicitation for any covered Federal action:

- (1) Discussing with an agency (including individual demonstrations) the qualities and characteristics of the person's products or services, conditions or terms of sale, and service capabilities; and,
- (2) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(d) For purposes of paragraph (a) of this section, the following agency and legislative liaison activities are allowable only where they are prior to formal solicitation of any covered Federal action:

- (1) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;
- (2) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and,
- (3) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Public Law 95-507 and other subsequent amendments.

(e) Only those activities expressly authorized by this section are allowable under this section.

(__.205 Professional and technical services.

(a) The prohibition on the use of appropriated funds, in (__.100 (a), does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a Federal contract, grant, loan, or cooperative agreement or an extension, continuation, renewal, amendment, or modification of a Federal contract, grant, loan, or cooperative agreement if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal contract, grant, loan, or cooperative agreement or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal contract, grant, loan, or cooperative agreement.

(b) For purposes of paragraph (a) of this section, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a

licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(c) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation, or reasonably expected to be required by law or regulation, and any other requirements in the actual award documents.

(d) Only those services expressly authorized by this section are allowable under this section.

(___).210 Reporting.

No reporting is required with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

Subpart C - Activities by Other than Own Employees

(___).300 Professional and technical services.

(a) The prohibition on the use of appropriated funds, in (___).100 (a), does not apply in the case of any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action, if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal contract, grant, loan, or cooperative agreement or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal contract, grant, loan, or cooperative agreement.

(b) The reporting requirements in (___).110 (a) and (b) regarding filing a disclosure form by each person, if required, shall not apply with respect to professional or technical services rendered

directly in the preparation, submission, or negotiation of any commitment providing for the United States to insure or guarantee a loan.

(c) For purposes of paragraph (a) of this section, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(d) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation, or reasonably expected to be required by law or regulation, and any other requirements in the actual award documents.

(e) Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(f) Only those services expressly authorized by this section are allowable under this section.

Subpart D - Penalties and Enforcement

(___).400 Penalties.

(a) Any person who makes an expenditure prohibited herein shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such expenditure.

(b) Any person who fails to file or amend the disclosure form (see Appendix B) to be filed or amended if required herein, shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

(c) A filing or amended filing on or after the date on which an administrative action for the imposition of a civil penalty is commenced does not prevent the imposition of such civil penalty for a failure occurring before that date. An administrative action is commenced with respect to a failure when an investigating official determines in writing to commence an investigation of an allegation of such failure.

(d) In determining whether to impose a civil penalty, and the amount of any such penalty, by reason of a violation by any person, the agency shall consider the nature, circumstances, extent, and gravity of the violation, the effect on the ability of such person to continue in business, any prior violations by such person, the degree of culpability of such person, the ability of the person to pay the penalty, and such other matters as may be appropriate.

(e) First offenders under paragraphs (a) or (b) of this section shall be subject to a civil penalty of \$10,000, absent aggravating circumstances. Second and subsequent offenses by persons shall be subject to an appropriate civil penalty between \$10,000 and \$100,000, as determined by the agency head or his or her designee.

(f) An imposition of a civil penalty under this section does not prevent the United States from seeking any other remedy that may apply to the same conduct that is the basis for the imposition of such civil penalty.

{ ____ .405 Penalty procedures.

Agencies shall impose and collect civil penalties pursuant to the provisions of the Program Fraud and Civil Remedies Act, 31 U.S.C. sections 3803 (except subsection (c)), 3804, 3805, 3806, 3807, 3808, and 3812, insofar as these provisions are not inconsistent with the requirements herein.

{ ____ .410 Enforcement.

The head of each agency shall take such actions as are necessary to ensure that the provisions herein are vigorously implemented and enforced in that agency.

Subpart E - Exemptions

(____.500 Secretary of Defense.

(a) The Secretary of Defense may exempt, on a case-by-case basis, a covered Federal action from the prohibition whenever the Secretary determines, in writing, that such an exemption is in the national interest. The Secretary shall transmit a copy of each such written exemption to Congress immediately after making such a determination.

(b) The Department of Defense may issue supplemental regulations to implement paragraph (a) of this section.

Subpart F - Agency Reports

(____.600 Semi-annual compilation.

(a) The head of each agency shall collect and compile the disclosure reports (see Appendix B) and, on May 31 and November 30 of each year, submit to the Secretary of the Senate and the Clerk of the House of Representatives a report containing a compilation of the information contained in the disclosure reports received during the six-month period ending on March 31 or September 30, respectively, of that year.

(b) The report, including the compilation, shall be available for public inspection 30 days after receipt of the report by the Secretary and the Clerk.

(c) Information that involves intelligence matters shall be reported only to the Select Committee on Intelligence of the Senate, the Permanent Select Committee on Intelligence of the House of Representatives, and the Committees on Appropriations of the Senate and the House of Representatives in accordance with procedures agreed to by such committees. Such information shall not be available for public inspection.

(d) Information that is classified under Executive Order 12356 or any successor order shall be reported only to the Committee on Foreign Relations of the Senate and the Committee on Foreign Affairs of the House of Representatives or the Committees on Armed Services of the Senate and the House of Representatives (whichever such committees have jurisdiction of matters involving such information) and to the Committees on Appropriations of the Senate and the House of Representatives in accordance with procedures agreed to by such committees. Such information shall not be available for public inspection.

(e) The first semi-annual compilation shall be submitted on May 31, 1990, and shall contain a compilation of the disclosure reports received from December 23, 1989 to March 31, 1990.

(f) Major agencies, designated by the Office of Management and Budget (OMB), are required to provide machine-readable compilations to the Secretary of the Senate and the Clerk of the House of Representatives no later than with the compilations due on May 31, 1991. OMB shall provide detailed specifications in a memorandum to these agencies.

(g) Non-major agencies are requested to provide machine-readable compilations to the Secretary of the Senate and the Clerk of the House of Representatives.

(h) Agencies shall keep the originals of all disclosure reports in the official files of the agency.

{___.605 Inspector General report.

(a) The Inspector General, or other official as specified in paragraph (b) of this section, of each agency shall prepare and submit to Congress each year, commencing with submission of the President's Budget in 1991, an evaluation of the compliance of that agency with, and the effectiveness of, the requirements herein. The evaluation may include any recommended changes that may be necessary to strengthen or improve the requirements.

(b) In the case of an agency that does not have an Inspector General, the agency official comparable to an Inspector General shall prepare and submit the annual report, or, if there is no such comparable official, the head of the agency shall prepare and submit the annual report.

(c) The annual report shall be submitted at the same time the agency submits its annual budget justifications to Congress.

(d) The annual report shall include the following: All alleged violations relating to the agency's covered Federal actions during the year covered by the report, the actions taken by the head of the agency in the year covered by the report with respect to those alleged violations and alleged violations in previous years, and the amounts of civil penalties imposed by the agency in the year covered by the report.

Appendix A to Part ____ - Certification Regarding Lobbying

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Statement for Loan Guarantees and Loan Insurance

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Appendix B to Part ____ - Disclosure Form to Report Lobbying.

[See attached.]

DISCLOSURE OF LOBBYING ACTIVITIESApproved by OMB
0348-0046Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352
(See reverse for public burden disclosure.)

1. Type of Federal Action: ☐ a. contract ☐ b. grant ☐ c. cooperative agreement ☐ d. loan ☐ e. loan guarantee ☐ f. loan insurance	2. Status of Federal Action: ☐ a. bid/offer/application ☐ b. initial award ☐ c. post-award	3. Report Type: ☐ a. initial filing ☐ b. material change For Material Change Only: year _____ quarter _____ date of last report _____
4. Name and Address of Reporting Entity: ☐ Prime ☐ Subawardee Tier _____, if known: Congressional District, if known: _____		5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime: Congressional District, if known: _____
6. Federal Department/Agency:		7. Federal Program Name/Description: CFDA Number, if applicable: _____
8. Federal Action Number, if known:		9. Award Amount, if known: \$ _____
10. a. Name and Address of Lobbying Entity (if individual, last name, first name, MI): _____		b. Individuals Performing Services (including address if different from No. 10a) (last name, first name, MI): _____
(attach Continuation Sheet(s) SF-LLL-A, if necessary)		
11. Amount of Payment (check all that apply): \$ _____ ☐ actual ☐ planned		13. Type of Payment (check all that apply): ☐ a. retainer ☐ b. one-time fee ☐ c. commission ☐ d. contingent fee ☐ e. deferred ☐ f. other; specify: _____
12. Form of Payment (check all that apply): ☐ a. cash ☐ b. in-kind; specify: nature _____ value _____		
14. Brief Description of Services Performed or to be Performed and Date(s) of Service, including officer(s), employee(s), or Member(s) contacted, for Payment Indicated in Item 11: _____ _____ _____		
(attach Continuation Sheet(s) SF-LLL-A, if necessary)		
15. Continuation Sheet(s) SF-LLL-A attached: ☐ Yes ☐ No		
16. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.		Signature: _____ Print Name: _____ Title: _____ Telephone No.: _____ Date: _____
Federal Use Only:		Authorized for Local Reproduction Standard Form - LLL

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C. section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLL-A Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a followup report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in item 4 checks "Subawardee", then enter the full name, address, city, state and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number; the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, state and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.
(b) Enter the full names of the individual(s) performing services, and include full address if different from 10 (a). Enter Last Name, First Name, and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.
14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee(s), or Member(s) of Congress that were contacted.
15. Check whether or not a SF-LLL-A Continuation Sheet(s) is attached.
16. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503.

**DISCLOSURE OF LOBBYING ACTIVITIES
CONTINUATION SHEET**Approved by OMB
0348-0046

Reporting Entity: _____

Page _____ of _____

Appendix C to Part ____ - Contract Clause**NEW RESTRICTIONS ON LOBBYING**

(a) Definitions. As used in this clause,

"Agency", as defined in 5 U.S.C. 552(f), includes Federal executive departments and agencies as well as independent regulatory commissions and Government corporations, as defined in 31 U.S.C. 9101(1).

"Covered Federal action" means any of the following Federal actions:

- (1) The awarding of any Federal contract;
- (2) The making of any Federal grant;
- (3) The making of any Federal loan;
- (4) The entering into of any cooperative agreement; and,
- (5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

Covered Federal action does not include receiving from an agency a commitment providing for the United States to insure or guarantee a loan.

"Indian tribe" and "tribal organization" have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B). Alaskan Natives are included under the definitions of Indian tribes in that Act.

"Influencing or attempting to influence" means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government" means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency" includes the following individuals who are employed by an agency:

- (1) An individual who is appointed to a position in the Government under title 5, U.S. Code, including a position under a temporary appointment;
- (2) A member of the uniformed services as defined in section 101(3), title 37, U.S. Code;
- (3) A special Government employee as defined in section 202, title 18, U.S. Code; and,

(4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, U.S. Code appendix 2.

"Person" means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation" means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

"Reasonable payment" means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient" includes all contractors and subcontractors at any tier in connection with a Federal contract. The term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed" means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State" means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and a multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibition.

(1) Section 1352 of title 31, U.S. Code provides in part that no appropriated funds may be expended by the recipient of a Federal contract, grant, loan, or cooperative agreement to pay

any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) The prohibition does not apply as follows:

(i) Agency and legislative liaison by Own Employees.

(A) The prohibition on the use of appropriated funds, in paragraph (b)(1) of this section, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a Federal contract if the payment is for agency and legislative liaison activities not directly related to a covered Federal action.

(b)(2)(i)

(B) For purposes of paragraph (A) of this section, providing any information specifically requested by an agency or Congress is allowable at any time.

(b)(2)(i)

(C) For purposes of paragraph (A) of this section, the following agency and legislative liaison activities are allowable at any time only where they are not related to a specific solicitation for any covered Federal action:

1 (i) Discussing with an agency (including individual demonstrations) the qualities and characteristics of the person's products or services, conditions or terms of sale, and service capabilities; and,

2 (ii) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.

(b)(2)(i)

(D) For purposes of paragraph (A) of this section, the following agency and legislative liaison activities are allowable only where they are prior to formal solicitation of any covered Federal action:

1 (i) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;

2 (ii) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and,

3 (iii) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Public Law 95-507 and other subsequent amendments.

(b)(2) (E) Only those activities expressly authorized by paragraph (i) of this section are allowable under paragraph (i). (b)(2)

(ii) Professional and technical services by Own Employees.

(A) The prohibition on the use of appropriated funds, in paragraph (1) of this section, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a Federal contract or an extension, continuation, renewal, amendment, or modification of a Federal contract if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal contract or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal contract.

(b)(2)(ii)

(B) For purposes of paragraph (A) of this section, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation, or reasonably expected to be required by law or regulation, and any other requirements in the actual award documents.

(b)(2) (D) Only those services expressly authorized by paragraph (ii) of this section are allowable under paragraph (b)(2) (ii).

(iii) Reporting for Own Employees.

No reporting is required with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

(iv) Professional and technical services by Other than Own Employees.

(A) The prohibition on the use of appropriated funds, in paragraph (b)(1) of this section, does not apply in the case of any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action, if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal contract or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal contract. (b)(2)(iv)

(B) For purposes of paragraph (A) of this section, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

(C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation, or reasonably expected to be required by law or regulation, and any other requirements in the actual award documents.

(D) Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.

(b)(2) (E) Only those services expressly authorized by paragraph (iv) of this section are allowable under paragraph (b)(2) (iv).

(c) Disclosure.

(1) Each person who requests or receives from an agency a Federal contract shall file with that agency a certification, set forth in _____, that the person has not made, and will not make, any payment prohibited by paragraph (b) of this clause.

(2) Each person who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, Standard Form-LLL, "Disclosure of Lobbying Activities," if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under paragraph (b) of this clause if paid for with appropriated funds.

(3) Each person shall file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under paragraph (c)(2) of this section. An event that materially affects the accuracy of the information reported includes:

(i) A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or

(ii) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or,

(iii) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(4) Any person who requests or receives from a person referred to in paragraph (c)(1) of this section a subcontract exceeding \$100,000 at any tier under a Federal contract shall file a certification, and a disclosure form, if required, to the next tier above.

(5) All disclosure forms, but not certifications, shall be forwarded from tier to tier until received by the person referred to in paragraph (1) of this section. That person shall forward all disclosure forms to the agency.

(d) Agreement. In accepting any contract resulting from this solicitation, the person submitting the offer agrees not to make any payment prohibited by this clause.

(e) Penalties.

(1) Any person who makes an expenditure prohibited under paragraph (b) of this clause shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such expenditure.

(2) Any person who fails to file or amend the disclosure form to be filed or amended if required by this clause, shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

(3) Contractors may rely without liability on the representations made by their subcontractors in the certification and disclosure form.

(f) Cost allowability. Nothing in this clause is to be interpreted to make allowable or reasonable any costs which would be unallowable or unreasonable in accordance with Part 31 of the Federal Acquisition Regulation. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any of the provisions of Part 31 of the Federal Acquisition Regulation.

(End of Clause)

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